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TEACHERS' CLASSROOM DECISION-MAKING: ITS RELATIONSHIP TO TEACHERS' PERCEPTIONS OF PUPILS AND TO CLASSROOM INTERACTION

Thesis submitted for the degree of PhD

by

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CHAPTER 1 - INTRODUCTION

The traumas of the beginning teacher during the first experiences of classroom teaching are well documented (Evans, 1976; Hannam et al, 1976; Hanson and Herrington, 1976). Faced with the problems of making sense out of a new environment, of learning to translate her own ideas into practice, of coping with the potentially conflicting expectations held for her by pupils, staff, headteachers, herself and others, the beginning teacher is in a situation of stress. Amidst all this, the classroom may present a constant stream of behaviour within which incidents appear and disappear with alarming rapidity, and since she is held responsible for classroom events, the beginning teacher, in order to survive, must learn to select from, and interpret, the infinite number of cues available to her, must identify particular situations where her intervention is necessary and plan particular courses of action. In short, the teacher must make decisions.

However, the decisions made by teachers in classrooms differ from those familiar to psychologists studying problem-solving behaviour in the laboratory (e.g. Kleinmuntz, 1968; Wason and Johnson-Laird, 1972), and from those taken by participants in the many business, economic or political games and simulations (see Zuckerman and Horn, 1970): the beginning teacher has first of all to identify the decision situations and the decisions have to be made spontaneously without time for the evaluation of alternative courses of action or of different aims. In fact, this type of decision-making has been referred to as "instantaneous decision-making" (Bishop and Whitfield, 1972), although the term "decision-making" may even itself be inappropriate for describing what teachers do. Nevertheless, it would seem, for the beginning teacher at least, that identifying decision points and making such instantaneous decisions is an important part of learning to cope in the classroom, and to adapt to a demanding environment. This view has recently been acknowledged by a number of researchers (Farr and Brown, 1971; Bishop and Whitfield, 1972; Shavelson, 1973) and several training packages in classroom decision-making skills have emerged over the past few years to fulfil the perceived need (Twelker, 1967; Hill and Martin, 1971; Marsh, 1979), but paradoxically, little attention has been directed to empirical research on teachers' classroom decision-making and virtually nothing is known about how teachers make, or learn to make, these decisions.

This dearth of research could be explained by a number of factors. Firstly, researchers concerned with classroom processes have frequently conceptualised teaching as a cognitively uncomplex activity, and one which is intuitive rather than rational. Jackson (1968), for example, suggests that "...the teacher does not appear to be very analytic or deliberative in his moment to moment dealings with students..." (p. 151), but acknowledges that in "preactive teaching" (the time when the teacher is not in contact with the children, as opposed to "interactive teaching") the teacher "...often seems to be engaged in a type of intellectual activity that has many of the formal properties of a problem-solving procedure." (ibid.) In fact, the classroom phenomena which have attracted researchers' attention have tended to concern behaviours rather than cognitions, and observational studies of teaching behaviour have perhaps unwittingly confirmed the conception of teaching as a 'simple-minded' activity by indicating the large proportion of routine, managerial activities in which teachers are engaged (e.g. Hilsum and Cane, 1971; Duthie, 1970; Boydell, 1974).

Secondly, whereas the study of classroom behaviour has a set of established research methods, the study of teachers' cognitions has not. Willems (1969), in evaluating procedures for naturalistic research, discusses "The Law of the Hammer", which, stated briefly, suggests that tools are often allowed to define the problems to be tackled. The absence of tried and tested methods, and the inevitably uncertain reliability of such methods, must undoubtedly hamper the development of decision-making research.

Thirdly, the study of teachers' cognitions in relation to classroom behaviour gives rise to conceptual problems due to the merging of such previously separate research areas as human problem-solving, information processing, person perception, interpersonal interaction, and classroom interaction analysis, each with some relevance to the subject under study, and each with its own accepted models and methodologies, none of which alone are adequate for the conceptualisation and investigation of teachers' classroom decision-making.

In spite of these difficulties, the importance of considering teachers' cognitions in attempting to answer questions in such areas as classroom processes, curricular innovation, teacher training and teacher effectiveness has been noted by several researchers (e.g. Smith and Geoffrey, 1968; Shavelson, 1973; Winne and Marx, 1977; Eggleston, 1977). Hirst (1971) in fact suggests that cognitions form a fundamental part of the very definition of teaching: "What a particular activity is, what a person is doing, depends crucially on how he himself sees the activity." (p. 8) Wilson (1972) similarly suggests that behaviour, in an educational context, should not be studied in isolation, for this behaviour only has meaning as far as it has purpose or intention. If this basic premise is accepted, any meaningful conception of classroom processes must take cognitions into account.

Only relatively recently, however, have attempts been made to access and analyse teachers' classroom decision-making, and research in the area is in such embryonic stages that even definitions of classroom decision-making are rare occurrences, and terms such as "problem solving", "decision-making", "mental activity", "thought processes" and "cognitions" appear to have a great deal of conceptual overlap and are sometimes used interchangeably.

Several questions of both theoretical and practical value clearly require, for the achievement of adequate solutions, the investigation of teachers' decision-making. The initial concerns of this project were to consider how teachers learn to make decisions, how they learn to discriminate amongst classroom events, and how they learn to respond spontaneously to many diverse classroom situations in different ways.

The arrangement of chapters in the thesis is intended to reflect something of the order in which the study was conceived and carried out. The rationale for this order is to some extent obvious, mostly following the traditional pattern of reviewing literature, formulating hypotheses, examining methodology, piloting and subsequently carrying out a main study. However, an early awareness in the project that some questions concerning teachers' decision-making may not be answerable, and that issues concerning teacher decision-making could be studied from different theoretical standpoints, led to the examination of models and methodology before the formulation of specific hypotheses. This was for the purely practical reasons of avoiding the adoption of inappropriate theory and ensuring that the questions posed were at least potentially answerable. This procedure in turn led to a continuous process of interaction between theoretical, methodological and empirical considerations throughout the initial stages of the project. The following paragraph provides the rationale, and a map, of the thesis.

Chapter 2 presents a review of the small amount of literature relating to teachers' classroom decision-making, indicating the different theoretical stances of researchers in this area and their different methodologies; it also describes attempts to develop practical training packages in classroom decision-making skills which have far exceeded in number the attempts to carry out relevant empirical research. Chapter 3 considers the relationship between models, or conceptual frameworks, and methodologies; it considers the functions of models in educational research and proposes a loose structure to define the area of study in terms of teachers' and pupils' cognitions and behaviour; the chapter continues with an examination of the potentially useful methods of enquiry that have emerged from decision-making research. Chapter 4 reviews the literature relating to the investigation of relationships amongst teachers' and pupils' cognitions and behaviour, other than decision-making research, thus providing a context within which to develop clearer notions of the classroom decision-making process; and chapter 5 reports the issues investigated and the methods adopted in a series of pilot studies, together with their results. These pilot studies aided the formulation of a model of teachers' classroom decision-making which is reported in chapter 6, and from this several hypotheses are developed and a main study devised, the design of which is detailed in chapter 7. Chapters 8 to 11 report the results of the main study; to facilitate their interpretation, each chapter deals with one particular area of the study and is preceded by a section outlining the hypotheses with which it is concerned, the type of data collected, how and when it was collected, and the analysis procedures adopted, with reliability statistics where appropriate; due to the large amount of data analysis, the results are reviewed at the end of each chapter. Chapter 12 presents a discussion and overview of the results, and the thesis is concluded with a summary, appropriate appendices, and a list of references.

The research undertaken and reported in this thesis began in September 1975, the data collection for the main study was carried out during the school session 1976/77 and the project completed in 1979.

CHAPTER 2 - REVIEW OF RESEARCH ON TEACHERS' CLASSROOM DECISION - MAKING

The systematic study of human decision-making can be traced at least as far back as Wilhelm Wundt's school of introspection in the late 19th Century, where reports of cognitive experience in laboratory experiments led Wundt to the infertile conclusion that higher mental processes, such as decision-making, were so complex as to be beyond the scope of human investigation (see Miller, 1962, pp. 25-39). The recent development of more sophisticated theory and methods, however, has greatly stimulated research. Von Newmann and Morgenstern's (1944) game theory gave considerable impetus to research, especially in the field of economics. Wald's (1950) statistical decision theory and the resurgence of interest in Baysian statistics created mathematical models of decision-making, increasing the scope for its quantification. It is only with recent rapid advances and inventions in the field of communications, however, that interest has developed in human information processing and computer simulated thought processes (Newell, Shaw and Simon, 1958; Feigenbaum and Feldman, 1963); this, in turn, has provided greater conceptual apparatus for the study of human decision-making, and, within the field of psychology, has generated a considerable amount of research in the whole area of cognitive processes.

In the field of education, however, the consideration of decision-making as a significant part of classroom teaching has only just come to be acknowledged. Those interested in classroom decision-making have followed a number of different routes of enquiry, often borrowing from other areas of decision-making research but finding their concepts and methods inadequate. As Whitfield (1977) comments, "The literature, on both mathematical models of decision-making with its emphasis on axiomatic rule-based processes, and managerial decision-making with its emphasis on reflective action designed to maximise profit and efficiency objectives in productive industry, is generally unhelpful in efforts aimed at characterising the determinants of action in interactive social situations in which a multiplicity of possibly conflicting goals are present" (p. 86).

The small amount of literature which has been published in the area of teachers' classroom decision-making can be classified into five main categories. The first is concerned with asserting the importance and relevance of teacher decision-making to other areas of education, particularly to the understanding of classroom interaction; it generally draws attention to the scarcity of empirical research in the field, and occasionally attempts to define, or distinguish, different types of decisions. The second concentrates on the development of theory and models appropriate for explaining classroom decision-making; and the third on what may be appropriate methodology for the investigation of decision-making. The fourth category is concerned with reports of relevant empirical research; and the fifth with the development of training material designed to "improve" teacher decision-making. These categories are by no means mutually exclusive, but provide a useful framework within which to review the available literature. It is interesting to note that little of the literature concerns empirical research, and, as pointed out by Sutcliffe (1977), it is even rare to find an attempt to define, in any precise way, the actual meaning of classroom decision-making.

1) <u>The Definition of Teacher Classroom Decision-Making and its Relevance to other Areas of Education</u>.

Shavelson (1973) suggests that "What distinguishes the exceptional teacher from his or her colleagues is not the ability to ask, say, a high order question, but the ability to decide <u>when to ask</u> such a question" (p. 144). Shavelson defines decision-making as a skill, asserting, rather dogmatically, that it is <u>the</u> basic teaching skill, while other skills such as questioning and explaining represent the alternative courses of action open to the teacher in a decision situation. No more precise definition is provided, but Shavelson suggests "any teaching act is the result of a decision sometimes conscious but more often not" (p. 144). This spontaneous, apparently unthinking aspect of teachers' classroom decision-making has also been noted by other researchers (e.g. Bishop and Whitfield, 1972).

A slightly more detailed definition of classroom decision-making is provided by Sutcliffe and Whitfield (1976) who suggest that a decision is when a decision-maker or an observer "acknowledges the availability of at least one alternative behaviour to the one observed at a given instant of time" (p. 14) although they also add that "It is a necessary condition that the decision involves, or has involved in the individual's previous history, the higher cognitive processes" (ibid). However, it would be possible for an observer to propose an alternative to virtually any teaching behaviour and hence their definition of decision-making reduces to situations where the researcher can demonstrate teachers are using, or have used, "higher cognitive processes". Such a definition does not in any way facilitate the identification of decisions and Sutcliffe and Whitfield acknowledge their lack of clarity concerning the whole process of decision-making, and in particular the relationships between intentions, choice points, decisions and acts.

Given the difficulty of defining decision-making, several researchers have attempted to delineate the area of interest by describing the types of classroom decisions which teachers might make, or by describing the possible process of teachers' classroom decision-making.

Bishop and Whitfield (1972) for example, attempt to clarify the nature of classroom decisions by classifying them into the following areas:

A	Learning	A1	Cognition
		A2	Attitude
B	Relationships	B1	Pupil/Pupil & Pupil/Adult
		B2	Pupil/Teacher
		B3	Teacher/Adult
C	Environment	C1	Apparatus and Aids
		C2	Organisation & Administration

Their reason for such a classification is to indicate the scope and variety of classroom decisions; they admit, however, that these areas are not necessarily the ways in which teachers themselves would classify them and that in real classrooms, decisions frequently involve several of the areas together.

Whitfield (1974) speculates that decisions which do occur during classroom interaction chiefly involve such issues as:

a) Implementation and/or modification of pre-lesson decisions.

b) Language structure: level, vocabulary, particular illustrations and questions.

c) Number, and type, of examples.

d) Error correction and explanation.

e) Motivating particular children to participate in the various lesson activities.

f) Discipline and social control.

g) Pacing of the lesson with respect to time.

Sutcliffe and Whitfield (1976) further suggest ways in which the nature of the decisions themselves may differ (e.g. immediate/reflective, aware/unaware (of the decision process), action/no action (by the teacher), simple/composite (i.e. does the decision give rise to one or more than one action)). However, in all of these decision classifications, the distinctions are speculative, based on introspection, observation and limited discussion with teachers, and although they help to define the area of study, have not been empirically tested.

With similar speculation, Farr and Brown (1971) consider how classroom decisions may be made, and suggest that "most instructional decisions are made by forfeit: that is, by not recognising that a decision can be made or by not being aware of possible alternatives. The usual "forfeit decision" involves continuation of a practice whether or not it is the most appropriate procedure for the situation. Other decisions are made on the basis of limited or biased information; or they are made after consulting "expert" opinion, with little regard to the needs and problems of a specific situation" (p. 341).

In addition to these inferred accounts of teachers' classroom decisions and of the decision-making process, several writers have suggested what may be useful purposes in the study of decision-making, and have occasionally made prescriptive recommendations. Farr and Brown (1971) for example, propose that to bring about a greater understanding of, and an improvement in, classroom instruction, a process of systematic evaluation should be carried out by teachers themselves to aid their classroom decision-making, to make themselves more aware of the decisions with which they may be confronted and the possible ways of dealing with them, and, it is suggested, to make themselves more effective teachers. Other writers and researchers in the same field have been concerned with the development of models of teacher effectiveness, and of the role of decision-making in them.

Winne and Marx (1977), in a critique of research paradigms adopted in teacher effectiveness studies, state "we see the mental life of both teachers and students in classrooms as critical items to be studied if we are to understand the process by which teaching influences students' learning... an adequate knowledge about teacher effectiveness cannot develop without considering the mental life of teachers and students, since it is this mental arena in which teachers and students go about much of the business of promoting learning". (p.670) Winne and Marx suggest that teacher effectiveness studies require to be based upon a model which allows classroom behaviour to be understood within the context of teachers' and pupils' cognitions.

Walberg (1977) is similarly critical of the "agronomic" (treatment/yield) paradigm imported via behavioural psychology to study teacher effectiveness, and is hopeful that a study of teacher decision-making may "illuminate the mediational linkages between the socio-psychological content of teaching and teacher behaviour, and between teacher behaviour and student learning". (p. 37)

Shavelson (1973) suggests that teacher training would be more effective if it were to include training in decision-making which could integrate other teaching skills. Similarly, Bishop and Whitfield (1972) suggest that the function of a theoretical decision-making framework could be to provide the bridge between theory and practice which is frequently sought in teacher training; they view decision-making as the occasion when "background information" (on education, psychology, sociology and subject methods) can start to have relevance to practical problems. Eggleston (1973, 1977) proposes a similar view, suggesting that greater knowledge in the area of curricular decision-making may shed light upon the mechanisms linking the "ideology" and "practice" of the teacher.

Smith and Geoffrey (1968) speculate that a study of teachers' cognitions as it relates to classroom behaviour, could aid educational innovation. In their "microethnographic" approach to classroom processes they consider the ways in which one teacher makes, and learns to make, classroom decisions. They suggest that only when an understanding of how the teacher operates in the "real world" is reached can progress be made towards an "ideal world", and recommend, "If the shifts one is trying to make do not demand reorganisation of the basic dimensions of teachers' conceptual systems, the probability for alteration and innovation should be higher". (p. 95).

In conclusion, it can be seen that no very adequate definitions of teachers' classroom decision-making have been proffered, although several writers have distinguished it from other educational decision-making by indicating its spontaneous, possibly unconscious, nature, and the lack of available time for the evaluation of alternative strategies. The literature presents a variety of classifications for classroom decision-making both in terms of content and nature; and there is considerable speculation concerning the relevance of this area to teacher training, teacher effectiveness studies, the understanding of classroom processes, and to curricular innovation and implementation; all the quoted authors express a very firm belief that a greater understanding of the ways in which teachers make classroom decisions may in some way lead to an "improvement" in teaching.

2) <u>Theory and Models of Classroom Decision-Making</u>.

The theoretical frameworks, or models, designed to account for the processes of teachers' classroom decision-making can be divided into two broad categories, the logically-founded and the empirically-founded. The logically-founded models have generally borrowed freely from the theory of cognitive psychology, human information processing or statistical decision-theory; they are either psychological or statistical in nature, or occasionally a combination of both, being concerned with the definition of the possible factors involved in decision-making, or the statistical relationships amongst the alternatives in a decision. Most decision-making models fall into the 'logical' category, having no foundation in empirical classroom research. Although one might expect models of classroom decision-making to be built from studies of classroom observation and teachers' reports of their conscious decision-making, this is in fact a rare occurrence and only one such empirically-founded model, recently published, could be discovered.

McDonald (1965) provides an example of a logical model derived from psychological theory. He borrows heavily from Miller, Gallanter and Pribram (1960) and from human information processing theory, when he suggests that in a decision-making situation, a teacher considers alternative courses of action and makes a subjective probability assessment of the consequences of each alternative (based on his/her knowledge of the class): the teacher then uses a decision rule ("a principle to be used in selecting among the alternatives when the probability and value estimates are known") to arrive at a decision.

Smith and Geoffrey (1968) adopt a similar model (developed from Bross, 1953) in which they conceptualise a prediction system and a value system; the prediction system generates the alternatives and their consequences; the making of a decision, in its simplest form, involves choosing the alternative which seems likely to yield those consequences valued as ideal. However, as Smith and Geoffrey point out, making decisions is not this easy. Their model, like McDonald's, is mechanistic; their components, such as decision rules and value systems are not easily identified in real life, and their theoretical process of decision-making fails to reflect some of the real-life features of classroom decision-making, such as its apparent spontaneity, and the lack of time for generating and evaluating alternative actions.

Shavelson (1973, 1976) borrows from statistical decision theory to develop a model of teachers' classroom decision-making in which he assumes that classroom decisions involve decision-making under uncertainty: a teacher has a choice of several different teaching "skills" and the teacher's preference for a particular skill will depend on his/her estimate of certain events such as the students' "state of nature" (e.g. the students' cognitive, affective, and social states). Shavelson does point out that most classroom decision-making does not correspond to statistical models in that there is little time for evaluating optimal solutions, but he suggests that such models may have heuristic value. The model has prompted his own research into the area of teachers' predictions of states of nature, and its components have led him to speculate upon ways of training student teachers in decision-making (Shavelson (1976) pp. 403-409).

Bishop (1972) acknowledges that some decision-making is like a conditioned response, and that teachers do not generate all the options open to them before making their choice. Nevertheless, Bishop and Whitfield (1972) have developed an elaborate logical model of classroom decision-making which divides decision-making into six separate processes, and which seems to have been designed for training purposes:

1) cause?
2) decision areas/criteria involved?
3) options available?
4) enough information?
5) the decision: what and why?
6) decision evaluation?

However, such a model, although possibly serving a function in teacher training, is again clearly a poor conceptualisation of real classroom decision-making.

Snow (1968) has developed a somewhat less rigid model of classroom interaction in which professional decisions are preceded by attention to cues, the extraction of information, hypothesis generation, and inference about the state of the learner; the decision being followed by the exercise of skilled performance. The process is also assumed to be affected at times by such factors as aptitudes, knowledge, skills and affective states. Although Snow's model appears slightly more realistic, taking into account the active participation of teachers in defining the problem situation and its possible solutions under various influences and constraints, and placing decision-making within a temporal sequence, it is still based on mainly logical/psychological grounds.

An empirically derived model of teachers' classroom decision-making has been more recently proposed by Hargreaves

(1977), who adopts a phenomenological approach in his investigation of teaching. His model of classroom decision-making is based upon the analysis of teachers' commentaries upon their own lessons. He suggests that teachers' classroom "decisions" are in fact stereotyped responses to perceived configurations of stimuli. This view would indicate that teachers' classroom decisions are more analagous to conditioned responses or to the operation of a set of rules in particular circumstances rather than to the rational decision-making outlined in other models.

In general, the logical models developed to explain teachers' classroom decision-making have imposed a rational, rigid and unreal structure upon the decision-making process. The same researchers who have acknowledged the spontaneous, unconscious nature of teachers' classroom decision-making have, simultaneously, constructed models which construe decision-making as a conscious, deliberative activity. These logical analyses are sometimes justified in terms of providing a starting point for further research, or in terms of providing models useful for teacher training purposes. However, the use of logical models of decision-making in teacher training may, if they are unrepresentative of what teachers actually do, be more of a hindrance to the beginning teacher than a help, and there is clearly a need for much more empirical work on teacher decision-making and for more interaction between empirical studies and theoretical frameworks in order to build up appropriate models which more accurately reflect real classroom decision-making processes.

3) <u>Methods of Investigating Classroom Decision-Making</u>.

Clearly, a difficulty in decision-making research is gaining access to the normally covert mental processes which are involved, but there has been no shortage of methodological suggestions. Researchers have noted numerous techniques. The majority of these, however, have never been piloted in the context of teachers' decision-making, several have never gone further than the minds of the researchers who have written about them, and frequently suggested methods are only appropriate for investigating certain types of decision-making, or for investigations in contrived, non-naturalistic situations, and the appropriateness of some of the methodological suggestions appears highly questionable.

The aim of this section is to summarise the methods appearing in the literature together with the forseeable difficulties in their use. The origin and development of the more practicable of these methods, and issues concerning their validity, reliability and appropriateness are considered in detail in chapter 3.

Shavelson (1973) discusses four quite unrelated methods of exploring classroom decision-making. Firstly, he suggests a method of identifying decision points, based on the logical properties of language. By analysing classroom verbal interaction into units similar to those devised by Smith et al (1962), Shavelson proposes that one could compare actual teachers' classroom responses to logically-predicted responses; where these differ, a teacher decision could be inferred. However, this results in a rather contrived definition of decision-making, taking no account of cognitive processes, and relying on inferences from linguistic behaviour for the identification of decisions. No cases of the use of this method are quoted by Shavelson. Secondly, he suggests laboratory simulation as a potential means of analysing decision-making, quoting a study by Moore to illustrate the process of flow-charting sequences of decisions during a simulation exercise from which strategies of decision-making could then be inferred. Similar methods have frequently been adopted in laboratory problem-solving experiments (see Kleinmuntz, 1966), and offer the researcher a considerable degree of control over the decision-making situation, but at the cost of the naturalistic setting. Thirdly, the possibility of analysing teacher-pupil interaction for stable sequences as indicators of the teacher's decision-making patterns is suggested, although the study by Nicholson, which is quoted, has not succeeded in identifying instructional sequences other than at the beginnings of lessons, and Shavelson is unclear about how such sequences relate to decision-making. Lastly, Shavelson suggests the use of stimulated recall as an aid to the analysis of behavioural sequences: a sound or video recording of classroom interaction is played back to the teacher and stopped at "critical" points where the teacher is asked to report on such matters as her possible alternative acts. Bishop and Whitfield (1972), Shulman (1977) and Winne and Marx (1977) also suggest that stimulated recall could provide a useful means of exploring teacher decision-making, although Sutcliffe and Whitfield (1976) point out that some teachers have anxious reactions to videotapes of their own lessons and are consequently inhibited from giving useful commentaries. Stimulated recall methods have been in use in other areas of research, and have recently been adopted in classroom research (e.g. Peterson and Clark, 1978), but the precise procedures employed have differed widely.

Bishop (1972) suggests a means of understanding the cognitive discriminations involved in teachers' decision-making by identifying how teachers categorise classroom situations. He suggests presenting teachers with one situation at a time and asking them to list others which are in some way similar, thus, it is hoped, gradually building up a picture of how the teacher differentiates her environment. Again no reports are available on the use of the technique although it would seem to risk imposing a rather more rigid structure upon teachers' classifications than actually exists, and may lead to problems of interpretation if large amounts of data are accumulated.

Whitfield (1974) and Kyriacou and Sutcliffe (1978) suggest an entirely different approach. They propose that when a teacher perceives a stimulus and experiences "response need" (presumably this coincides with the making of a decision), stress is experienced, indicated by an increase in heart rate which is reduced after a decision has been made. However, it would seem likely that other factors would also produce teacher stress, including perhaps, taking part in classroom experiments which measure teacher stress. In fact, Sutcliffe and Whitfield (1976), reporting their use of the method, point out that during videotaped lessons heartbeat rates were often high. They also point out that teachers' understanding of stress tends to be more associated with interactions in the staffroom and role-conflicts in school rather than with class teaching.

Hargreaves (1977b) suggests that many of the routine decisions made by teachers involve the use of Schutz's "cookery-book knowledge" or "recipes which provide typical solutions for typical problems available for typical actors" (p. 12). Hargreaves advocates a phenomenological approach to their study, relying on teachers' commentaries of their decisions after the event. He points out that such commentaries can provide two different types of rationalisation, the first being "a justification of the decision in which the teacher seeks to render it as socially acceptable to the person who asks for the commentary.... In so doing the teacher may adjust his account to what he sees as the values, expectations and interests of he who asks for the commentary." (p. 14) The second type of rationalisation can, "consist of the teachers' methods of rendering his decision as a rational action, that is, his means of understanding his action as having purposes or intentions (goals) which are to be realised through particular understandings of events (knowledge) and through particular actions (means)" (ibid). The former obviously contributes little to the knowledge of teachers' decision-making, but Hargreaves suggests that the latter, however difficult it is to distinguish from the former, constitutes a source for uncovering the "common sense knowledge" involved in decision-making. Through his work on teachers' decision-making with reference to deviance and discipline (Hargreaves et al, 1975), he develops the notion that teachers react to a configuration of stimuli concerning the act (what is being done), the actor(s) (who is doing the act and why), and the situations (where and when the actors are involved in the act), and it is these configurations, and the teachers' methods of predicting pupil behaviour and pupils' reactions to treatment, which he suggests could be analysed by means of commentaries.

A similar approach was adopted by Smith and Geoffrey (1968) with their "microethnographic" method. Smith observed and noted Geoffrey's behaviour and collected Geoffrey's own accounts of what he was doing and why: they then used this data in the development of various models of classroom teaching.

To summarise, a number of methods for the investigation of teachers' classroom decision-making have been suggested. The majority have been borrowed from other fields of research, such as laboratory problem solving in the case of simulation procedures, and medical education in the case of stimulated recall; many of the methods are still ideas in the minds of researchers, they are speculative suggestions and have never been put into practice within a classroom decision-making context. Each method would produce a different type of data, and could have advantages or disadvantages depending upon how decision-making is conceptualised and upon the hypotheses under consideration. All of the methods have foreseeable difficulties, and clearly a considerable amount of experiment and refinement is necessary to produce a methodology capable of reliably investigating questions of teachers' classroom decision-making.

4) Empirical Evidence.

Only a few of the methods noted in the previous section have been put into practice in empirical research, and the methods adopted by different researchers have tended to reflect their theoretical standpoint. Shavelson, for example, adopting a logical/statistical conceptualisation of classroom decision-making, has used laboratory simulation tasks to investigate the relationships between the information about pupils given to teachers, and teachers' use and manipulation of the information. Shavelson suggests that teachers may use certain heuristics to predict "states of nature" which may influence their decision-making and quotes several studies by Tversky and Kahneman (1971, 1972, 1973, 1974) which have identified three heuristic principles which, it is alleged, people may commonly use. These heuristics are representativeness, (i.e. people decide whether or not an object belongs to a particular category by judging the similarity between the attributes of the object and the attributes of the category, being insensitive to the reliability of the evidence available), availability (i.e. people are influenced by the ease with which instances or occurrences can be brought to mind), and adjustment and anchoring (i.e. people make initial judgements which influence later judgements). Tversky and Kahneman demonstrated the effects of these heuristics in contrived, laboratory or questionnaire-type situations.

Shavelson, Cadwell and Izu (1977), however, attempted to test the effect of representative and anchoring heuristics in one hundred and sixty four subjects consisting of both teachers and graduate student non-teachers in a contrived, laboratory-type situation with some relevance to classroom teaching. Subjects were given information about a hypothetical pupil, the information could be given as either reliable or unreliable in its source, and could present either a favourable or unfavourable impression of the pupil. After reading this information, subjects filled in a questionnaire, asking them to estimate the pupil's success at school and to indicate how they would respond to the child in three classroom situations. The subjects were then given more information about the child, which was either reliable or unreliable in source, favourable or unfavourable, and were asked to answer the same questionnaire again, all combinations of teaching background x reliability on first trial x favourableness of first trial x reliability of second trial x favourableness of second trial being accounted for. Multiple regression techniques employed in a path analysis suggested no evidence for the use of either a representative or anchoring heuristic in either of the samples, although Shavelson et al point out that the experiment was "unnatural" and freed from the personal involvement which one might find in real classroom situations. Shavelson's subjects behaved quite rationally and objectively (i.e. they were unaffected by information of low reliability and apparently uninfluenced by earlier judgements). The subjects also completed a multiple-choice questionnaire where they were asked to report the level of instructional material they would select for the child, their response to the child if he/she couldn't answer a question during a maths lesson, and the importance they would attach to praising the child every time he/she did good work. The estimated ability of the child appeared to be an important factor in deciding how to select instructional material, but the other decisions appeared to be uninfluenced by information measured in the experiment. Shavelson concludes that the subjects may use different kinds of information to make different decisions.

In Shavelson's experiment, the information about the childwas explicitly given to the subjects, the origin of the information (whether coming from a student or headteacher, for example), and hence an indication of the reliability of the information, was also explicit. But in the real teaching situation, information about children is not so easily found. Much of the information which teachers have about children may be inferred from the children's past behaviour, some information may come to the teacher through a series of other individuals and may consequently have become distorted; some information received from other teachers or parents may have to be evaluated against an assessment of the person who is supplying the information (e.g. a child described as 'a behaviour problem' by a very formal, 'disciplinarian' teacher may imply different attributes than the same description given by a teacher who is known to have few expectations for pupil behaviour), or against the suspected motives of the informant. Consequently, in an experimental situation where facts are presented to teachers quite explicitly, it is not surprising that they respond rationally and objectively; but in real life where facts are less certain, where the information processing demands upon the teacher are considerably greater, and where the teacher may have to infer certain attributes to complete her assessment of the pupils, it would seem quite likely that the teacher may err in her assessments and predictions, and that these errors may occur in a direction consistent with her general perspectives.

Shavelson suggests that the work of Dusek (1975), Dusek and O'Connell (1973) and O'Connell, Dusek and Wheeler, (1974) supports the notion that teachers' assessments of pupils are, in fact, objective since these studies have demonstrated a high correlation with objective test scores of the same constructs. However, the question of the "accuracy" of teachers' assessments raises the epistemological issue of how it can be known whether the "objective" test is measuring the same construct which the teacher is assessing, or whether in fact both the test and the teacher may simply be making the same crude assessment. The work of Willis and Brophy (1974) and Good and Brophy (1978) is perhaps more appropriate in this direction, since it attempts to examine the formation and basis of teachers' assessments of their pupils, rather than their correlation with other measures.

Shavelson, Atwood and Borko (1977), again concerned with the objectivity of teachers' assessments, investigated how cues (concerning ability, effort and performance) given to teachers about a fictitious pupil influenced their assessment of the factors responsible for the pupil's behaviour. They found that attributions to ability, effort and luck were affected by variations in cues about pupils: when cues were consistent (e.g. high ability, high effort, high performance) performance was attributed to internal factors (effort and ability); when cues were inconsistent (e.g. high ability, high effort, low performance), attribution became more complex and external factors (luck) were seen as slightly more important.

In a second study by the same researchers, the effect of the reliability (determined by the source of the information being a teacher or a pupil) and valence (favourableness) of cues on teachers' attributions for a student's academic performance was studied. All subjects (graduate education students) received two pieces of information concerning a fictitious pupil (throughout the sample all combinations of reliability x valence were accounted for) and were then asked to suggest the extent of influence of four factors (using a six point scale) on the pupil's academic success (indicated by A's and B's on his final report card). The most important determinants of success were viewed as ability and effort; difficulty of exams and luck were rated as less important. When the information given about the pupil was reliable, the valence had no effect on teachers' attributions to ability, suggesting that teachers appear to ignore unreliable information and act objectively.

Again, however, these experiments present a more explicit situation than is found in classrooms, and one could expect teachers to behave "objectively" in these situations without the implication of similar processes being carried out in the classroom. The structure of these experiments also restricted information given about the pupils to the areas of ability, effort and performance and restricted the possible causes of achievement to effort, ability and luck. Although one would expect teachers to assume the overall model of 'ability + effort = achievement', in real life causal attribution may, at least in some cases, be more complex (e.g. teachers may perceive an able child's performance being affected by a 'broken home'; or the low test marks of an intelligent, hard-working child may be attributed to his being 'highly strung' and nervous; or a child who is very able in some subjects may be perceived as completely failing to grasp the essentials of others: in these cases achievement may be explained in terms of more than simply ability and effort). Consequently, Shavelson's experimental approach to investigating teacher attributions of causality runs the risk of greatly oversimplifying the process. Shavelson further assumes that teachers' perceptions of pupils influence their"pedagogical decision-making" without in any way establishing the mechanisms or circumstances in which this may occur.

Sutcliffe and Whitfield, adopting a logical/psychological conceptualisation of classroom decision-making, have used methods of observation and interview to identify decisions, and physiological measures (heart beat and voice frequency analysis) to identify stress. Sutcliffe and Whitfield (1976) report their use of these methods, indicating that their measure of stress appeared to be associated with almost any kind of request or command, and that their sample of teachers appeared able to recall and discuss the decisions they made, including "null decisions" (decisions not to act). A fuller analysis of their work, however, has not yet appeared.

Recently, Peterson and Clark (1978) adopted a modified form of Snow's (1972) logical/psychological conceptualisation of classroom decision-making, where they hypothesized three different levels of decision (see fig. 2.1): a decision concerning whether the cues available to the teacher are within tolerance; a decision concerning whether alternative behaviours are available within the teacher's memory state; and a decision of whether to behave differently. Peterson

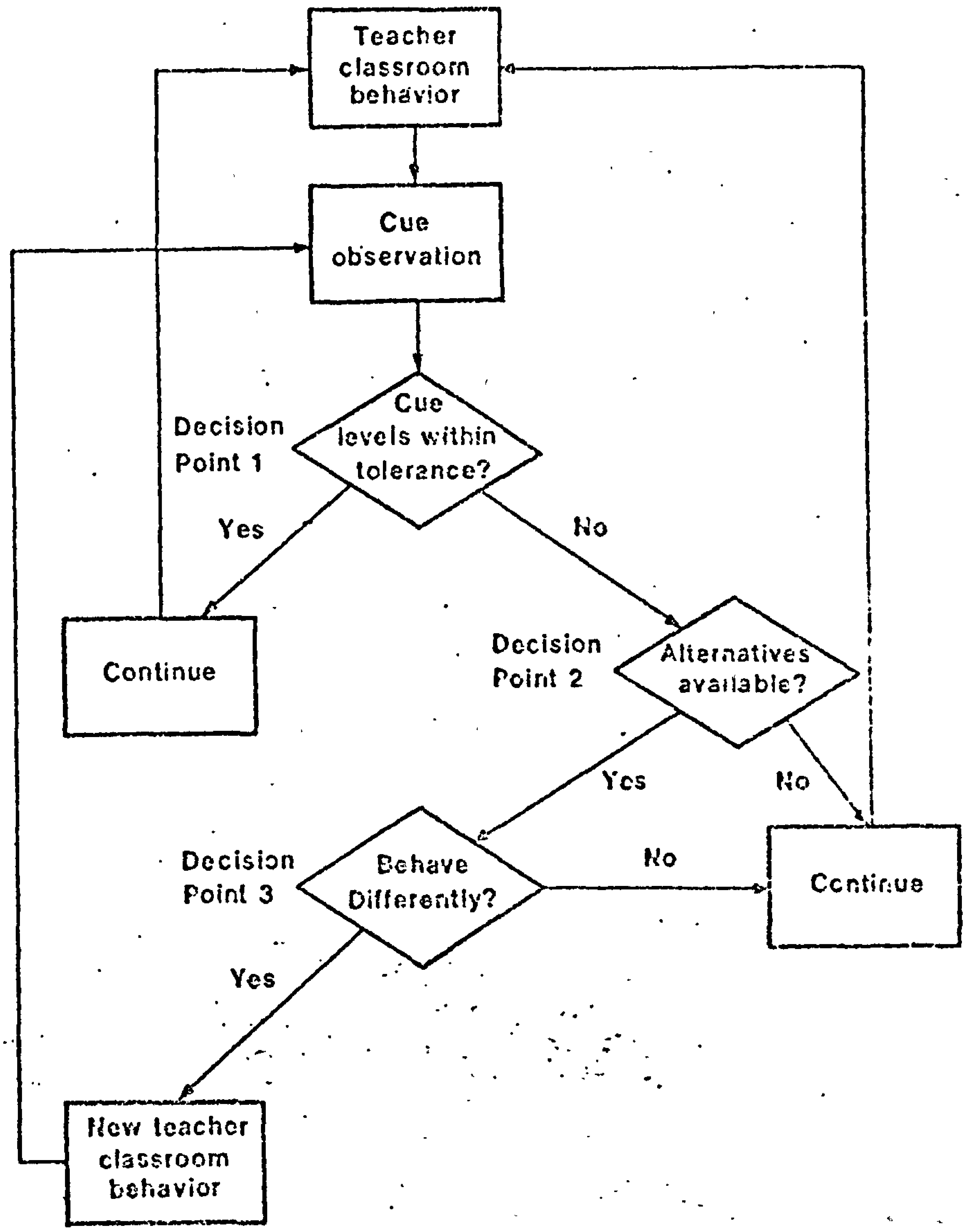


Figure 2.1: Modified Version of Snow's (1972) Model of Classroom Decision-Making, Taken from Peterson and Clark (1978)

and Clark suggest that teachers may make decisions at different levels, or at all levels, on different occasions, and thus take different paths through the model. By using stimulated recall procedures with a sample of twelve experienced teachers, they attempted to answer four questions concerning these paths:

1. What frequency of the teachers' reports are represented by each path of decisions in the model?
2. How do teachers differ in the frequency of use of each path, and how are these differences related to teacher aptitudes?
3. How are teacher differences in paths taken related to teacher planning before teaching?
4. How are differences in teachers' choices of paths related to the achievement and attitudes of their students after instruction?

Each of the twelve teachers taught a social studies lesson to a group of eight children on three separate occasions. Before the lesson, the teachers were allowed ninety minutes preparation time when they were instructed to think aloud as they planned their lesson, and their commentaries were tape recorded. The subsequent lesson was video-taped and four brief (2-3 mins.) segments were selected, one from the beginning, two from the middle, and one from the end of the lesson, for use during a stimulated recall interview. The interview was structured on four questions, concerning what the teacher was doing and why, what the teacher was noticing about the students, whether the teacher was thinking of any alternative actions, and whether any student reactions caused the teacher to act differently to plan. These questions were asked after each segment of videotape, and the answers tape-recorded. The prior experiences and abilities of both the teachers and students were assessed by tests of verbal ability, reasoning ability, flexibility of closure and conceptual level tests. A multiple choice test and essay test relating to the lesson materials, and an attitude questionnaire were administered to the pupils to assess the outcomes of instruction.

The teachers' responses to interview questions were used by two coders to categorise the paths taken by teachers in their decision-making. The fact that this data may reflect either teachers' thinking during teaching or thinking during interview or a mixture of both is acknowledged in the interpretation of results.

The most common path to be taken by teachers on all three lessons, was to be continuing as normal without thinking of any alternative strategies. Path 2 represented teachers being aware of pupils' behaviour being outside the limits of tolerance, but no alternative actions being apparent to the teacher, and this occurred about a fifth as often as path 1. Path 3 represented situations where teachers had decided that pupil behaviour was outwith the level of tolerance, they were aware of different alternative teacher actions but decided not to change their behaviour; this occurred to about the same extent as path 2. The final path, number 4, accounted for a similar path to number 3 except that the teachers adopted one of the alternative actions, thus changing their behaviour; this again occurred at a fairly low level except on the final lesson commentaries, which may possibly be interpreted in terms of the experimental situation having influenced the teachers' reports of their cognitive activity.

A few of the teacher aptitude tests indicate moderate correlations with the paths taken. Verbal ability scores correlate moderately and negatively with path 2: Peterson and Clark suggest two possible interpretations of this; firstly that it may be indicative of high verbal ability being facilitative in dealing with unexpected pupil behaviour; secondly that in the stimulated recall interviews, teachers high in verbal ability were more able to articulate alternative courses of action. Moderate to high correlations between path 3 scores and scores of conceptual level, verbal ability and reasoning ability and a moderate correlation between path 4 scores and teacher conceptual scores are interpreted in terms of these paths requiring more complex cognitive processing.

Teachers' planning statements were coded into one of six categories according to whether their content concerned instructional objectives, subject matter, instructional process (strategies), instructional materials, or the learner, and a miscellaneous category for those statements which did not fit any of the five substantive categories. Subject matter statements were further classified as concerning lower-order subject matter (i.e. facts) or higher order subject matter (i.e. concepts or principles). Moderate correlations were found between teachers' planning statements concerning objectives and path 3 scores, and together with a moderately high correlation between path 4 scores and instructional process, and a high negative correlation between path 4 scores and lower order subject matter statements, Peterson and Clark suggest that those teachers who emphasised subject matter in their planning were less likely to change their behaviour in response to student behaviour than were teachers who emphasised instructional process, thus some forms of planning may be associated with a reluctance to change classroom teaching behaviour. However, moderate correlations occur between planning scores and teacher aptitude scores; consequently which are the significant variables that may be causally related cannot be determined from this study.

In terms of the student achievement and attitude measures, path 3 scores correlated moderate to highly and negatively with achievement scores and with attitudes to teacher method and subject scores: this was interpreted in terms of teachers, who did not change their behaviour when pupils' behaviour exceeded the tolerance levels, being less effective and resulting in poor pupil attitudes towards teacher, method and subject matter. However, if this were the case, one might also expect to find a similar pattern of correlations in the case of path 2 scores, but this is not in evidence. Path 4 scores correlate moderately and negatively with pupil achievement scores on the multiple choice test and on "concrete themes" on the essay test, but positively and slightly with pupil scores on "abstract themes" on the essay test; this is the opposite of the pattern of correlations between path 1 scores and student achievement scores. Peterson and Clark suggest that "business as usual" teaching (path 1) may be associated with learning facts whereas instruction that is adapted to pupil reactions may be associated with pupil expression of higher order ideas.

However, Peterson and Clark's experiment raises several methodological issues. Firstly, both the teachers and pupils were well prepared for the experiment; both received an "orientation to the study" and completed "an informed consent form"; and before giving the "think aloud" commentaries on their lesson planning, the teachers first listened to a model tape recording of the process: this could have encouraged the teachers to give the information they thought the researchers wanted, and no indication is given by Peterson and Clark of how the teachers, or pupils, viewed their role, or their purpose in the experiment. This could have greatly influenced the data collected: for example, the teaching material supplied to the teachers contained mostly factual material and slides: if the teachers viewed their task as one of communicating as many facts as possible to the pupils this may have resulted in many subject matter statements during their planning, little response to pupil behaviours during teaching, and the memory of a larger number of facts by the pupils; whereas teachers, concerned with carrying out their normal teaching process, may have been less attentive to communicating facts, more responsive to pupil behaviour and hence resulting in lower pupil achievement scores. Consequently, several of the measures taken may be influenced by the ways in which the teachers conceptualise the experiment, and the results obtained may bear little resemblance to those which might have been obtained in a naturalistic setting. Several other factors of the experimental approach may also have influenced the findings: the teachers had a long period of preparation preceding the lesson, the classes consisted of eight pupils, and both the pupils and the lesson materials were previously unknown to the teacher, and one lesson is hardly sufficient time wherein pupils can form stable assessments of their teacher, subject matter or method of teaching. One further complicating factor was the achievement tests' exclusive concern with the measurement of relatively short-term memory of facts or, in the case of the essay test, the number of concrete or abstract "themes" mentioned; such outcomes may be more directly related to the amount of time teachers spend imparting facts in lessons, or to the ways in which the facts are imparted, rather than to the teachers' aptitudes, planning strategies or classroom decision-making. Finally, it is impossible to determine what significance to attribute to teachers' responses to the stimulated recall interview: the questions which were asked of the teachers presuppose the validity and appropriateness of Snow's model, asking, in effect, whether the teacher was making one of the decisions along the four different paths; this may have encouraged teachers to either think of their teaching, or at least to report their thoughts, in a manner which resembled the model but which did not represent their true thoughts or valid reasons for their actions; possibly only some teachers' classroom decision-making occurs as Snow predicts.

Peterson and Clark's study is interesting and useful in that it pioneers new methods of investigating teaching, and although the methodological problems arising from their experimental approach, together with the small sample of teachers, render the results of little factual value, the project clearly highlights the need both for a detailed study of methods appropriate for accessing teachers' decision-making and for the study of teachers' decision-making in a variety of teaching contexts.

Lastly, the work of Joyce and Harootunian (1964) is also relevant to teachers' classroom decision-making, although they were principally concerned with lesson planning. They interviewed thirty-nine female student teachers using a structured interview to ascertain the ways in which the students made decisions concerning the appropriate objectives, procedures and methods of evaluation employed in a planned science lesson. They concluded that students in fact tended not to link objectives and classroom procedures and made few decisions concerned with lesson-planning. This point has also been observed by Wragg (1974) and Withall (1975) who independently suggest that students learn their classroom behaviour largely from copying the behaviours of those teachers whom they observe, or whom they can remember as good teachers when they themselves were pupils, although such views are based solely upon the researchers' personal experiences.

It is apparent that little empirical research has been carried out in the area of teachers' classroom decision-making, and that which has been tackled has adopted different methods to answer different questions. Shavelson and his associates have been concerned with possible tendencies amongst teachers to distort information available to them in accordance with a set of heuristics; Sutcliffe and Whitfield have been more concerned with identifying and categorising decisions; Peterson and Clark investigated the congruence of teachers' decisions with a decision-making model, and the relationships of paths through the model to preceding teacher variables and to pupil outcomes; and Joyce and Harootunian were concerned with lesson planning and implementation. The little empirical research available is probably more informative about methodology than about the nature of teachers' classroom decision-making: laboratory simulations clearly do not reflect the realities of classroom teaching, physiological measures appear to have questionable reliability in identifying decisions, questionnaires relating to investigating the rationality of student teachers' teaching may not be measuring variables relevant to the teaching process; on the other hand teachers appear to be able to talk about at least some of their decisions, and stimulated recall appears to aid teachers' commentaries on their lessons although the significance of these commentaries is unknown. Clearly there is scope for much further research.

5) <u>The "Improvement" of Teacher Decision-Making</u>.

The development of training material for classroom decision-making has far exceeded the pace of empirical research into the nature of decision-making. Various models have been developed to identify the possible skill elements of decision-making and materials have been developed to enable the practice of these skills.

Bishop and Whitfield (1972) assert that practice in each of the stages of their six-stage model could improve teachers' competence in dealing with critical incidents. Bishop (1970) suggests the use of group discussions, and simulations as a means of developing the knowledge and skill required for classroom decision-making, and of integrating both educational theory and practice.

Similarly, Hill and Martin (1971) analyse "educational decision-making" (considering decision-making in more than simply the classroom context) into nineteen component skills, such as "identifying forces for and against the alternatives" and "ranking and rating alternatives (including putting a value on applicable risk factors)".

They trained a sample of forty teachers in these skills and administered a pre-and post- test consisting of a problem where the teachers were to write down the steps taken in solving it. The tests suggested that after training, teachers adopted different approaches to decision-making, spending less time upon generating possible alternatives and more time upon evaluating alternatives. However, whether the measured change is a result of changes in the teachers' thinking or simply a change in the teachers' method of reporting their decisions, having been exposed to Hill and Martin's model, is unknown, and no measure is available to assess whether, as a result of training, the teachers are in any way, more effective decision-makers.

Sieber and Lanzetta (1964, 1966) suggest the notion of "structural complexity" to explain the individual differences in tachistoscopic decision performances. They suggest that people with "complex conceptual structures" require more information and time before reaching decisions, and in turn, give more information and indications of uncertainty than "structurally simple" people when employed in a task requiring the identification of a tachistoscopically-produced image. They suggest that these differences may be due to variation in the number of alternatives which people generate in response to the decision problem, and also to differences in ability to differentiate and encode information inherent in the problem; and that college students' decision-making processes can be changed by training in the study of a problem in greater detail and by generating a larger number of alternative solutions. Adopting this theoretical perspective (which is well-supported by laboratory experiment), Salomon (1970) has developed some unevaluated simulation training procedures aimed to develop teachers' skills in studying the stimulus in greater detail and generating more alternatives. However, this approach assumes that "cognitive complexity" in teaching can be learned and is a general skill or trait, an assumption which is empirically unsupported, and one could reasonably argue that a person may in fact view some problems with greater "complexity" than others, i.e. in certain (perhaps more familiar) contexts a person may perceive the stimulus in greater detail and generate more alternatives, and consequently the concept of "cognitive complexity" may itself be more complex than imagined by some researchers in this field.

Various kinds of simulation material have been developed over recent years to train beginning teachers in responding to classroom situations. Twelker, (1967), for example, developed a repertoire of videotaped, classroom critical incidents to which student teachers were asked to respond. Twelker assumed that student teachers could be operantly conditioned into developing appropriate teaching behaviour; for every critical incident Twelker also produced videotapes of several possible pupil responses to the students' handling of the incident; and after the students' actions, a teacher trainer selected whichever pupil response was thought to be most appropriate. Twelker suggested that this form of training enabled students "to practice discriminating cues that signal potential problems which require immediate attention" and "to practice responding to these situations, making decisions, and considering the possible consequences of his action"(p. 199). Simulation procedures have taken several forms other than videotape. Tansey (1969) reviews the methods adopted by Twelker, and also the role-playing and group problem-solving methods of Cruikshank (1967) and McQuigg's (1969) case studies approach, pointing out the differences in presentation and the focus of the training. More recently, Hughes and Traill (1975) discuss eight different types of simulation which were used in an Australian college, including in-basket activities, role-playing situations, microteaching and critical incident laboratories. Other simulation material developed with the intentions of training teachers, in as varied tasks as teaching problem solving, to recognising and responding to social and emotional problems in the classroom, is outlined by Cruikshank (1967), Gropper, Kress et al (1968), Buffie (1970) and Martin (1972).

Bierschenk (1977) reports the developments of video-taped simulations designed both for training purposes and the investigation of teachers' decision-making. He assumes that "a human being accumulates between birth and adulthood behavioural strategies for the purpose of being able to meet different situations. We have therefore concentrated on the problem of developing an instrument that will permit the study of (1) which strategies the individual uses, (2) which of them are available in different situations, and (3) at different times" (p. 73). For the purpose of training, the sequences of videotaped events were determined by attempting to predict the consequent behaviours of teachers' decisions by reference to an "accepted psychological theory". However, one may argue whether psychological theory is a good predictor of classroom behaviour. Meanwhile, no empirical research has been reported by Bierschenk.

Although recent years have seen a growth in teacher training simulations, employing a variety of materials and procedures, simulations have met with some substantial criticism. Marsh (1979), for example, claims that some simulations involve too much simulated material (photographs, school record cards, etc.) whereas they could alternatively rely on student teachers' own experiences of school; he more importantly suggests that concentration upon critical incidents may depict teaching as nothing other than a collection of techniques for dealing with specific classroom problems, and speculates that emphasis on teacher-pupil relationships in simulations may prevent the student teachers' recognition of other important professional relationships. Added to these problems, are questions concerning what experiences can be valuably simulated, under what conditions simulations may be effective, and whether simulations which train students to make classroom decisions in a manner unrepresentative of real classroom decision-making may cause more decision-making problems than they solve. Marsh himself suggests that more realistic aims for teacher training simulations would be to "enable pre-service teachers to widen their range of attitudes to educational issues" and to "encourage decision-making on educational issues to be based upon 'reasoned' and 'rational' processes", and has developed simulation material and procedures with these aims in view.

However, in spite of the widespread use of simulations in various fields (see Zuckerman and Horn, 1970), there are clearly problems in their use, and the appropriateness and effectiveness of teacher training simulations can only be ascertained through empirical research.

Virtually all simulations involve, either explicitly or implicitly, some training in decision-making, or the development of some, often unspecified, cognitive factor, and Wagner (1972) provides some support for the importance of cognitive factors in the development and change of teaching behaviour. He demonstrated that from a total sample of seventy-eight students divided randomly into three treatment groups, those taught to discriminate between different types of teaching behaviour became more child-centred in their teaching (as assessed by an interaction analysis schedule) than did those given feedback in microteaching where they had been instructed to teach a pupil-centred lesson, and the latter group did not differ significantly from a control group receiving no treatment. Wagner suggests that given the motivation to change, learning to discriminate between appropriate and inappropriate behaviour is more important than practising the behaviours concerned.

However, Wagner's micro-teaching group engaged in little discussion with supervisors and most feedback came from other students; in actual practice where some degree of cognitive discrimination accompanies micro-teaching, one might expect differences between such groups to be less marked. A similar comment also comes from Fuller and Manning (1973) who, in reviewing the theory and method of self-confrontation, suggest that the ineffectiveness of micro-teaching may lie in a lack of consideration of cognitive factors: "In the rough and tumble of the complex classroom, most responsive interpersonal teaching behaviour is probably automatic. Perhaps in the actual classroom, new, consciously performed behaviours disappear. Perhaps the teacher forgets her new second language and once more starts to speak her native tongue." (p. 484)

Clearly there is considerable interest in practical training in decision-making, but attempts to develop training materials have so far been based upon speculation and untested models, evaluation of the material has been poor or non-existent, and their lack of any consistent theoretical basis emphasises the need for greater knowledge of teachers' classroom decision-making.

To summarise, it seems that various researchers have indicated the need for greater knowledge in the area of teachers' classroom decision-making in order to improve upon the understanding of classroom processes for the purposes of more effective teaching, teacher training and educational innovation. However, lack of adequate models for the conceptualisation of teacher decision-making and the lack of piloted methodology have contributed to the occurrence of little empirical research to date. The rapid growth in decision-making "training packages" reflects perhaps a practical concern for the improvement of classroom decision-making, but such methods are themselves largely dependent upon empirical research for their development into appropriate, effective, training procedures.

CHAPTER 3 - MODELS AND RESEARCH METHODS.

The previous chapter has indicated the multiplicity of models and methods which have been suggested for the conceptualisation and investigation of teachers' classroom decision-making. Most of the models are based solely on analytical grounds with little or no relevance to existing empirical research findings, some are clearly inappropriate to account for real classroom decision-making; and some of the methods proposed for its investigation have questionable validity. Given this situation, it would seem advisable to consider the functions of models in the social science research process, to consider the criteria, if any, which should be satisfied by appropriate models, to consider the relationship between models and methods and to consider their appropriateness and validity in the context of classroom decision-making research.

The term model, however, is a confusing one, since it has been used in a variety of ways to denote different structures serving different functions. Nuthall and Snook (1973) point out the proliferation of models in education over recent years and list the many purposes, mostly unrelated to research, which they have been deemed to serve. The concern in this chapter is with research models relating to the study of teachers' classroom decision-making. Models, even within this field, however, can be formulated at different levels of abstraction. At the highest level of abstraction are what may be termed 'methodological models' or 'paradigms', which outline the procedures by which knowledge is acquired, and by which explanations are regarded as valid.

Since the beginning of social scientific writing, philosophers and social scientists have debated at length their concerns over what constitutes an appropriate methodology for the social sciences. Frequently, the proponents of the arguments have been classified into two groups, the positivists (e.g. Nagel, 1961; Popper, 1962) who argue that social science should adopt 'the scientific method' of the natural sciences, and the phenomenologists (e.g. Schutz, 1954), with their roots in what is often termed 'German idealism' or 'hermeneutics' (Von Wright, 1971), who argue that social scientific enquiry is essentially different in its aims and its processes from that of the natural sciences.

What is labelled by the positivists as '<u>the</u> scientific method' dates back to 15th and 16th century philosophers who were critical of the medieval practices of deducing conclusions from self-evident or authoritative premises, and wished to substitute them with more rigorous procedures for the acquisition of knowledge. More recently, the method has been elaborated (Dewey, 1933; Popper, 1962) to a stage-wise process, progressing from the identification and definition of a difficulty, through a process of hypothesising a solution to the problem and deducing the consequences of such hypotheses, to testing the hypotheses in terms of their consequences, and subsequently accepting or rejecting them.

Phenomenologists such as Shutz, however, claim that the aim of the social scientist is to understand what it is like to be another human being, to be able to build models identifying the goals, motivations and unique perspectives of others, and in so doing, both the procedures of social science and the nature of social scientific knowledge differ from those of the natural sciences.

Several other claims have also been made concerning features of the social sciences which make the implementation of the scientific method difficult if not inappropriate: for example, the impossibility of directly observing some variables of interest (e.g. 'human experience' or 'motivation'), the non-repeatability of the matter under study (some researchers argue that all human actions occur within unique contexts, and although one could generalise amongst certain types of context, some human actions-most evident perhaps in historical research-are unrepeatable), and the relationship of the scientist to his subject matter (the fact that he is an interacting part of the system under study). Similar difficulties, however, also occur in some areas of the natural sciences and the debate over the value of the scientific method for social science research has far from ceased as a result of such arguments.

The division of educational research into two major categories according to the methodological paradigm it adopts has frequently been made. Delamont (1975), for example, discusses the two major 'camps' involved in classroom research - labelled 'the psychometric' and 'the alternativist'. The psychometric camp is described as arising from positivist traditions, being concerned with the development of models of the precise nature and effects of teachers and teaching, adopting techniques of "objective" fact gathering and developing a quantitative description of classroom events (e.g. Wragg, 1973). The alternativists are described as arising from the phenomenological tradition, being concerned with participants' interpretations of events, adopting techniques of unstructured observation and interview and placing a high degree of inference upon their findings, and often being concerned with the relationship of school to society (for example, Sharp and Green (1975), Nash (1973) and Lacey (1970) are all concerned with the socially stratifying functions of the school).

The two types of research stem from different research traditions, with different goals, different questions, different methods and different types of data. Kaplan (1964) distinguishes data concerning "act meaning" from that concerning "action meaning", the former refers to the meaning of behaviour to the actor, whereas the latter refers to the culturally-defined meaning of behaviour. Alternativist approaches to the study of classroom processes may be construed as being concerned with structuring "act meaning" data, whereas psychometric approaches are concerned with structuring "action meaning" data*. The two approaches produce different kinds of explanation, but, within the field of teachers' classroom decision-making, may potentially produce explanations of the decision-making process which are complementary, explaining classroom behaviour both in terms of its meaning to the teacher and its meaning to researchers.

However, the development of valid explanation is not simply a process of structuring data. As Kuhn (1962), and Kaplan (1964) point out, irrespective of the methodological paradigm adopted, every observation presumes a "schema", or conceptual framework: observation does not occur in a pure, objective form; the observer only attends to selected stimuli, and observations are categorised, conceptualised and possibly labelled (i.e. they are interpreted by the observer as an example of a particular type of event). This identification of significant concepts for the formulation of hypotheses can be considered as one of the functions of another, more substantive type of research model, which is formulated at a much lower level of abstraction than that of the methodological paradigm. In discussing models of this form, Kallos and Lundgren (1975) suggest that a model is like a map: both make certain features appear more

* this point is further discussed with reference to appropriate research methods (p. 65).

important and relevant than others according to the particular purpose involved. Models may also suggest ways in which significant concepts relate to one another. However, such models can vary in their explicitness and level of abstraction; some researchers have claimed that these models constitute a weak form of theory (Van Dalen, 1979), others (e.g. Snow, 1973) have defined them as analogies whereas the term theory is reserved for a more formal statement of related postulates. Nuthall and Snook (1973) adopt Polanyi's (1958) description of models as interpretive frameworks, a description with which Kallos and Lundgren's "maps" have much in common, and suggest that the function of a model is to persuade others that one way of looking at and structuring data is better than any alternative view.

However, such models may present several problems for the furtherance of educational theory and knowledge. Nuthall and Snook, examining models which have stimulated research on teaching, suggest that there are only three basic models of teaching: the behaviour control model, the discovery learning model and the rational model. The former two are models which have been imported from the fields of behaviourist and cognitive psychology respectively, and the latter is imported from the field of philosophy. Nuthall and Snook point out that each model has its own associated concepts built around a conception of what teaching ought to be like and since the models themselves are untestable, much educational debate centres around fruitless arguments concerning which conception of teaching is more appropriate and why. When the models do generate research, claim Nuthall and Snook, each model identifies its own questions and research methods and the resulting findings do not add to a unified body of knowledge which exists independently of the models; when the models fail to be persuasive the associated knowledge falls from view.

An alternative to different areas of research being promoted by different models is suggested by Nuthall and Snook to lie in the development of a more appropriate classroom model which will more adequately conceptualise classroom teaching.

Kallos and Lundgren (1975) propose a similar argument, suggesting that an overdependence on the models and methods of psychology has constrained the development of educational research and resulted in the adoption of inappropriate psychological concepts to interpret classroom phenomena instead of a study of the classroom developing in its own right.

However, it would be naive to consider the possibility of all classroom research deriving from the same teaching model. It may even be desirable and productive to have a number of competing models as found in other areas of science (see Kuhn, 1962). However, many models of teaching have been formulated at a still lower level of abstraction than those discussed by Nuthall and Snook. Joyce and Weil (1972), for example, develop sixteen models of teaching from different areas of psychology alone, each emphasising different characteristics of teachers or different behaviour as significant and important in understanding the teaching process. Within the field of classroom research, disciplines such as social anthropology, sociology, and linguistics, in addition to various traditions within psychology, employ quite different models to guide and interpret research. In adopting different models, researchers within different disciplines view classrooms in different ways and make different assumptions about what is significant and important; they therefore operationalise research questions using their own sets of concepts, adopt methods which are regarded as legitimate within their own field and produce knowledge the significance of which is interpreted by their original models. For example, terms such as "negotiation", "operant conditioning", "self-presentation", "interaction", and "solicitation" have all been employed in describing what teachers and pupils say and do to each other, and each of these concepts is associated with a body of theory and knowledge which, when also imported, may eventually result in differing interpretations of classroom processes.

Clearly a wide variety of models, at different levels of abstraction, can be, and have been, adopted to conceptualise classroom processes. Each model is associated with its own concepts, its own important questions, its own methodology, and, as Nuthall and Snook point out, its own ideology. One could thus diagrammatically represent approaches to research on classroom processes as shown in figure 3.1, where ideology may include such factors as one's conception of man (e.g. as predictable and rule-following, or as autonomous and self-reflecting) and one's conception of how teaching ought to be; the models adopted would indicate the significant concepts, at different levels of generality, and their interrelationships; and the methodology would consist of methods involved in assessing these concepts, and the procedures by which knowledge is considered to be valid.

<u>Ideology</u>	<u>Theory</u>	<u>Methodology</u>
e.g. conception of man, conception of teaching as it ought to be, social values.	(or models) e.g. the operant conditioning model	research design, research methods.

<u>Figure 3.1</u>:

<u>A diagrammatic representation of approaches to classroom research</u>

The direction of influence of these three categories is not always clear, and may differ in individual cases. Research rarely explicitly relates ideology, theory and methodology. Dunkin and Biddle (1974) for example, suggest that much classroom research is "purely empirical" paying little attention to any theoretical basis: the models adopted by classroom observers are often implicit in the features of the classroom which they study, rather than explicitly stated. However, it would seem logical that the main directions of influence would be in terms of ideology influencing theory in turn influencing the methods adopted.

Nuthall and Snook suggest that much of the evaluation and debate concerning different models of teaching is on ideological grounds, although from the point of view of establishing a body of empirically verified knowledge, clearly progress can only be made through the constant interaction between theoretical models and empirical research, leading to more detailed, elaborate theoretical structures. At the same time, however, if, as Nuthall and Snook suggest, many models are sterile as far as research and a contribution towards the knowledge of education are concerned, given the large number of models which provide different interpretations of classroom processes, it would seem desirable to have certain criteria for distinguishing models which may be productive for particular purposes.

Snow (1973) lists 12 criteria for the evaluation of theories and models, relating to the explicitness of postulates and definitions, the explicitness of boundaries and limitations, internal consistency, correspondence with existing data, fertility for hypotheses generation, testability, parsimony, quantifiability, and the avoidance of unnecessary symbolization, formalization, and over-simplification, and the distinguishability of the essential features of the model. However, in the context of models of classroom processes, several of these evaluative criteria would appear to be aesthetic rather than essential. For example, a model which is parsimonious, corresponds with existing data and avoids symbolization may be preferable to a researcher than a model which is less so, just as a simple proof may be preferable to a mathematician, when compared to a complex one, on the grounds of 'mathematical beauty', but such criteria do not necessarily distinguish the most appropriate or productive of models of classroom processes.

Snow's criteria for the evaluation of theories and models may be assuming a more prolific, sophisticated network of formal theory than actually exists within the field of classroom processes, since several of his criteria would be inappropriate or irrelevant in the evaluation of classroom process models, and it is doubtful whether the consideration of such criteria could lead to any fruitful improvement in the models themselves. However, Snow's criteria could perhaps be more usefully summarised in terms, of three desirable attributes of classroom process models.

Firstly, Snow's criteria of explicitness, the avoidance of unnecessary symbolization, formalization, and oversimplification and the distinguishability of the essential features of the model may be summarised in terms of clarity. Wilson (1972) points out the general lack of conceptual clarity in the fields of psychology and education; Hargreaves (1972) indicates that "high elasticity" concepts such as "self-image" or "role expectation" have been popular in educational research and suggests that some of the popularity has in fact been due to the number of meanings which can be assigned to the concepts and the variety of ways in which they can be measured, resulting in a complete obscurity of meaning. Yet if models are to be meaningful and communicable, clarity in both concepts and their interrelationships is obviously essential.

Secondly, Snow's criterion of fertility for hypothesis generation could be interpreted within a broader criterion of research utility. Even within a research context, models may serve different functions at different times. A model may serve to organise or interpret existing knowledge, a model which is known to be inadequate may serve a heuristic function in stimulating empirical research which in turn leads to a revised and improved model, or a model may act like a theory in giving rise to testable hypotheses. Clearly models in educational research are required to meet a criterion of usefulness, but the criterion may differ depending on the stage and purpose of the research.

Although it would be advantageous for models to be testable, several writers have pointed out that they are often untestable (e.g. Nuthall and Snook, 1973; Snow, 1974); and although correspondence with existing data may be viewed as a supportive feature of a model, existing data may be inappropriate, or as Nuthall and Snook suggest, may be "tied" to another model; Van Dalen (1979) dramatically points out that if this were an essential criterion for the acceptance of theory, Newton, Darwin and Einstein's contributions to science would have been lost. However, these two criteria relate to another issue discussed by Snow (1974) concerning the appropriateness or "ecological validity" of a model. Snow suggests that if a model is unrepresentative (i.e. it doesn't fit the nature of what it sets out to explain), it will not give rise to fruitful knowledge and, due to the untestability of many models, the research which it generates may be unable to refute the model. Snow quotes the laboratory study of learning as an example where the adoption of unrepresentative models of learning have, over the past forty years, led to negligible results in terms of increased knowledge. Snow's argument for ecological validity has much in common with the arguments proposed by Nuthall and Snook (1973) and Kallos and Lundgren (1975) for models of classroom processes to be based upon empirical knowledge of classrooms, rather than borrowed from other disciplines. Consequently, a third criterion for models may be asserted, that they should really be appropriate or ecologically valid in order to avoid the development of untestable theory which generates much fruitless irrelevant research.

To summarise, three broad criteria have been suggested which would appear to be prerequisites for models to be of value in research into classroom processes, and may serve as useful guides in the development of future models. Firstly, models should be conceptually clear so that they can be clearly understood by others and so that inconsistencies in the use of terms can be avoided. Secondly, models should serve a clear research function, whether this be to organise existing knowledge or to explain or predict classroom phenomena. Thirdly it is suggested that models should be appropriate for the nature of their subject of study.

Within the field of teachers' classroom decision-making, it has been shown in chapter 2 that although many models exist, several serve a training rather than research function, that there is a lack of conceptual clarity in accounts of how teachers make classroom decisions, and that the models' representativeness is highly questionable since the majority have been rationally rather than empirically derived. The little empirical research which has been conducted in the area of teachers' classroom decision-making also makes difficult the formulation of appropriate models. At the present stage of decision-making research, and at the stage of this present study, a model was required in order to structure research relevant to classroom decision-making, to indicate the relationship of decision-making to classroom processes and to stimulate initial exploratory studies which could yield sufficient knowledge to lead to later refinements in the model. At the same time, it was important to avoid imposing a structure upon teachers' classroom decision-making which was so rigid that only inappropriate questions could be formulated within it. Consequently, at this stage, a global model, at a relatively high level of abstraction, and containing few assumptions, was developed to outline the area of interest.

It was assumed that teacher decision-making was a cognitive operation or a series of such operations which resulted in the generation, modification or maintenance of teacher behaviour, i.e. that to study teacher decision-making involves more than simply the study of teachers' classroom behaviour; it requires the understanding of the significance of this behaviour to the teachers, and consequently both 'act meaning' and 'action meaning' would be of interest. Similarly, it was assumed that pupils also engage in cognitive activities which guide their behaviour, and that as teachers' behaviour would be likely to have an effect upon pupils' cognitions, so too would pupil behaviours have an effect upon teacher cognitions. Consequently, the model was developed, as shown in figure 3.2.

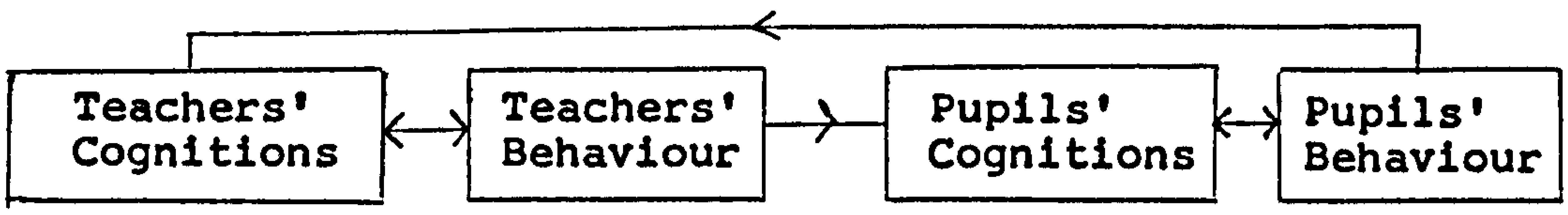


Figure 3.2:

Classroom process model illustrating decision-making context

Other influences would, of course, also affect teachers' and pupils' cognitions; and it seems a reasonable assumption that a person's own behaviour may influence their cognitions and consequently, there is bi-directional influence between teachers and pupils' own cognitions and behaviour.

In conceptualising teachers' classroom decision-making in this way, exploratory investigations concerning how teachers make and learn to make their classroom decisions could begin by exploring the nature of teachers' cognitions and their relationship to teachers' behaviour. This exploration was carried out in two ways: firstly existing research concerning the interrelationships of teachers' and pupils' behaviours and cognitions was reviewed and its relevance to teachers' classroom decision-making considered in order to provide a context of empirical research within which classroom decision-making could be more appropriately conceptualised; secondly,methods of investigating the nature of teachers' decision-making were evaluated in terms of their past uses, known reliabilities, appropriateness for investigating teachers' cognitions and behaviour and the nature of the data which they yield; these methods were then employed in a series of exploratory studies investigating the nature and interrelationships of teachers' cognitions and behaviours.

Since the development of any empirical research project depends upon the availability of appropriate research methods, these were considered and an evaluation of them follows in the second part of this chapter; the review of related research, apart from the research specifically on teachers' classroom decision-making already reviewed in chapter 2, follows in chapter 4.

Methods of Investigating Teachers' Cognitions and Behaviours.

Since models define the areas, or concepts, of interest in a study, they also limit the range and nature of methods which can be adopted. The aim of this section is to consider in greater detail the methodological approaches suggested in chapter 2, which would be appropriate for the investigation of teachers' cognitions and behaviour. Consideration is made of the past uses of each method, the nature and significance of the data collected, and the appropriateness of the methods in the context of a study of teachers' classroom decision-making, and any attempts to validate the methods are noted. The methods considered were grouped under the headings: systematic observation, participant observation, rating techniques, simulation, stimulated recall, decision-making correlates and interview.

Systematic Observation.

Systematic observation, in its typical form, involves the use of a predetermined list of classroom behaviours, and occurrences of these behaviours are noted, often at specific time intervals, by observers sitting in classrooms. Many variations of this procedure have been developed such as the use of videotape, sequence coding as opposed to time sampling, and attempts to code context as well as behaviour.

The expansion in the development of observation schedules designed for observing classroom interaction has been noted by many researchers (see Simon and Boyer (1970), Cohen (1977) and Dunkin and Biddle (1974)). The schedules vary in the purposes for which they were designed, in their theoretical bases, although these are frequently not elaborated, in the behaviours and behavioural units on which they focus and in the degree of inference required by the observer in using them.

Systematic observation provides a numerical description of overt behaviour. Kaplan (1964) discriminates the meaning of behaviours in terms of the act-meaning ("what it (behaviour) signifies to the actor or to those with whom he is interacting" p. 358) and action-meaning ("its meaning to us as scientists, taking the action as subject-matter" p. 32).

Wilson (1972) points out a similar distinction when talking of the "language" use and the "performance" use of terms; and if these distinctions are made then it is clear that systematic observation can be considered as measuring behaviour in terms of its 'action meaning', or 'performance' characteristics or, as McIntyre and McLeod (1977) suggest, in terms of the "conventional meanings available within the wider culture".

However, a study of teachers' decision-making also requires the investigation of the meaning of a teachers' behaviour to that teacher and of the ways in which classroom behaviours are interpreted. It is conceivable that whereas a teacher's questions may all be similarly categorised by an observation schedule, a question may serve different functions to that teacher. For example, a question may be addressed to a pupil because the teacher knows he is the only person in the class who is likely to know the answer; because the question may be one which a low-ability pupil may have some chance of answering; because the teacher has noticed that a pupil is not attending; or because the teacher wants to know whether a particular pupil or group of pupils has understood the preceding instructions. Similarly, pupils' behaviour may be interpreted differently by teachers than by an observer - the inability of one pupil may be understood in terms of the pupil's lack of attention, and that of another in terms of the pupil's lack of ability; such different interpretations may lead teachers to react differently in future interactions. Attempts have been made to account for the intention implicit in classroom interaction (for example, in Barker et al's (1963) behavioural units and Bellack's (1966) language moves) in terms of inferences made by observers but such interpretation has an unknown degree of validity.

Consequently, systematic observation may give a relatively objective count of particular classroom behaviours and an indication of sequences in their occurrence , but this description of classroom interaction is obviously limited by the predetermined behaviour categories of the schedule which may well bear little resemblance to the ways in which those engaged in classroom interaction construe classroom behaviour or which may cut across the distinctions made by those interacting - for example, some teacher behaviours, coded by observers as questions concerned with instruction may be regarded by the teacher as disciplinary (demanding the pupil's attention or curbing inattention), or dealing with motivation, or personal relationships. It would therefore seem that although systematic observation may be the only means of obtaining a general, objective, quantitative description of overt classroom behaviour, its usefulness in relating classroom behaviour to the aims and intentions of teachers and pupils may be dependent upon it being complemented by other methods. Sutcliffe and Whitfield (1976), for example, having defined a decision as a point where an alternative action may have been taken, attempt to combine an observation schedule with a structured teacher interview to identify and classify classroom decisions. A report of this work is not yet available.

There appear to be conflicting reports concerning the stability of observational evidence (see Medley and Mitzell, 1963; Shavelson and Dempsey-Atwood, 1976). Several studies have shown that observational data collected within specific contexts is stable over both short (Marshall et al, 1977), and long (Brophy et al, 1975) periods of time, and Marshall suggests that variability is associated with differences in subject matter and differences in classroom structure. However, subject matter, and possibly classroom structure, do change in the course of normal classroom activity: consequently, in the normal classroom, there is some doubt about the stability of the characteristics which observation schedules may be assessing.

The reliability of observers in using observation schedules has frequently been assessed using videotape recordings, and very high reliabilities have been recorded especially where the schedules require little inference on the part of the observer (e.g. Flanders, 1968; Boydell, 1974).

It has frequently been argued, however, that observer presence must itself influence the interaction which observation schedules are designed to measure (e.g. Dunkin and Biddle, 1974). Masling and Stern (1969) compared the recordings taken during consecutive five-minute intervals of an observed lesson and found that correlations showed no signs of increase over time. They conclude that either the observer influence is negligible, or that observer influence is not a simple variable which, as one would expect, has its greatest effect at the beginning of the recording session and its lowest effect at the end. However, the study could be criticised for its small sampling unit: the correlation of five-minute samples of classroom interaction is hardly likely to show the slight changes which possibly occur over a fairly lengthy period of time.

More recently, Samph (1976) conducted a more rigorous study where the classroom interaction of ten teachers was compared, using FIAC, under conditions where there was an observer in the classroom, and under conditions where the classroom interaction was being tape-recorded, unknown to the teacher. Significant differences were found and Samph reported that when an observer was present, the relative frequency of occurrence of Flanders Interaction Categories was closer to the teacher's reported 'ideal', assessed by questionnaire in advance of the observations.

In the widespread use of systematic observation, it is frequently assumed that the distortion of the data by observer presence is significantly small to be negligible or that the distorted data collected through systematic observation is preferable to data from alternative methods. Although the possibility of observing classrooms without teacher knowledge would avoid this problem, such a procedure raises ethical questions.

Participant Observation

Participant observation involves the unstructured observation of classrooms by observers whose objectives are to identify the meaning of events, as interpreted by participants, in the contexts in which they occur. The method has been advocated by several classroom researchers (e.g. Delamont, 1973; Nash, 1973) on the grounds of its flexibility, its potential for considering behaviour in context, and its consideration of the significance of behaviour to participants. Becker (1957), one of the earliest investigators of the method, defines it as "an observation of some social event, the events which precede and follow it, and explanations of its meaning by participants and spectators, before, during, and after its occurrence."

In Kaplan's terms, participant observation is attempting to describe act meaning rather than action meaning, and consequently it would seem a particularly appropriate method for investigating the cognitive precedents of teaching behaviour and the significance of classroom events to the teacher.

However, although attempts have been made by phenomenologists to be more rigorous – for example, by being aware of possible biases (e.g. Schwartz and Schwartz (1955) point out the danger of "reinterpretation" - giving an event meaning by reinterpreting it in relation to subsequent events), or by adopting self-critical attitudes to observation (e.g. Garfinkel and Sacks (1970) discuss the "anthropological strangeness" approach) or by arriving at a final interpretation as a result of amalgamating the perspectives of the various participants (e.g. Elliott and Adelman, 1975) - this type of approach lacks reliable quantification (important if comparisons, or generalisations, are to be made) and generally centres around the observer's own conception of classroom "reality" or his conception of the "interpretive frameworks" of others.

Consequently, although participant observation may be a useful technique for generating insights, its association with high degrees of inference, its unknown validity and the difficulties in quantification make it of doubtful value in any rigorous testing of hypotheses, and the technique was thought to have its greatest value in early exploratory studies.

Rating Techniques

Rating techniques can take various forms, but generally involve subjects rating people, objects or events on the intensity of specific attributes, using a numerical scale. Sometimes the attributes are predetermined by the researcher; in the case of repertory grid techniques (Kelly, 1955) they are provided by the subjects. The latter techniques attempt to achieve greater "meaningfulness" and impose less structure upon the subjects' reporting of their perceptions by using constructs which have been elicited from the subjects themselves.

The Repertory Grid could be a potentially useful technique for accessing teachers' perceptions, for example, of pupils and events. It has the advantage of quantifying cognitive variables, although there could be difficulties with generalisations amongst subjects if they choose different constructs, a problem avoided by other rating techniques. Kelly (1955) suggests various ways of eliciting constructs; no attempts seem to have been made to compare the results obtained by using different methods and triadiic elicitation seems to be the method most commonly adopted (see Nash, 1973, Wood and Napthali, 1975). When constructs are elicited, the context in which this construct is meaningful (e.g. in the classroom, in a particular subject, in the playground) is supplied by the subject but is unknown to the researcher, and the context may differ from one construct to another: as suggested by the pilot studies in chapter 5, repertory grid techniques can present some practical and theoretical problems.

Kelly (1955) points out that within the framework of Personal Construct Theory, the traditional notions of test validity and reliability are inappropriate, since these may in fact vary amongst individuals and contexts, and no attempt appears to have been made to assess these features of the repertory grid, or of other rating scales, except in the case of the semantic differential. Warr and Knapper (1968) have shown ratings on the semantic differential, which involves the use of rating scales with particular bipolar adjectives, to be stable over time, and split half correlations indicate high internal consistency. Warr and Knapper also provide support for the predictive and concurrent validity of the semantic differential. However, Warr and Knapper have considered a particular form of rating scale in particular situations and the relevance of their findings to other rating scales used in classroom contexts is questionable.

Simulation

Simulated problem-solving tasks have been developed (e.g. Miller, 1967; and Wason and Johnson-Laird, 1972) to study human decision-making by attempting to make thought processes more apparent. As discussed in chapter 2, Shavelson et al (1976, 1977) have also attempted to simulate the effects of information about pupils upon teachers' classroom decision-making. However, such methods, although permitting considerable experimental control, are susceptible to the criticisms of all laboratory techniques: they place subjects in an artificial, non-threatening situation where the tasks which face them are "unreal". In the area of classroom decision-making, it could be argued that a simulation exercise is too different from real classroom teaching, where there are pressures of time and where the teacher carries the responsibility for what happens in the classroom and for what results from her own behaviour, for the exercise to be meaningful, and that simulations similar to real classroom experience would be difficult if not impossible to achieve. However, the method could perhaps have potential as an exploratory tool for the generation of hypotheses to be later tested in the real classroom: in this case the method may serve a heuristic function linked to more naturalistic research.

Stimulated Recall

Over recent years running commentaries given by participants while carrying out a specialised activity have been used successfully by researchers investigating human information processing. For example, the monitoring of chess players' thought processes has led to the development of heuristic computer chess-playing programs (see Newell, Simon and Shaw, 1958; and De Groot, 1965). The method has also been adopted within the fields of medicine (Elstein and Shulman, 1971), and clinical psychology (Kleinmuntz, 1968).

Although the delivery of a running commentary while teaching would be virtually impossible due to the largely vocal and continuous nature of the activity, tape recordings of lessons have been used to stimulate teachers' recall of their cognitive activity.

Such methods have been enthusiastically advocated by Whitfield (1974) and Shavelson (1973) as highly appropriate for the study of teacher decision-making, although Sutcliffe and Whitfield (1976) suggest that, for some teachers, observing a videotape of their own lesson may be an anxiety provoking experience. However, the method is currently being adopted by Shulman (1977), McDonald (1977) and McKay and Marland (1979) and has been used by McIntyre et al (1977) to investigate the types of distinctions teachers make amongst their pupils during instruction, and by Peterson and Clark (1978) to identify levels of classroom decision-making.

There is the possibility that this method, like Hargreaves' (1977) commentaries, may give rise to the collection of post-teaching rationalisations rather than the actual cognitive operations of teachers during teaching.

Although not specifically related to teachers' running commentaries, several researchers have considered the validity of running commentaries in laboratory problem solving tasks. For example, Dansereau and Gregg (1966), showed that the time taken in mental multiplication tasks was related to the number of "subprocesses" involved and was independent of whether or not the subject provided a running commentary, which would suggest that the commentaries do not influence the cognitive operations. Similar findings were noted by Davis (1968) and Benjafield (1969). However, these studies have been concerned with the study of simple, laboratory problem-solving tasks, no validation has been carried out on the stimulated recall of teachers on their teaching, a far more complex task in which teachers may be egocentrically involved and where they may be defensive about their reasons for action, and such validation may perhaps be impossible. Any attempt to assess the reliability of this technique would also be hampered by the impossibility of replicating the teachers' experience, and by the interference between the reasons given by teachers for their behaviour and their future behaviour and rationalisations.

Consequently, although this may be another method for assessing the "act meaning" of behaviour, the validity and reliability of data collected by the method remains unknown.

Decision-Making Correlates

Whitfield (1974) suggests the use of pulse rates, and Sutcliffe and Whitfield (1976) the use of voice frequency analysis as a means of detecting decision situations, assuming that decision-making is accompanied by stress; Kyriacou and Sutcliffe (1978) have attempted to define the notion of teacher stress more clearly, placing it within a psychological context. However, the use of physiological measures to study decision-making makes rigid assumptions about the nature of decision-making: it may be that physiological stress can be recorded in other than decision situations (stress, as previously suggested, may be induced by the recording of physiological measures themselves) or teachers may not always be aware of decision situations at these points.

Sutcliffe and Whitfield (1976) suggest that the advantage of physiological measures is the more objective identification of the "null decision" (decision not to change behaviour), but even if the method does identify "decision points", implying an unusual definition of 'decision', the problem of accessing what the teacher views as problematic and how she proceeds to find a solution still remains. No investigations appear to have been published using Whitfield's method, but its use would seem likely to result in various problems concerning the interpretation of the data, and the investigation of the process of teachers' decision-making would require the use of other methods.

Interview

In attempting to discover teachers' ways of construing pupils and classroom events and their rationales for behaviour, the use of interview would seem an obvious starting point. However, in the making of classroom decisions, it may be that much of a teacher's cognitive activity is spontaneous or unconscious and consequently inaccessible through interview.

Hargreaves (1977) points out the difficulty of knowing what status to attribute to teachers' commentaries on their lessons (see chapter 2), and Sharp and Green (1975) point out that in interviewing teachers after observing their classroom behaviour, teachers may feel pressure to present themselves in a way consistent with their perception of how they had previously presented themselves to the observer. Such distortions of interview data, together with other potential influences associated with interview techniques, such as the content of the interviews and interviewer characteristics, which are well debated in research literature (e.g. Bynner and Stribley, 1979; Van Dalen, 1979; Nisbet and Entwistle, 1970), may contribute to an unknown and possibly immeasurable degree of unreliability in interview data. However, interviews have been used by several researchers in conjunction with classroom observation, producing descriptive accounts of teachers' understandings of classroom processes (e.g. Sharp and Green, 1975; Hargreaves et al, 1975), and this could provide a useful method in exploratory investigations.

In summary it would seem that there are several methods which are appropriate for the exploratory study of different particular aspects of teachers' cognitions and behaviours, and which may provide further insight into teachers' classroom decision-making. It may be, however, that due to the limitations and weaknesses of some methods, and the questionable validity of others, the selective use of several methods together may be advisable in order to complement the strengths and weaknesses of each.

CHAPTER 4 - TEACHERS' AND PUPILS' COGNITIONS AND BEHAVIOURS.

If we assume the model outlined in the previous chapter to be a conceptually broad but fairly appropriate model of classroom activity relating to teachers' decision-making, questions can be formulated concerning the relationships amongst teachers' cognitions, teachers' behaviour, pupils' cognitions and pupils' behaviour. This chapter aims to bring together existing research which has attempted to examine both the nature of cognitions and behaviour in the classroom and their interrelationships, to provide a context within which more specific questions concerning teachers' decision-making may be posed.

Dunkin and Biddle (1974) point out that much classroom research has concentrated on attempting to find relationships between distal, loosely connected variables, such as teacher attitudes and pupil performances, without considering the more microscopic causal chains of classroom events. Many of these studies have been concerned with teacher effectiveness, investigating behaviour in classrooms, or some characteristic of teachers, and their possible effects upon children (see Rosenshine, 1971; Rosenshine and Furst, 1973; and Dunkin and Biddle, 1974), but results from these researches have not been fruitful, the underlying paradigms are over-simplistic (see Winne and Marx, 1977), and they give little insight into the relationships amongst classroom behaviour and teachers' and pupils' cognitions. Pygmalian studies, arising from the study by Rosenthal and Jacobson (1968), where the relationship of teachers' expectations of pupils to pupil performances has been considered, constitute another area which has stimulated much research and controversy, and which has similarly involved the investigation of distal, global variables with little or no concern with identifying underlying mechanisms. No investigation has been found, however, where aspects of teachers' and pupils' behaviours and cognitions have all been studied simultaneously. Consequently, a cognitive/behavioural impression of classroom processes can be inferred only from assembling the results of numerous studies which have generally investigated different variables relating to diverse segments of classroom activity. Inevitably, the resulting impression may not be considered very reliable or illuminative, but may point out questions for future clarification.

The research is reviewed in two sections: firstly, that dealing with teachers' cognitions and their relationship to teachers' behaviour and pupil cognitions and behaviour; and secondly that dealing with pupil cognitions and their relationship to the other components of the model.

Although the aim of the review is to outline the nature of the associations between cognitions and behaviour which are suggested by existing research relating to the teaching process, individual studies are selected for more detailed discussion where they involve novel or problematic methodology, which may, in some cases, be an important consideration in the evaluation of the research findings, and, in others, may have significant implications for future research in this area.

Teachers' Cognitions: their relationship to teachers' behaviour, and pupil cognitions and behaviour.

Although suggestions for the investigation of teachers' cognitions have been frequently pronounced (Gage, 1963; Smith and Geoffrey, 1968; Dunkin and Biddle, 1974), no studies have been found which attempted to investigate explicitly the nature of teacher cognitions or to impose any conceptual structure or form generalisations concerning the cognitive activity of teachers. Phenomenological or ethnographic studies of classrooms have investigated the cognitive activity of teachers, but have generally been more concerned with the development of models of particular aspects of teaching (e.g. Smith and Geoffrey, 1968), models of social control (e.g. Sharp and Green, 1975), or to cognitions within a very narrow field (e.g. Hargreaves et al, 1975), and although providing much descriptive material of individual teachers' reported cognitions, generalisations are difficult to make due to the very small samples of teachers involved.

Rather than referring to 'teacher cognitions', phenomenological studies frequently adopt the term "teacher ideology" which is used to refer to similar cognitive phenomena and is defined as "a connected set of systematically related beliefs and ideas about what are felt to be the essential features of teaching .... a broad definition of the task and a set of prescriptions for performing it, all held at a relatively high level of abstraction" (Sharp and Green, 1975, p. 68). It may be argued that teachers' beliefs, ideas and rationales may be less well integrated, less logical and less consistent than is suggested by such definitions, but the fact remains that no attempts have been made to find out systematically the nature of beliefs, ideas and rationales that teachers actually have.

Several research projects have directed attention towards specific aspects of teachers' cognitions, such as teachers' understanding of subject matter (Waimon, Bell and Ramseyer, 1972), teachers' perceptions, or expectations, of pupils (Nash, 1973; Rosenthal and Jacobson, 1968), or teachers' self-concepts (Trowbridge, 1973), and these have frequently attempted to relate such variables to classroom behaviour or pupil performance.

In the area of teachers' knowledge and understanding of subject matter, it has frequently been reported that teachers tend not to spend much time organising and planning their lessons (Joyce and Harootunian, 1964; Wragg, 1974) and presumably therefore spend relatively little time structuring their subject matter. Waimon, Bell and Ramseyer (1972) suggested that if a sample of student teachers were to develop a more clear and rigorous understanding of their subject matter, their teaching would be more effective. Although no attempt was made to identify the mechanism by which the rigour and clarity of the teacher's understanding of subject matter may influence pupil learning, the relationship between these two variables was experimentally investigated.

A microplanning course was developed and taught to a group of ten students who also took part in microteaching and clinical teaching sessions, which enabled them to practice and modify their learned skills for which successful performance was reinforced. The experimental group was then compared to a control group, which had not undertaken the microplanning, microteaching or clinical teaching sessions, in a series of lessons taught to small groups. It was found that pupils taught by the experimental group showed significantly greater ability to reason with the material taught but there was no significant difference in subject matter recall. Due to the design of the 'treatment' course, however, it is impossible to conclude that the differences in reasoning ability were due to the students' improved understanding of their subject material, one may be equally justified in attributing these effects to the students' microteaching and clinical teaching practice, or to the increased confidence which may have resulted from the successful completion of the course.

Several projects have investigated the relationship between variables concerning teachers' attitudes and cognitive discriminations and their teaching behaviour. Wagner (1972), for example, demonstrated that learning to discriminate between appropriate and inappropriate behaviour was sufficient, given the motivation to change, for college students to be able to alter their teaching behaviour in the direction of child-centredness. Borg and Stone (1974) also found that "protocols" (similar to Wagner's cognitive discrimination training) were as effective as courses involving microteaching for changing simple, clearly-defined teacher behaviours amongst which were included clarity, feedback and encouragement.

The use of questionnaires and attitude tests to examine the relationship between less specific teacher cognitions and behaviour, however, has been less successful. Aspy (1972) tested a sample of teachers on the extent of their knowledge of learning theory and investigated the correlations between this and the teachers' classroom behaviour, assessed in terms of Flanders' Interaction Categories, and some high inference rating scales. No significant correlations were found. Aspy interprets this as support for the belief, often reported by teachers and noted by Campbell (1971) and Jackson (1968), that learning theory is irrelevant to teaching. However, Aspy adopts very global measures of teachers' knowledge and behaviour which may well have obscured more specific relationships between the two.

More recently, Ekstrom (1976) adopted a similar approach, using a battery of questionnaires to assess teachers' aptitudes, knowledge, attitudes and cognitive style, and found inconsistent or non-significant relationships between these variables and teachers' classroom behaviour, assessed by systematic observation.

Some attempts have been made to examine in closer detail, the ways in which teachers interpret or define pupils' behaviour. Stebbins (1971) investigated teachers' definitions of disorderly behaviour in the classroom, observing teachers' classrooms, noting disorderly incidents and then interviewing the teachers about these incidents using a structured interview schedule. Stebbins found that disorderly behaviour was often attributed to a stable property of the pupil involved, such as his personality or home background. Teachers attributed many motivations to pupils, apparently believing that they also knew how their pupils defined many disorderly situations. When evaluating a pupil's misconduct, the teachers more often took their personal knowledge of the pupils into consideration if the pupils were perceived by the teacher as unusual in ability or behaviour.

Solomon and Kendall (1975) studied three teachers in traditional classrooms and three in open* classrooms: they found that although the occurrence of misbehaviours was assessed by the researchers as similar in number, the teachers in the traditional classrooms perceived misbehaviour more frequently and employed more discipline and criticism. However, as Solomon and Kendall acknowledge, the allocation of teachers to these schools involved the process of teachers' and schools' mutual selection; consequently the above findings could be accounted for in terms of school or teacher preferences for particular teaching styles, in terms of organisational influences upon teaching style, or perhaps simply by the fact that misbehaviour may be more easily noticed by teachers in traditional classrooms where rules of silence and seat-work are more generally observed.

The teachers' cognitions may also include evaluations

* the American use of the term 'open' in this context corresponds broadly to what is termed 'progressive' in Britain.

which the teacher has about herself, and, amongst the many studies of self-concepts, teachers have not been ignored. Trowbridge (1973) for example, found some significant correlations between a measure of teachers' self-concept and measures of the degree of teacher talking, teacher involvement in routine activities and teacher involvement in various classroom thinking processes as coded by classroom observers. However, conceptual problems concerning the notion of 'self-concept' and what self-concept questionnaires are measuring (see Wylie, 1961; Bilby et al, 1972) make it difficult to attach real significance to these results. Teachers' reported evaluations of themselves, for example, may differ depending upon the persons requiring the evaluation and the purposes to which it will be put; teachers may also perceive themselves as teachers differently from the way they perceive themselves as individuals (i.e. they may perceive themselves as having a professional role), added to this problem, teachers' notions of how they would like to present themselves to others may be affected by numerous other factors. In addition, the Tennessee Self-Concept Scale, used by Trowbridge, presents five point scales on one hundred constructs, including whether the subject likes to look nice or not, whether he regards himself as religious, whether he believes that his friends have confidence in him and whether he has a lot of self-control: one could well argue that these scales do not relate to one clear self-concept dimension and that such a variety of dimensions are employed in the test, that test scores could not meaningfully discriminate amongst subjects.

Within the field of phenomenological studies of the classroom, the notion of 'significant other' has frequently been adopted. A 'significant other' is a person perceived by another as being in a position of influence in their lives. Karmos and Jacko (1977) investigated student teachers' conceptions of significant other during their final year of training and student teaching, using questionnaire methods. They found, not surprisingly, that during the final year of training, college lecturers were perceived by students as less useful and less influential than school teachers. This coincides with various studies in the literature suggesting a change in students' attitudes during the transition between college and school teaching, (see MacBeth and Morrison, 1972; Morrison and McIntyre, 1973; Gibson, 1977; Doyle, 1977): whereas during teacher training courses, students have been found to develop progressive attitudes to education, similar to their tutors, the trend has been found to reverse towards the end of the course when students are about to take up teaching posts in schools.

By far the most researched area of teachers' cognitions, however, concerns teachers' perceptions of their pupils. Research in this area has generally taken the form of large-scale factor analytic studies, repertory grid studies, or phenomenological investigations. In the case of factor analytic studies, teachers are asked to rate their pupils on a large number of constructs which are then factor analysed (e.g. Hallworth, 1966; McIntyre et al, 1966; and Herbert, 1974). This approach yields different numbers of factors in different studies but factors relating to the areas of general ability, classroom behaviour and sociability have generally accounted for a large proportion of the sample variance. However, investigations of this kind raise issues concerning appropriate methodology and analysis. Solomon and Kendall (1977), for example, obtained ratings of two hundred and five primary school children from their teachers, using five-point rating scales on thirty constructs. It would seem very unlikely that teachers could reliably evaluate their pupils on thirty constructs, especially when the wording of some of the constructs is obscure (e.g. "tolerant of differences", "creative verbally"). The constructs were devised by the researchers and many of them (e.g. "skilled at problem-solving") are certainly not the kind of assessments which are reflected in British teachers' commentaries upon their pupils (see Sharp and Green, 1975; Hargreaves et al, 1975). Consequently, the researchers may be taking account of constructs which are of little importance to teachers and excluding those of greater importance (e.g. an intelligence or general ability construct was not included in the thirty constructs). The scores for all pupils on different constructs were intercorrelated and factor analysed using orthogonal rotation: thus the data from six different teachers were combined before analysis. Differences amongst teachers in the use of the rating scales were not investigated and such differences may have resulted in an untypical intercorrelation matrix and therefore spurious, factor analysis results. These weaknesses in the design and analysis of Solomon and Kendall's study are possibly reflected in the contrived labels which they have found necessary for the 4 resulting factors: "democratic, cooperative behaviour; autonomous intellectual orientation; responsible, perseverant, striving behaviour; and involvement in class activities". The democratic, cooperative behaviour factor accounted for the largest portion of the sample variance (41%) which would suggest that the teachers perceived aspects of behaviour as important pupil attributes. Correlations between the factor scores and test and questionnaire assessments of the pupils on various abilities and attitudes showed generally inconsistent or insignificant results, except for the significant correlation of the autonomous intellectual orientation and the responsible perseverant striving behaviour factors with attainment test scores, which would suggest that those whom the teachers viewed as able and striving tended to achieve more.

A more appropriate research procedure and form of analysis was adopted by a series of British studies (Hallworth, 1962; Hallworth and Morrison, 1964; Morrison, McIntyre and Sutherland, 1965; McIntyre, Morrison and Sutherland, 1966) where, in the case of the latter two studies, the rating scales were developed in collaboration with teachers in order to concentrate on the assessment of perceptions considered by teachers to be important in the classroom context. In the case of all the above studies, the ratings for each sex group in each class were intercorrelated and standardised before being combined for factor analysis, thus making some allowance for the different relationships amongst rating scales with different teachers. Morrison, McIntyre and Sutherland (1965) found the three main factors emerging from primary school teachers' assessments concerned behaviour, attainment and sociability. A later study (McIntyre, Morrison and Sutherland, 1966) found that, in a sample of thirty-four primary school teachers, differences in assessments were associated with the estimated social class of the school and with the age and experience of the teacher: the factor analysis of ratings of teachers in middle class and mixed social class schools resulted in a first factor with high loadings on 'pleasantness' and 'trustworthiness', whereas with teachers in urban and suburban working class schools pupils' attainment and attitudes to school were highly loaded on the first factor; in the case of older and more experienced teachers the first factor loaded highly on attainment and attitudes to work, and in the case of younger teachers on pupil behaviour.

Some studies on teachers' perceptions of pupils have attempted a less directed approach, using Kelly's (1955) repertory grid techniques (e.g. Nash, 1973; Wood and Napthali, 1975; Taylor, 1976). Nash (1973) used Kelly's method of triadic elicitation to obtain a series of constructs used by each of eight primary school teachers who then rated the children in their class on these constructs using a five point scale. Nash points out that the three most frequently used constructs were hardworking-lazy, mature - immature, well-behaved-poorly-behaved. Wood and Napthali (1975) carried out a similar process with a sample of secondary school teachers eliciting as many as twelve constructs, and factor analysed each teacher's ratings. They found the most common structure to consist of two factors, the first dealing with attributes of ability, the second with motivational attributes; the actual constructs elicited from the teachers could be classified into six areas: (i) the involvement of the pupil in the learning situation, (ii) the pupil's ability in the subject, (iii) the pupil's overall ability, (iv) the pupil's behaviour, (v) the quality and tidiness of work presented, and (vi) the interest displayed by the pupil in the subject.

With a sample of forty-eight primary school teachers, Taylor (1976) employed the full context form of the repertory grid, which involved each teacher sorting cards containing the names of the pupils in her class, and explaining her reasons for grouping the children as she did. Taylor classified the elicited constructs into thirteen substantive categories and found that a very high proportion concerned ability and behaviour and very few concerned personality.

Although the three reports produce slightly different interpretations of teachers' perceptions, they appear to support the finding of the British factor analytic studies Nash's study took place in a progressive primary school, Wood and Napthali's in a secondary school, and the schools were in different parts of the country; these factors could contribute to the found differences.

Repertory grid methods have the advantage of enabling teachers to rate their pupils on dimensions which are meaningful to them, and as the work of Nash, Wood and Napthali and Taylor indicate, the constructs elicited from teachers appear to be more characteristic of the ways in which teachers talk about their pupils than are some of the constructs supplied by researchers. For example, Sharp and Green's Mrs Carpenter describes her pupils as "thick and those who aren't thick are disturbed" and then proceeds to discriminate different degrees of 'deprivation'; such constructs as "thick" and "deprived" are similar to some of those elicited by repertory grid techniques and are clearly less sophisticated concepts than Solomon and Kendall's "autonomous, intellectual orientation"!

The descriptions of pupils which have emerged from phenomenological studies often concentrate heavily upon pupils' social backgrounds. For example, all three of Sharp and Green's teachers appear to spend a great deal of time rationalising their pupils' deprivation when talking of their pupils; in Hargreaves' study, home background is again frequently mentioned by teachers although they also talk at length about their pupils' ability, behaviour and motivations. This emphasis in teachers' commentaries could be a reflection of the actual questions asked by the researcher to stimulate the commentaries, or of the direction in which the researcher has wittingly or unwittingly steered the teachers' reports, and hence may be a consequence of the inevitably subjective nature of the phenomenological approach.

In phenomenological studies of teachers' perceptions, the concept 'typifications' is frequently used (e.g. Hargreaves et al, 1975) which refers to a collection of attributes typically applicable to particular pupils. This seems analogous to the person perception theorists' use of the term stereotype: Cook (1971), for example, suggests that people build up a network of 'association rules' from their experience which inform them of which attributes tend to appear together in an individual. It is suggested that stereotypes serve a useful function in deciding how to react to other people: Korten (1973) points out, "The stereotype is implicitly a set of likelihoods which provide the perceiver with predictive power which he would not have without the stereotype" (p. 38). The use of the term stereotype suggests the use of static, inflexible ways of perceiving people, but person perception researchers have shown, in experimental studies, that stereotypes are flexible: Argyle and Kendon (1967), for example, showed that the attribution of intelligence to those wearing glasses had very shortlived effects; once a person became acquainted with another, attributions of intelligence were made on grounds other than physical appearance. Similarly in phenomenological studies of classrooms (Murphy, 1974; Sharp and Green, 1975; Hargreaves et al 1975), it has been found that teachers' typifications appear to become more flexible during the year. Hargreaves (1977a) points out that several person perception models, implicit in classroom research, fail to allow for these changes in perception over time and fail to reflect contextual or situational variations. Hargreaves suggests an alternative model, proposing that initially, teachers, on the basis of their previous knowledge, stereotype pupils, then elaborate their typifications to include such areas as the motivations of the pupil, his/her home background and peer relationships, and make allowances for the contexts of their assessments; the highly elaborated typifications then become stabilised.

Possibly as a result of concern over teachers' use of stereotypes or typifications, several studies have investigated the validity of teachers' assessments. Wilson (1969) for example, showed that teachers' assessments of arithmetic ability and reasoning ability taken at the beginning of a session correlated between +0.45 to +0.88 and +0.33 to +0.85 respectively with attainment test scores. Four months later, the correlations were +0.79 to +0.96 and +0.63 to +0.89 respectively, suggesting that the teachers were quite accurate in their assessments of these abilities, and although the accuracy varied amongst teachers, it improved with increased teacher-pupil contact. Assessments by the teachers of pupil attitudes and sociometric status were less accurate. Jackson and Lahaderne (1967) found smaller correlations between measures of pupils' I.Q. and of achievement in reading, language and arithmetic and teachers' estimates in these same areas, ranging from +0.31 to +0.51, the correlations being generally higher for boys than girls. Brophy and Good (1970) indicated correlations similar to Wilson's (1969), and Evertson, Brophy and Good (1972) found even higher correlations between teachers' assessments of achievement and objective test measures with teachers of first year primary school children, early on in the term. This study was followed up by Willis (1972) who again found that teachers in the first year of primary school can quite accurately predict achievement (r=0.63) after only a few days of contact with the children. Gregg (1978) also demonstrated, in a sample of 2 primary schools, that teachers assessments of ability correlated at +0.74 with pupils' I.Q.

Such correlational studies, however, do not prove the validity of teachers' assessments, although they may suggest that both teachers and the tests are abstracting the same global differences amongst the children. Consequently, the high correlations found between teachers' predictions and attainment test scores at the beginning of the school year do not necessarily contradict Hargreaves' typification model which suggests that teachers adopt stereotypes when they first come into contact with pupils, and hence, one might expect, have less valid perceptions of pupils at this time.

A more satisfactory answer to the question of the validity of teachers' assessments may lie in investigations of how teachers form their assessments. Several simplistic accounts of the process have been proferred. For example, Nash (1973) found significant correlations between how favourably a teacher perceived her pupils (estimated in terms of the summed ratings for each pupil on the repertory grid) and the pupils' reading quotient and class position: Nash suggests this is evidence of 'halo' and 'Pygmalian' effects, the more favourably perceived pupils being expected to achieve more and consequently performing better. However, this is a highly speculative interpretation of the data, which infers a great deal about teachers' cognitions and decision-making which is unsubstantiated. There may be 'halo' effects in teachers' assessments, or there may in fact be high correlations amongst the pupil attributes commonly assessed by teachers; these attributes may also be assessed accurately by teachers and they may well correlate highly with attainment - one could reasonably expect, for example, a significant correlation between Nash's three most frequently used constructs (hard-working-lazy, mature-immature, well-behaved-poorly behaved) and attainment.

Murphy (1974) suggests that in real classrooms the operation of both halo and Pygmalian effects may be severely restricted due to the teachers' distinctions between academic and social constructs. In his investigation of one primary school, he found that ability was construed as innate and unalterable whereas behaviour was construed as within the control of the teacher. In terms of ability and class position, children were seen to select and classify themselves, the teacher regarding himself simply as an observant onlooker.

A more detailed study of the formation of teachers' perceptions of pupils was made by Willis and Brophy (1974) using interview techniques. They collected the impressions of teachers with first year primary classes during the first two weeks of a new session, and found that teachers' perceptions of pupils appeared to be based largely on the pupils' observable classroom behaviour.

Much research on teachers' perceptions of pupils, their validity and their relationship to pupil performances has been stimulated by Rosenthal and Jacobson's (1968) "Pygmalion in the Classroom". Numerous variations of the Pygmalian study have been carried out; expectations, performances, and sometimes intervening variables such as classroom interaction, have been assessed in different ways with different samples, in different contexts.

The original Pygmalian study involved a whole school, where pupils were given a test of general intellectual ability early in the school year. Teachers were told that this was a test to detect "late-bloomers" who could be expected to show unusually high achievement gains during the coming school year, and were given a list of the "late-bloomers" in their class. The same test administered at the end of the year showed that the "late bloomers" had outgained other pupils, the greatest gains occurring in the first two years of the school. Rosenthal and Jacobson interpret these results in terms of teachers' expectations influencing pupil performance, with teachers' and pupils' classroom behaviour being intervening variables.

Baker and Crist (1971) reviewed the twenty-five replication attempts and related studies available at that time. The results of these studies were tabulated to show the effects upon the following dependent variables although no study included more than two or three: teacher classroom behaviour, pupil classroom behaviour, pupil achievement and pupil I.Q. Twenty studies used the Pygmalian induced expectancy method and eleven of fourteen showed effects on teacher classroom behaviour, two of six showed effects on pupil classroom behaviour, three of nine showed effects on pupil achievement and none out of nine showed effects on I.Q. Of five naturalistic studies (using naturally occurring expectancy effects, as in the case of younger siblings taught by the same teacher as older siblings) three measured pupil achievement: all naturalistic studies showed significant differences, but none of the studies included I.Q.

No study has exactly replicated the Rosenthal and Jacobson experiment, and the findings of teacher expectancy studies are far from conclusive, as pointed out by Elasoff and Snow (1971), and later by Brophy and Good (1974), Dunkin and Biddle (1974) and by Crano and Mellon (1978). In fact Pygmalian studies have encountered a large number of methodological criticisms. Finn (1972), for example, points out the problem in experimental studies of whether teachers' expectations are in fact changed by the false information passed on by the researchers, and suggests that one reason for the lack of significant differences in studies using classes in the higher grades, or using teachers who have already had several weeks of contact with their classes, could be the natural expectations which the teachers have already formed. Several studies have been criticised on statistical grounds, such as the inappropriate use of gain scores (see Crano and Mellon, 1978); studies involving laboratory type (i.e. non-classroom, and sometimes non-teacher) situations have been criticised on the grounds of their lack of representativeness to real classrooms and real teachers (e.g. Snow, 1974). However, one of the main areas of criticism levelled at Pygmalian research is the assumption of the linkage between the independent and dependent variables, the lack of explicit models to link these variables and the lack of investigation into intervening variables. As Finn (1972) points out, experimental expectancy studies assume: " 1) that the test data will produce changes in teacher attitudes, 2) that modified teaching behaviours will result, and 3) that these will be of sufficient magnitude to produce changes in pupil achievement. That a single test score, provided the teacher at a single point in time, would be sufficient to produce all three outcomes is questionable" (p. 390).

Several speculative accounts have been suggested to explain the mechanism by which teachers' expectancies may influence pupil performance. Cohen (1972) suggests that classroom processes could be understood in terms of the development and maintenance of status systems, and that one's position in a status system may, for example, determine the degree of active involvement in learning. Werner (1972) suggests that the growth of achievement mótivation is dependent upon the learning of cognitive structures which represent the causal importance of effort; and that teachers who encourage the growth of achievement motivation may be encouraging pupils to perceive effort as an important determinant of performance, which, in turn, may influence the pupils' intensity of work, and the children's degree of persistence in the face of failure. However, such conceptualisations leave unanswered many questions concerning the interrelationships of teachers' and pupils' behaviour and cognitions, and of the decision-making inevitably involved in the process.

Brophy and Good (1974) present a more explicit model of how teachers' expectations may influence pupil performance in some cases. They view the expectancy effect as a series of stages, beginning with the stage, early in the school year, where teachers form differential expectations regarding the achievement potential and personality characteristics of their pupils, some expectations being rigid, others more flexible. Teachers then treat pupils differentially and where expectations are inappropriate and rigid, pupils are treated inappropriately. Pupils, however, also respond differentially, and Brophy and Good suggest that, other things being equal, pupils will respond to teachers with behaviour that complements and reinforces the teachers' particular expectations for them. Over a period of time, the pupils for whom the teachers hold inappropriate and rigid expectations, will gradually approximate the teachers' expectations more and more closely. Consequently, over the school year where teachers' expectations are rigid and inappropriate, these expectations will be gradually fulfilled by the pupil, and will result in a level of achievement which may not be predictable on the basis of past achievement alone. However, this process may only occur with a few children in the class, and for the others, where the teachers' expectations are either appropriate, or less rigid and have eventually become appropriate, their performance may be more predictable from past achievement.

Unfortunately, the steps in this model have not been adequately researched, and only one study can be found which has attempted to examine closely the mechanisms of teacher expectancy effects. Luce and Hoge (1978) with a sample of five classrooms, took behavioural measures of teacher-pupil dyadic interaction and pupil attentiveness, measures of pupil intelligence and achievement in verbal and mathematical skills, and teacher ratings of pupils on scales of general intellectual ability, motivation to do schoolwork, reading achievement and mathematics achievement. They found that teacher rankings of pupils on motivation correlated significantly with a number of teacher-initiated interactions such that those perceived as less motivated received more interaction; similarly correlations between behaviours and test scores suggested those low in I.Q. and achievement test scores engaged in more interaction of both teacher- and pupil-initiated varieties and had lower scores of attention. Teacher ratings of pupils correlated significantly with I.Q.

and achievement test scores. Luce and Hoge interpreted these results in terms of teachers' perceptions of ability and achievement not being translated into differential teacher behaviours; whereas the correlations involving motivation ratings and classroom behaviours were interpreted in terms of teachers' "natural responses to poorly motivated pupils". Four separate factor analyses were carried out on the teacher rating, teacher behaviour, child behaviour and achievement scores respectively to reduce the data to four measures. Regression analyses suggested that achievement could be significantly predicted from behaviour factors independent of their relations with expectancy. Consequently, in Luce and Hoge's study, it would seem that expectancy effects were not operating. However, Luce and Hoge collected data towards the end of the academic year; one could hypothesize that this is the least likely period in which to find teacher expectancy effects. Moreover, Luce and Hoge examined class data as a whole: one could well anticipate, as do Brophy and Good (1974), that expectancy effects may only occur in the case of a few pupils in the class, of whom the teacher has 'favourable' perceptions; a correlational analysis of class data as carried out by Luce and Hoge would obscure effects of this kind.

The discovery of Pygmalian effects appears to depend much upon the methodological approach of the researchers. It has been shown by experimental studies that, in tutoring situations, some expectancy effect can be found (e.g. Beez, 1968). However, classroom studies using experimentally induced expectations have frequently not shown any expectation effect (see Dusek, 1975; Brophy and Good, 1974) and even when expectancy effects are found, they appear to be slight. Several naturalistic studies have shown stronger expectancy effects than have experimental studies (e.g. Brophy and Good, 1970) although Brophy and Good (1974) point out that some naturalistic studies have shown no expectancy effects, which may be interpreted in terms of some teachers not allowing expectations to interfere with their ability to treat students appropriately.

Brophy and Good (1974) suggest that a distinction may be made amongst proactive, reactive and overreactive teachers to account for the different expectancy effects found on different occasions. Proactive teachers are defined as having specific goals in mind, they initiate most interaction and do not let their expectations for behaviour interfere with progress toward these goals. Reactive teachers allow much pupil initiation and pupils play a large part in controlling the patterns of teacher/pupil interaction. Overreactive teachers are not only conditioned by student differences, they 'overreact' by treating the pupils as if they were even more different than they really are. Brophy and Good suggest that it is overreactive, and to some extent, reactive, teachers who are going to act most differentially towards their pupils and therefore produce expectancy effects. However, this hypothesis is as yet untested, and may be difficult to test due to the value judgements implicit in identifying these categories of teachers: for example, the identification of overreactive teachers depends upon a criterion of appropriate reactivity, and the identification of proactive teachers depends upon the identification of pupil differentiations appropriate for specific teaching goals.

More recently, some studies have suggested that pupils' own expectations may have a more significant effect upon their performance than do the expectations of the teacher. Rappoport and Rappoport (1975), for example, demonstrated that induced expectancy (in the form of high test results) had greater effect on performance when provided to a sample of pupils, than when given to a sample of teachers, and the former was as effective as attempting to induce expectancy in both the teacher and the pupils. However, this result could well be due to the nature of the experimental treatment - false test results given by an educational research worker may be far more likely to induce a state of expectancy in pupils than in teachers.

In another study involving possible pupil variables in the Pygmalian mechanism, Fiedler (1975) found that pupils' perceptions of their influence in classroom interaction, measured by questionnaire, related positively and significantly to academic achievement, but observed measures of influence (using the Hit-Steer Observational System, which assesses the number of times a teacher or pupil attempts to influence the other and whether they are successful) showed no significant relationship to achievement. From these results, Fiedler concluded that students learn more in classes where they feel they have more control over their behaviour, regardless of whether they actually do exert such control. However, the direction of influence amongst the variables, or the interaction among them, is unknown; consequently, it is possible, for example, that perceived classroom influence may be enhanced by academic achievement.

Pupil variables may in fact influence teachers' perceptions and behaviours. Brophy and Good (1974) reviewed studies suggesting that sex, physical characteristics, seating position, sibling performance and personality can be related to patterns of teacher-pupil interactions. Klein (1971) found, in an experimental situation, that college students could significantly influence the amount of criticism and approval used by lecturers by appearing either attentive or inattentive. Noble and Nolan (1976) found, in a sample of senior high school children, that pupil-volunteering was significantly related to the number of teacher-directed questions received by the pupil, and that this pattern was consistent over time, suggesting that in general teachers give more attention to those pupils who "demand" it.

In an attempt to settle arguments concerning the direction of the major influence between teachers' expectations and pupils' achievement, Crano and Mellon (1978) carried out a cross-lagged panel correlational study, using data collected by Barker-Lunn (1970), to investigate the correlations amongst measures of teachers' expectancies and pupils' achievements taken on yearly occasions. The correlations between teachers' expectations and pupils' later performance were greater than the correlations between pupils' performance and teachers' later expectations; strangely, social attributions were also found to correlate more highly with future achievement than were academic assessments and Crano and Mellon suggest this may be indicative of a more complex underlying process involved in the Pygmalian effect; however, it could be accounted for in terms of halo effects. Although Crano and Mellon interpret these results in terms of teachers having a greater expectancy effect than pupils, the correlations between teachers' ratings at the beginning and end of the years are not high, especially in the lower grades where the mean correlation is 0.289, whereas the correlations between achievement at the beginning and end of the year is above 0.8 for all grades: this suggests that there is considerable flexibility in the ways in which teachers perceive their pupils, and considerable stability in pupils' performances. Pupils' expectations and classroom behaviour were not studied and whether and how these factors may have influenced teachers' perceptions of pupils or the pupils' performance remains problematic.

The evidence from research on the influence of teachers' expectations is far from conclusive. However, reviewers of Pygmalian studies have been unanimous in their assertion that more replication of expectancy studies would be a futile exercise (e.g. Elasoff and Snow, 1971; Brophy and Good, 1974; Dunkin and Biddle, 1974; Dusek, 1975; West and

Anderson, 1976), and that research should concentrate upon the mechanisms by which teachers develop expectations and by which these expectations may influence pupil achievement.

Several studies have shown that teachers' perceptions of their pupils can be related to teacher-pupil classroom interactions. Silberman (1969), for example, interviewed ten teachers asking them to nominate one pupil in their class towards whom they experienced attitudes of 1) attachment, 2) indifference, 3) concern, 4) rejection*. In observing the classes it was found that the attachment group more frequently answered correctly and made few demands of the teacher compared to their classmates, but the teacher did not call on them more than other pupils although they did receive more praise, and Silberman (1971) suggests that pupils in the attachment group may have been favoured in more subtle ways. The concern group was seen as making the greatest number of demands upon the teacher, and they received the most teacher contact of the four groups studied. The indifference group received least teacher contacts, and the rejection group received a large number of contacts, many of which were reprimands, but a high degree of praise was also in evidence. Most differences between the groups, however, were not statistically significant. Jenkins (1972) replicated Silberman's procedure and also interviewed the teachers regarding their perceptions of pupils' behaviour

* these attitudes had been noted by Silberman to be particularly frequent in teachers' discussions about pupils in an earlier study (Jackson, Silberman and Wolfson, 1969).

during the observation periods, and obtained ratings from teachers concerning the frequency of occurrence of certain classroom behaviours. He found interaction patterns similar to Silberman's, but also found much higher correlations amongst some of the teachers' ratings of pupil behaviours than between the ratings and the observation count of the behaviour (suggesting a possible halo effect). Jenkins also found that teachers' ratings were much better discriminators amongst the groups than was observed behaviour (i.e. differences in teachers' ratings of the groups were greater than observed differences). This again provides support for the notion that teachers' behaviour towards pupils is closely related to their perceptions of pupils, but would also suggest that teachers' perceptions of pupils are not based solely on pupils' behaviour. Good and Brophy (1972) again replicated the Silberman study with some slight methodological improvements (teacher attitude data was collected after the observation data; teachers were asked to nominate three instead of one for each attitude group; and the study took place in nine classrooms in different types of schools). They found similar trends, including what was interpreted as the teachers' attempt to compensate for the attachment pupils' greater frequency of initiating contacts and seeking response opportunities, by calling upon them less frequently to answer questions or to discuss their work. Evertson et al (1973) in another replication study, however, found few differences in interaction among different attitude groups, although this is interpreted by

Brophy and Good (1974) as due largely to the inclusion of as many as five pupils in each group, hence cancelling out the effects of the more "extremely perceived" pupils.

Garner and Bing (1973) investigated five classrooms, assessing the distribution of teacher-pupil contacts, the degree of pupil involvement in work, obtaining teachers' ratings of their pupils on eleven five-point scales, and obtaining a measure of socioeconomic status and I.Q. A cluster analysis of all this data resulted in six clusters, which showed some trends similar to Silberman's. Two clusters, for example, obtained most teacher-initiated contact - one rated averagely on ability, poorly on behaviour and highly on likeableness (cluster 1), the other rated poorly on behaviour and work (cluster 4); these may correspond to Silberman's concern and rejection group. Garner and Bing's cluster 2 was identified as bright, outgoing, hard-working, well-behaved and well-liked by the teacher; this cluster engaged in a large proportion of pupil-initiated work contacts and teacher-initiated procedural contacts, but a low level of teacher-initiated work contacts, and may correspond to Silberman's attachment group. Garner and Bing's clusters 3 and 5 were rated averagely and engaged in a below average number of teacher contacts, corresponding to Silberman's indifference group. The sixth cluster was a group of three pupils who appeared to be an exaggerated version of cluster 1 (the concern group).

However, Garner and Bing's study suffers from several faults of analysis: all the teachers' data were analysed together thus possibly obscuring individual differences in 'clustering' pupils; the rating scales were pre-determined by the researchers and scores were standardised, hence the degree to which teachers could discriminate amongst pupils on a construct did not influence the clustering and those which were poor discriminators for some teachers may have been overweighted; the observation data was also included in the cluster analysis, hence the clusters were discriminated on the grounds of all the data, and the analysis did not provide a test of the hypothesis that pupils perceived differently would be differentially treated; and the method of cluster analysis required the number of clusters to be predetermined, thus possibly preventing the development of 'natural' clusters. Consequently, Garner and Bing's clusters may well not accurately reflect the typology (or way of construing pupils) which is actually employed by the individual teachers.

As reported earlier, Luce and Hoge (1978) found significant negative correlations between teachers' perceptions of pupils' motivation and several classroom interaction measures, suggesting that pupils perceived low in motivation tended to be engaged by the teacher in more interaction, but Luce and Hoge considered class measures in their study and did not examine the relationships of interaction with differently perceived groups.

In a novel and interesting study carried out by Lundgren (1972) a relationship was found between a "steering group" (identified as those between percentiles ten and twenty-five in terms of ability) and patterns of teacher-pupil interactions in secondary schools. It was found that whereas the I.Q. of the class was unrelated to the number of "moves" (interactional unit) per lesson, the I.Q. of the steering group was positively related. Lundgren suggests that the "steering group" may serve the function of assisting the teacher to pace a lesson and inform him of when to change to the next topic.

Lungren further discovered significant differences in teacher-pupil interaction patterns amongst groups of pupils elicited from teachers using Marton's (1970) cognitive structures approach. This approach assumes that information is cognitively grouped and stored according to its similarity and hence will be recalled in meaningful groups; Lundgren asked teachers to recall their pupils as they remembered them, not in alphabetical order and not according to how they were seated in the classroom. Lundgren suggests that the groups which teachers distinguish may fulfil different roles: whereas the role of the steering group is to provide feedback to the teacher to enable appropriate pacing of the lesson, other groups may fulfil the role of structuring and initiating discussions, and others may have the passive role of merely listening to class discourse. Lundgren suggests that the nature and context of teaching may require teachers to form such groups. A similar point is made by Sharp and Green (1975) who suggest that the problems of management and control require the teacher to differentiate amongst pupils with respect to a rationale for the allocation of her time and energies, in order to solve the problem of order.

In summary, it would seem that teachers' cognitions can cover a wide variety of phenomena, although the cognitions which have been most researched and have been found to relate most strongly to classroom interaction are those concerning perceptions of pupils. Teachers appear to use few dimensions in their assessments of pupils and several studies suggest halo effects. Teachers' perceptions of pupils have also been related to pupil performances but the results of such studies are inconsistent, findings appear to be strongly influenced by the research designs adopted, and explicit accounts of the suggested processes involved have not been verified. Teachers' perceptions of pupils have been measured in various ways, but the literature is relatively consistent in its findings of the ways in which teachers discriminate amongst their pupils, and a small amount of research has suggested relationships between the attributes assigned to clusters of pupils within the class and patterns of classroom interaction.

The possible, and as yet unverified, uniformity amongst teachers in their perceptions of pupils and patterns of classroom interaction has been speculatively adduced to the context of the school and classroom. It may be within the scope of classroom decision-making research to investigate the mediating mechanisms between school and classroom contexts, teachers' perceptions and patterns of classroom interaction.

Pupils' Cognitions: their relationship to pupil behaviour, teachers' cognitions and teacher behaviour.

Brophy (1974) speculates that in the average classroom, pupils may have as much influence on teachers' behaviour as teachers do upon that of pupils. However, the teacher, probably as a result of the responsibilities and expectations attributed to her profession has generally been taken as the prime influence upon classroom events, and consequently relatively little research has been carried out upon the pupils' part in classroom interaction.

It has already been noted that various attributes of pupils, such as sex, physical characteristics, seating position, sibling performance and personality, can be associated with teacher-pupil interaction, that pupil expectancy effects have in some studies been stronger than those of teachers, and that in the case of college students at least, some aspects of students' behaviour can influence teachers' behaviour. However, more detailed studies of pupils' cognitions and their relationship to classroom interaction are rare, possibly due to the difficulty in interviewing and obtaining reliable introspections from pupils, especially in the primary school, where a large proportion of classroom research is carried out. Sharp and Green (1975, p. 239), for example, comment on the difficulty they found in interviewing primary school children, and point out that most of the research on peer group influences and pupils' "world views" has been carried out on older children; nevertheless, from their observation of three primary school classrooms they suggest that "the pupil plays a highly significant part in his own identity construction" (p. 127).

Nash (1976) investigated how pupils perceived their teachers, using repertory grid techniques, and found that the most commonly occurring constructs were: keeps order - unable to keep order, teaches you - doesn't teach you, explains - doesn't explain, interesting - boring, fair - unfair, friendly - unfriendly. Pritchett and Willower (1975), using a questionnaire measure of pupil perceptions of "custodial teacher pupil control behaviour", found a significant correlation between this measure and a measure of negative attitudes toward school. However, correlations were low, ($r = 0.31$) and other variables were not controlled thus rendering interpretations of this relationship speculative.

Several studies have related pupil self-concept measures to other classroom - related variables, although, as noted earlier, the term "self-concept" is frequently used in various ways, (see Wylie, 1961; Bilby et al, 1972). Dean (1976) found, with a sample of forty-eight "gifted" children, that high scores on a self-esteem questionnaire were significantly associated with greater learning on two laboratory learning tasks, involving free recall and paired associate learning. An analysis of the order of recalled items showed that those with high self-esteem tended to recall in reverse order to the order of presentation, whereas those low in self-esteem recalled in the same order: Dean suggests this may indicate that those high in self-esteem may be adopting more complex learning strategies. Shiffler et al (1977) observed the classroom behaviour of primary school children and found different patterns of behaviour for different levels of self-concept, the highest self-concept group showing the greatest percentage of "task-oriented" behaviours, and the lowest exhibiting the largest percentage of "non-directed behaviours".

Nash (1973) found high correlations between teachers' ranks on school subjects and pupils' own estimates of their positions, and suggested that pupils' self-concepts may be greatly influenced by teachers' perceptions. Gregg (1978), replicating some of Nash's work, found that correlations between pupils' and teachers' ratings of class position were high in the summer term but very low in the autumn term; Gregg suggests that time and the level of interaction may be among the factors determining how accurately (compared to the teacher's assessment) a child perceives his/her class position, although whether teachers' or pupils' ratings changed most over the course of the year was not investigated.

Several studies have recently found a strong relationship between pupil attendance at school, or time spent in work involvement, or pupil attention in class, and the level of pupil achievement (reviewed by Bennett, 1978). The studies are of a correlational nature and the interpretation made of these results is that pupils' achievement is influenced by attendance, work involvement and pupil attention. Although this is a largely common-sense interpretation (e.g. if pupils don't go to school, they are unlikely to learn the knowledge and skills generally imparted through a school education), the high correlations may also be partly accounted for in terms of the demotivating effects of consistent low achievement (i.e. those who don't achieve at school may be less inclined to attend or participate) or in terms of the inability of low-achievers to participate in class work.

In summary, little appears to be known of the nature of pupils' cognitions or their relationship to other classroom variables. Several studies of classrooms have considered pupil behaviour alone (e.g. Boydell, 1975) or have been concerned with pupil achievement measures (see Rosenshine, 1971; Rosenshine and Furst, 1973; Dunkin and Biddle, 1974), and attempts to consider pupil cognitions have, on occasions, been limited to inferences from pupil behaviour as a result of the difficulties involved (e.g. Sharp and Green, 1975).

Clearly teachers are involved in a considerable amount of cognitive activity of which forming assessments regarding the performance and attributes of the children in their class is a part. They also react differently to groups within the class which are perceived differently, and their ratings of pupils on different constructs intercorrelate highly. However, it has also been shown that the expectations induced in, or formed by, some teachers do not always influence the pupils' performance, that teachers' ratings of their pupils are not constant over time, and that pupils may have some influence on teachers' perceptions of them, through the behaviour which they exhibit in the classroom.

From the evidence available, one could in fact conclude that teachers may be accurate in their assessments of pupils, and may view different techniques and responses as appropriate for different children. As Sharp and Green point out, the classroom context may require the teacher to differentiate hierarchically amongst her pupils in order to solve the problem of order and provide the rationale for her allocation of time and energies. What then become questions worth further exploration are: do pupil attributes constitute the main component of those teachers' cognitions influencing teaching behaviour? If so, in what ways do teachers discriminate amongst their pupils and why? How do those discriminations influence teachers' decision-making and consequently classroom behaviour? How is classroom behaviour interpreted by pupils, and what influence do pupils have over classroom interaction? To answer such questions requires the investigation of the cognitive activity of both teachers and pupils, and exploratory studies were undertaken to clarify the nature of the concepts and possible processes involved.

CHAPTER 5 - PILOT STUDIES

A series of studies was carried out in order to develop clearer notions of the nature of classroom decision-making, and to investigate teachers' perspectives on it. Attempts were made to answer such questions as what do teachers think about while they are teaching? how do teachers explain the processes of classroom decision-making and how do they account for their learning of the process? and which cognitions actually influence their classroom behaviour? It was also intended to clarify concepts which may be useful in conceptualising teachers' classroom decision-making, and to pilot methods of accessing and quantifying teachers' cognitive activities.

PILOT STUDY 1.

It seemed an appropriate starting point to spend some time observing and talking to teachers about their classroom behaviour and their reasons for such behaviour. It was not intended to formulate specific hypotheses about decision-making, but rather to initiate a 'loose', exploratory study to consider the ways in which teachers accounted for their behaviour, what classroom behaviour related to the decisions they were aware of and of whether teachers thought in terms of making decisions at all.

A primary school in Central Scotland, on the outskirts of an industrial town, was selected for the study, on the grounds of convenience for the researcher. The school children, numbering four hundred and seventy five, came from several surrounding housing estates, most of which were privately owned. A primary rather than secondary school was chosen due to the greater amount of classroom interaction which generally occurs in the former; and hence, the likelihood of teachers being involved in a greater amount of classroom decision-making.

Nine teachers (throughout all levels of the school) were observed at the beginning of the first term for two days each, a longer period (about four days) being spent with three of the teachers. During these six weeks, the observer spent most of the time sitting in the classroom, making written notes of what the teacher said and did, especially when unexpected or unusual events occurred. Breaks, free periods (when the class was taken by the visiting gym teacher), handwork sessions (when only the boys were left in the classroom with the teacher) and a few minutes at the end of each day after the children had gone home, were spent talking to teachers about what had happened in their classrooms, what had passed through their minds when they were teaching, and how they thought they had learned to cope with particular situations in the way they did.

The study resulted in a large volume of notes, from which several generalisations could be formed:

1. When asked questions relating to observed classroom events, teachers frequently spoke of the pupils, and justified

their own behaviour in terms of pupil attributes. For example, a primary six teacher who was asked why she sent a boy back to his seat when he had come out for help with an arithmetic problem, yet had helped a girl who had similarly requested it a few minutes later, explained that, "Peter is lazy - he doesn't bother to read the question and expects me to make things easy for him. He can do it when he tries." whereas, "Carol was genuinely stuck. If she comes out, I know she has tried and really can't do it."

A primary five teacher, who was asked why she moved a boy from his seat to work at a separate desk at the back, replied: "He talks too much. Quite a chatterbox at times and I like to put a stop to it before he really gets going and keeps the others off their work."

A primary four teacher, when asked why she did creative writing using work cards which she had constructed herself, justified this in terms of the pupils, although not in terms of particular pupil attributes: "The children enjoy using the pictures for their stories. They have a wide choice and I think they enjoy it. I look for pictures I think will interest them, and ask lots of questions to help them think up what to write, it makes writing easy."

When giving reasons for their behaviour, teachers often expressed their concerns with keeping the children busy, maintaining order or maintaining the children's interest. Reasons concerning the children's learning were rarely mentioned. However this may have been a reflection of the time of year (at the beginning of the session, the teachers may have been more concerned with organisation than usual) or of the type of questions asked.

2. As the discussion of pupils seemed to figure largely in teachers' conversations about their teaching, it was not surprising that when specifically asked to talk about their pupils, some teachers spoke at great length. All the teachers referred to the intelligence or academic ability of the children, one teacher referring to her pupils almost exclusively in these terms.

Home background was also frequently mentioned (particularly, though perhaps coincidentally, with the younger classes), and the personalities and behaviour of the children were also discussed. Teachers spoke of children whose parents "spoilt them", who had parents that "didn't care", who came from "a poor home" or have "mothers out at work" (this seemed to be disapproved of by several teachers, due to the mothers not being at home when the children finished at school); they also spoke of the child who was "happy-go-lucky", "serious", "delicate", "a dreamer", "a charmer", "quiet", "immature", "slow", "a chatterbox". Primary six and seven teachers tended to talk of their pupils in less favourable terms: "a rabble", "noisy", and "an undisciplined lot".

Teachers generally spoke at much greater length about a few individual pupils in their class, although some of their information was probably inferred or obtained from other members of staff. For example, a primary two teacher spoke of a boy whose parents spoilt him - when questioned about this, the teacher justified the judgement by saying that the boy always had money to spend, and the teacher pointed out that she had never met the parents. Because he was "spoilt", the teacher thought it necessary for her to be strict with him, "to show him he can't always get his own way". Observation bore this out: the child was frequently reprimanded for minor offences (such as standing with his hands in his pockets), and on more than one occasion reference was made to his having too much money to spend. A primary six teacher spoke of a girl from a poor home whose parents showed no interest in her work - again the teacher said she had never met the parents, and after questioning, it seemed that the judgement was based on the child's appearance (less well dressed than other children in the class) and the fact that the girl, who was spoken of by the teacher as being quiet and timid, sometimes didn't do her homework (the teacher also knew from a colleague that the girl's younger brother also tended not to do his homework).

The teachers sometimes seemed to have a tendency to try to knit their knowledge together - as if to make their pupils fit an acceptable picture or to find reasons (however tenuous) for a pupil's behaviour. For example, a primary five teacher spoke of one boy as "the type who'll struggle along but get there in the end" and of a girl as "the type who'll sail through life, leave school at sixteen, get married and be quite happy never having done very much".

In spite of these discussions taking place during the first month of a new school year, the teachers could speak at length about the pupils and gave the impression of knowing the pupils well, although the source and validity of much of their knowledge was undetermined.

3. In view of the emphasis which teachers seemed to place upon characteristics of their pupils when talking about their teaching, Kelly's triadic elicitation method was used to investigate further how three teachers construed their pupils. A great variety of constructs were revealed, as illustrated below. However, the teachers seemed on several occasions not to think in terms of bi-polar dimensions (Kelly, 1955), but in terms of attributes. For example, a child was reported as being hard-working or not, confident or not, rather than as more so than another child. In the situation of triadic elicitation, teachers frequently provided responses which were clearly not unidimensional e.g. "Those two are quite bright, and he's a good swimmer".

As can be seen from table 5.1, most of the constructs fall into the areas of ability (or academic constructs), behaviour and personality. It is difficult to spot any individual differences amongst teachers in the constructs used although Teacher 2 seems to employ a greater proportion of constructs concerned with personality and "pleasant" behaviour. The teachers were asked which constructs they thought were important and which they took most note of when interacting with the children, and the results are noted in table 5.2.

There is some general agreement on the importance of ability constructs; and the primary one teacher seems concerned with maturity and home background, whereas the primary five and primary seven teachers seem more concerned with behaviour and personality. The three most common constructs found by Nash (1973) in his sample of eight Scottish primary school teachers were hardworking - lazy, mature-immature, well-behaved - poorly-behaved. Nash found no ability or intelligence constructs, which he attributes to the school being "progressive".

A broad mixture of constructs was elicited from these three teachers; some were highly evaluative (e.g. "nice children") and others were very specific (e.g. "careless writer"). It is possible that triadic elicitation may 'force' the respondent to reply with constructs which are not personally meaningful, simply in order to comply with instructions. This appeared to be the case in some instances, but attempts were made to avoid it: if a reply was not quickly forthcoming, the teacher was asked if the three children seemed completely different or if she couldn't think of any way of differentiating them - if this was the case, another three children were chosen.

Teacher 1 (P1)	Teacher 2 (P5)	Teacher 3 (P7)
capable	bright	bright
mature	pestering	slow
well-adjusted	careless writer	more of a spark
intelligent	remedial	hard-working
seeks attention	untidy	gentle v. vicious
high ability	good personalities (when asked to describe this, the teacher replied "pleasant, well-adjusted")	independent
able to concentrate	stupid	boisterous
well-behaved	troublesome	quiet
independent	nice children (explained as "being polite and working well")	good at swimming
introverted/ extroverted	mischievous	
good coordination	well brought-up (explained as "polite well-mannered, not bringing their problems to school, working well on their own")	
confident	well-mannered.	
active v. doesn't do much		

Table 5.1: Constructs elicited from three primary school teachers

<u>Teacher 1</u> (P1)

maturity

intelligence

*home background (explained in terms of whether child was well-adjusted or whether he behaves well)

<u>Teacher 2</u> (P5)

bright

whether mischievous or not

how pleasant/unpleasant are their personalities

<u>Teacher 3</u> (P7)

bright

whether works well or not

gentle - vicious

*this construct was not in fact elicited by triadic elicitation.

<u>Table 5.2</u>: <u>The teachers 'most important' constructs</u>.

4. When asked to talk about the situations they came across in the classroom, teachers had difficulty in understanding the question. Very often they assumed that they were being asked about discipline problems, and spoke about noise in the classroom, bad behaviour, children not doing as they were told, children wanting attention, and, in the lower part of the school, children's inability to concentrate. However, teachers didn't always seem to conceptualise these as situations, they looked upon them as characteristics of certain pupils. When talking about noise, for example, they usually spoke of certain pupils as being the noisy ones, or of having a noisy class this year. Bad behaviour, or disobedience, were seen as something of which only certain pupils were capable.

The same teachers as before were asked to talk in greater detail about the classroom situations they experienced during the researcher's observation, or had experienced in the past, including non-discipline ones. The situations mentioned are given in the left-hand column of Table 5.3.

All three teachers mentioned that they had encountered several other situations as well but that theycouldn't think of them on the spur of the moment. Although specifically asked to talk about instructional situations as well as managerial ones, much greater emphasis was placed on management, especially by teachers 1 and 3.

5. Having mentioned the situations they came across in the classroom, all the teachers were asked how they dealt with them. Several generalizations emerged, but the majority of the replies were concerned with the teacher's assertion of authority. All teachers, apart from one, stressed the importance of "squashing the kids right at the beginning". "Keeping down the lively ones and bringing out the shy ones" and "You've got to show them who's boss" were also frequently mentioned along with "ignoring the ones who always want your attention" or "not letting them off with it". "Coming up with a witty reply" was seen as appropriate to some situations. These responses could be due to the disciplinary nature which they seemed to attribute to classroom situations. The three teachers who were asked for descriptions of situations in greater detail were also asked about how they dealt with the situations, what might affect the way they dealt with them, and what factors they thought influenced their decision-making most. The results are in the right-hand column of Table 5.3.

TEACHER 1 (P1)

Situation	Teacher's reported approach to the situation
children lacking concentration, or getting tired and bored	Change activity
child seeking attention	Ignore the child, withdraw him from the work group if he disturbs others.
some children are slower than others	Go over the explanations again.
children who have hurt themselves	Show some sympathy, unless it's a child who tends to over-react for the sake of attention.
child not doing as he was told	Find the reason for it. It may be due to lack of concentration - the child has to be encouraged to listen to the teacher. It may be due to lack of ability, he can't do as asked - in which case there's not much you can do about it. Or it might be because the child likes to do his own thing - in which case you've to let him know he's to do what everyone else does. If the child is timid, you would react less aggressively, but if a telling-off was like water on a duck's back, I'd lay into him a bit more.
copying down wrongly from the board	I'd do much the same as I've just said.

When asked what affected her decision-making most in these situations, the teacher replied that she thought it was important for the children to learn to consider other people, to concentrate on what they were doing and to give their best effort.

Table 5.3: Teachers' reports of classroom situations and their approaches to dealing with them.

TEACHER 2 (P5)

Situation	Teacher's reported approach to the situation.
noise	I don't allow this during normal class-work. If it occurs then the child is given a warning and if it persists they are made to sit on their own. (The teacher explained that when she first started teaching she let children speak a little (explained in terms of college influence), but found that they were either cheating or disturbing each other; this led her to allow talking only in project or art and craft work where, she explained, some noise doesn't matter).
child points out an error made by the teacher	I believe in admitting my mistakes and apologising.
a child making errors	If several children are making the error, I'd revise the topic with the whole class; if it's only one or two, I'd go over the matter with them on their own.
children bringing in things of interest	The children bring things in - I've had a budgie, hamster, World War II gas mask. If the class is interested, I make it the centre of the day's work, drawing and writing about it.
deciding on what to do next when one activity finishes	This is an everyday, continuous process. I have the week's work planned out in advance, but decide as the day goes on what is to be done when. (The teacher explained that this was affected by her mood, how much marking she had to do (if she has a lot she chooses an activity that won't add to it), and on the mood of the children (if they're "lively", she explained, she usually gave them written work).
children being slow in their work	If there are only two to three involved, I go over the work as a group. If they're very poor, I go over it with concrete materials.

Table 5.3 (cont'd)

TEACHER 2 (P5)/Continued.

Situation	Teacher's reported approach to the situation.
bad behaviour	Depends on what the child did and on my mood. It depends on the particular child. I might use the belt, give lines, keep the child in during break, or give him extra work. The aim would be for the punishment to have some remedial effect on the child - what is punishment to one child might not be punishment to another. Written work might be given to a child who needs practice anyway, but this would be avoided if I already have a lot of work to mark.
child not doing home-work	Unless a very good reason could be given, like a crisis at home, the child would get double homework the next night.
laziness	It's important to nag children about this, they shouldn't be let off with it because it's something they can do something about.

This teacher reported that the main influence upon the way she reacted to these situations was the importance that the children should learn something, and that their learning should be made interesting.

TEACHER 3 (P7)

Situation	Teacher's reported approach to the situation.
child wanting attention	If he's a show-off, I'll ignore him. If it's a child who really needs a lot of attention, then I would give it. (When asked how she differentiated these, she said the latter usually had home problems.)

Table 5.3 (cont'd).

TEACHER 3 (P7)/Continued.

Situation	Teacher's reported approach to the situation.
noise	It's important to make it clear to the children at the beginning when they can talk and when they can't. By being quiet and speaking quietly, I think you can encourage the children to follow suit.
children don't understand something that has already been explained, possibly several times before	You teach the whole class to start with, then find yourself going over it again with those who haven't understood, repeating the process, gradually whittling down the numbers till you're left with those who never do understand.
organisation situations, involving the setting out of work or the work routine	You have to show them what to do in explicit detail, and it takes the children quite a while to get into your way of doing things.
refusing teacher's authority	I'd send or drag them to the headteacher.
movement about the classroom	If it's to do with work, like sharpening a pencil, or a move to the library corner for a book, that's O.K., but for any other movement, I'd give them a telling off.
pupils being cheeky	There are different forms of cheek and different ways of handling it. Some children, usually ones who are quite good most of the time, don't realise they're being cheeky. If I mimic them, or tell them they're being cheeky, that's enough. But some children - the rough ones - you have to clamp down on and show them that you won't stand for their cheek. (When asked what distinguished a "good" child from a "rough" one, she replied that it was very much the home background.)

This teacher reported that what affected her responses to these situations most was her concern to have a good relationship with the children, for the children to learn something and for order in the classroom to be maintained.

Table 5.3 (cont'd).

The reported responses of teachers are not directly comparable since they didn't all mention the same types of situations. Where they did have situations in common, the teachers' perceptions of their context sometimes differed and the teachers quoted different "rules" for dealing with them, and these rules also differed in their degree of generality. For example, teacher 1 ignored children who sought attention and withdrew them from their group if they disturbed other pupils (supported by classroom observation), teacher 3 ignored "show-offs" who wanted attention, but said she gave it to those who "really needed it" (unsupported by observation). In another example, teacher 2 reported telling children off for talking and making them sit on their own if it persisted, (supported by observation) whereas teacher 3 believed in encouraging quietness by being quiet herself (supported by observation). Consequently, it may be that teachers differentiate situations differently and deal with them in slightly different ways, thus each teacher construes her environment in a personalised way. Some constructs also seem to be more critical than others, to particular teachers, in responding to some pupils in some situations: for example, the primary seven teacher mentioned that in dealing with a child who was cheeky, her decision would be influenced by whether he was "rough" or not and perhaps by his home background; and in the situation where a child made a simple error the child's intelligence might affect her response.

6. All the teachers were asked how they had developed their techniques of dealing with particular situations. Several reasons were given. In the case of "squashing the kids at the beginning", all of the teachers reported experiences, at the start of their careers, of not being hard enough on the children and losing control of the class as a result. One teacher thought it was fairer on the children "to be tough" because "if you start off friendly with them and you lose control then you have to be really nasty to get it back". Two teachers reported being advised to "squash them at the beginning" at college but not taking any notice of the advice until they experienced the results for themselves. A primary seven teacher reported a similar form of 'operantly conditioned' decision-making which resulted in her making a rule never to hit children with her hands: when she once hit a boy on the head it resulted in an unpleasant argument where the boy threatened to bring his parents to the school - the teacher now believed that this kind of confrontation was best avoided. These 'decision-rules'* appear to be developed in order to prevent undesirable situations occurring and seem often to be learned through unpleasant experience. The teachers reported that many of their approaches to particular classroom situations were learned by trial and error but generally of a less traumatic variety than those above. Techniques derived from other teachers were also mentioned; for example, a P4 teacher rearranged the seating of her class into a horseshoe shape on the advice of an older colleague who suggested that this cut down the noise level. Teachers

* the term is used in the rather loose sense of rules which teachers report guide their action.

also spoke about thinking in advance of the kinds of situations they might come across and deciding what they would do (for example, before they took on a new class) and also spoke of looking back on their mistakes and deciding where they went wrong. Two teachers mentioned that the way you handle situations "comes naturally" and that "when something happens you just know how to deal with it". In conclusion, it seems that teachers decide how to respond to situations prospectively (teachers thought they did this especially when they first started teaching), retrospectively (generally when something went wrong) and spontaneously (but not in a reasoned, 'evaluation of alternatives' way) and, as one might expect, trial and error seems to play a large part in the acquisition of adequate 'decision rules'.

7. In observing the teachers nothing was recorded to contradict the teachers' reports of how they dealt with situations, and if teachers' reports provided a valid and substantial account of their teaching it would seem that much teaching behaviour (or, more accurately, management behaviour) can be accounted for in terms of a few basic decision rules. None of the teachers planned their lessons in any detail (two teachers said they preferred to decide what was to be done as the day went on) and instruction seemed in many cases to be spontaneous - for example a picture of a dormouse started off an instructional sequence on hibernation, a child writing "toies" instead of "toys"

started off a lesson on spelling rules and their exceptions, and a primary two teacher regularly burst into number songs at appropriate moments during the course of the day. It seemed as if teachers drew relevant short lessons from a memorised repertoire in response to cues which emerged throughout the teaching day.

8. When asked how they saw their role as teacher, teachers again had some difficulty in answering. Rewording the question in terms of the function of teaching or the goals of the teacher didn't appear to make answering any easier. It seemed that teachers were not accustomed to thinking in these terms. Their replies were generally vague, clichéd definitions of teaching: teaching involved "giving knowledge", "crowd control", "widening the children's experience", "preparing the children for life", "helping children to learn something". One teacher mentioned that college had taught her that her job was to prepare children for secondary school, but that she felt she was doing her job well as long as the children progressed - "if the kids leave my class with more than they had when they came in, then I feel I'm doing my job". However, she added that she thought it was also part of her job to make learning interesting for the children. Generally, the teachers described their role as imparting knowledge and maintaining order.

<u>Conclusions from Pilot Study 1</u>.

This exploratory study seems to confirm Jackson's finding that if teachers make rational decisions (i.e. consider objectives and evaluate alternative courses of action) this is not evident from the way in which they talk about teaching. On the other hand they do appear to talk quite freely about 'general guides to teaching' or 'decision rules' (e.g. "You've got to show them who's boss." "You have to go over the exercise first, otherwise they'll just write rubbish in their jotters") which, according to teachers' reports, seem to be developed by a process similar to operant conditioning. In discussing their own classroom behaviour, teachers seem to talk in terms of stereotyped ways of reacting to particular types of pupils rather than to situations. The teachers did not find it easy to talk about classroom situations, or about their role, but could often talk at great length about their pupils: whether this reflects the inadequacy of the former concepts in describing teachers' activities, or whether teachers' perceptions of pupils are generally more important to teachers than other cognitions or more easily verbalised, or whether this is due to the nature of the methods employed here remains problematic.

PILOT STUDY 2

When asking teachers what determined their responses to classroom situations, it was noted that some teachers on some occasions gave quite long commentaries suggesting that many factors could influence their reactions whereas others, or the same teachers on different occasions, gave very brief, simple commentaries suggesting few factors influenced their reactions. In order to explore further the factors affecting teachers' decision-making, a simulation exercise was developed, along the lines of the situation-response interview which proved reasonably fruitful in pilot study 1. Since several teachers had reported developing techniques for coping with classroom situations during their initial experiences in teaching and as they didn't appear to have a great deal of awareness of the reasons for much of their everyday classroom interactions, attention was also directed towards student teachers who, it was thought, may be more aware of their own classroom decision-making processes.

Initially, several hypothetical classroom situations were presented, one at a time, to a sample of two teachers and two student teachers, who were asked, "What more do you need to know in order to make up your mind what to do, and what would you do?"

However, the replies from the experienced teachers turned out to be considerably more elaborate than those of the student teachers. For example, in response to the situation "Your class is working individually and quietly, when one group of children start talking amongst themselves ", one primary seven teacher, with four years' experience, gave this response: "I'd look up to see if there was an obvious reason for the noise, such as a wasp flying about the room. If there was, I'd tell them to try and ignore it. If there wasn't, I'd want to know whether the children concerned were natural skivers or whether there was a skiver amongst them. If it was very near the end of a lesson I might ignore it. But otherwise, if they were skivers, I would go over to them and give them a warning - if that wasn't successful, I would split them up. If there was just one skiver amongst them and he was a bit of a clown, I'd move him to the front, but if I had a good relationship with him a comment might be enough. If it was only a little noise, I'd probably ignore it".

A primary five teacher, with three years experience, gave an equally elaborate although not so logically organised reply to the same situation: "You get all sorts of noises in the classroom. If they're doing informal work (teacher later explained this to mean art or craft work) I expect them to make some noise. If they're doing an exercise there shouldn't be any noise. My reaction would depend on whether the children were generally noisy or quiet, or a mixture. If they're normally quiet, something might be upsetting them - someone might have stolen something from them, or someone might be upsetting them, or there might have been an accident that would need dealing with. If they were usually noisy, I'd ask them to quieten down and see if anything in particular was disturbing them." (At this point, the teacher paused, and was asked what she would do if the group was a mixture)... "I'd ask them to settle down (pause). If they were doing maths, I allow some asking of neighbours. You also get a buzz going on at the end of lessons - I'd ask them to quieten down though I don't expect silence.

Then you get a bustling noise coming in and out the classroom. When another teacher comes in you get a noise - you try to quieten them down but you're usually involved in conversation so it's difficult."

In contrast, two student teachers (each with only three weeks' experience of teaching - mostly observation) responded to the same question as follows. Student 1: "I'd want to know how many of them there were. If there were a lot making a noise I'd ask what was the matter. If it was just one or two I'd ask them if they'd finished. If they had, I'd give them more work to do and if not, tell them, 'Well, get on with it.'"

Student 2: "I'd let it pass unless it reached an intolerable level, then I'd tell them to shut up."

There is an obvious difference between the number of factors determining the teachers' reported responses and those of the students, which may reflect the degree of complexity in their differentiation of the classroom environment. The experienced teachers, perhaps because of a familiarity with a wider range of classroom situations, can anticipate different variations of the 'noisy' situation and have developed different ways of dealing with them. The teachers appear to make more distinctions amongst pupils, as well as situations, in their responses, they quote 'usual patterns of events', or configurations of factors which they appear to view as typical (e.g. the quiet children possibly being disturbed because someone is upsetting them).

The simulation procedure appeared to facilitate teachers' recall of their techniques for dealing with classroom situations, and an attempt was made to discover the difference in number and nature of factors of which students and experienced teachers were aware in their decision-making, and to estimate the effects of teaching experience upon the students' responses. This seemed a useful area of study in developing clearer notions of the cognitive activities involved in teaching.

The study was restricted to teaching in the P4-P7 range: infant teaching (P1-P3) is generally regarded as being different in many ways to teaching juniors and hence this restriction was regarded as limiting the number of extraneous variables. A list of classroom critical incidents was developed with the aid of three experienced primary teachers, with classes in the P4-P7 range, who suggested many of the situations themselves, and eliminated others -some suggested by the researcher - on the grounds that they were very rare events, or did not seem very probable. The resulting list of twenty one situations (see Appendix I) was agreed by all teachers to be representative of the types of situations which primary school teachers encounter. The list of situations was used in a simulation procedure on a sample of eight students and four experienced teachers, who were chosen on the criteria of convenience, accessibility and their willingness to help in the research. It was expected that teaching practice might have an effect upon the ways in which students made decisions; consequently the simulation was administered before and after teaching practice, and the students in the sample were also interviewed concerning their notions of the teacher's role and of their notions of the type of teacher they would like to be, in an attempt to identify any global cognitive changes.

The students*, all graduates, were first 'tested' during their first term of a teacher training course, after three weeks observation in schools but no formal teaching experience, and were then 're-tested' in the second term after six weeks of teaching practice. The teachers were 'tested' and two of them 're-tested' after a similar time interval.** The instructions given to both students and teachers are noted in Appendix 1 together with the list of classroom incidents.

The students' and teachers' replies were tape recorded and then coded in terms of the number of 'decisions' made for each critical incident. A 'decision' was defined as the statement of a condition or conditions and the action that would be taken if the condition(s) were fulfilled or unfulfilled. (e.g. "If they were very noisy, I'd give them a severe reprimand", "If he obviously didn't understand, I'd go over it from the beginning", "If he was the type who'd sit and dream all day, I'd get him to come and

* one female student had taught in Africa for 2 years (VSO) and one mature male student had taught in a Bolivian commercial college for 2 years; no other students had previous teaching experience.

**the shortage of teachers' 'free time' resulted in only 2 teachers being retested (experienced teachers generally took 30-40 mins for the exercise).

sit in front of me" are examples of 'decisions'). If the intervieweе simply stated, for example, that her action would depend on the subject, the time of day and the children involved, and probing on the part of the interviewer failed to suggest how these would influence her action, no decision was recorded. In some cases, conditions for action were stated, but the actions were not very specifically associated with them. For example, one student said, "I would either tell him to get on or ignore it depending on the subject, whether he often looked out of the window, and on what sort of mood I was in". Further probing of this type of answer (with questions, such as "How would the subject being taught influence your response?") sometimes suggested that the student or teacher might be making several decisions, and in other cases resulted in no neatly categorisable decisions. Approximately three-quarters. of all the students' and teachers' responses required no probing and were easily coded. Of the remainder, about half received probing questions, and all required a slight degree of inference in deciding how many distinctions the teacher/student was genuinely making since the distinctions and consequent actions were sometimes rather unspecifically connected.

The coder reliability in coding the number of decisions made by students/teachers was assessed on 3 tape recordings coded at an interval of 1 month apart. The resulting reliability coefficients were 92%, 88% and 88%.* An attempt was also made to assess the validity of the technique by observing the classrooms of the teachers. However, during two days of observation only eleven critical incidents were observed. The observation took place in the second term and the teachers all seemed to have adopted fairly smoothly operating work routines where few critical incidents arose, at least during the presence of the observer. Of the few critical incidents observed, no contradictory evidence was noted.

Tables 5.4 and 5.5 show the number of decisions coded from the tape recordings of both teachers and students on both "test" and "retest" occasions. It can be seen that in the first term, the average number of decisions for students was 17.5 and the average for teachers was 20.3. In the second term, the average for students drops to 14.6 and that of the teachers is 21.

* calculated by the formula:

$$\frac{\text{N. of decisions identified on one coding only}}{\text{N. of decisions which were identified on both codings}} \times 100\%$$

CRITICAL INCIDENT	STUDENTS 1 1st Test	1 2nd Test	2 1st Test	2 2nd Test	3 1st Test	3 2nd Test	4 1st Test	4 2nd Test	5 1st Test	5 2nd Test	6 1st Test	6 2nd Test	7 1st Test	7 2nd Test	8 1st Test	8 2nd Test	TOTALS 1st Test	TOTALS 2nd Test
1	2	2	2	1	-	-	1	-	2	2	2	2	2	1	2	2	13	10
2	4	1	2	1	2	1	1	-	-	-	-	1	-	-	-	-	9	4
3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
4	2	2	-	1	3	2	2	2	2	3	3	2	2	2	-	1	14	15
5	-	-	1	-	2	2	-	-	1	1	1	1	-	1	-	-	5	5
6	2	2	-	1	4	4	-	-	-	1	-	-	-	-	-	-	6	8
7	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-	-	3	2
8	-	-	-	-	-	-	-	-	1	1	-	-	1	1	1	1	3	3
9	2	2	-	-	1	1	-	3	1	1	2	2	2	1	4	-	12	10
10	2	1	-	-	1	1	-	-	1	1	-	-	-	-	1	1	5	4
11	1	1	-	-	2	2	-	-	-	-	1	1	2	-	2	-	8	4
12	-	-	1	1	1	1	-	3	1	1	2	1	-	-	2	-	7	7
13	1	-	-	-	3	3	-	-	-	-	-	-	-	-	2	-	6	3
14	3	3	-	2	3	3	1	-	1	-	-	-	2	1	1	-	11	9
15	2	2	-	-	4	4	3	-	4	1	-	-	3	1	1	1	17	9
16	-	-	-	-	1	-	-	-	1	1	1	-	-	-	-	-	3	1
17	1	-	-	-	-	1	1	-	-	1	1	1	-	-	-	-	3	3
18	1	1	-	-	2	-	1	1	1	1	-	1	-	-	1	1	6	5
19	1	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	2	3
20	1	2	1	1	1	-	-	-	-	-	1	1	-	1	-	-	4	5
21	-	1	1	1	2	2	-	1	-	-	-	-	-	1	-	-	3	6
TOTAL	25	21	8	9	33	28	12	12	17	15	14	14	14	11	17	7	140	117

Table 5.4

Number of Decisions Made by Students on First and Second Test of Simulated Critical Incidents.

CRITICAL INCIDENT	TEACHERS 1 1st Test	2 1st Test	3 1st Test	3 2nd Test	4 1st Test	4 2nd Test	TOTALS 1st Test	TOTALS 2nd Test
1	4	1	2	2	3	3	10	5
2	-	-	-	-	2	2	2	2
3	2	-	1	-	-	2	3	2
4	2	2	2	2	1	2	7	4
5	1	1	-	2	2	2	4	4
6	1	2	1	2	2	2	6	4
7	-	1	-	-	1	1	2	1
8	1	2	2	1	1	2	6	3
9	3	2	1	2	2	2	8	4
10	-	-	-	-	-	-	-	-
11	1	2	1	1	-	1	4	2
12	2	2	-	-	-	-	4	-
13	-	-	1	-	-	-	1	-
14	-	-	1	1	-	-	1	1
15	1	-	1	1	2	2	4	3
16	-	1	-	-	-	-	1	-
17	1	1	2	2	3	-	7	2
18	-	-	2	2	-	-	2	2
19	1	1	1	-	-	-	3	-
20	1	-	1	1	-	-	2	1
21	-	3	1	1	-	1	4	2
TOTAL	21	21	20	20	19	22	81	42

Table 5.5

Number of Decisions Made by Teachers on First and Second Test of Simulated Critical Incidents.

The general trend is for the total number of decisions made by students to drop on the second test, whereas the total figure for the two teachers is more stable. The two students with previous teaching experience (numbers 3 and 5) are amongst those students making a greater number of decisions.

Teachers' decisions are slightly more evenly distributed amongst the critical incidents than students', and in both the first and second terms, 48% and 45% respectively of students' decisions occurred on five critical incidents: children talking (critical incident no. 1): a child being unable to answer the teacher's question (no. 4); a child looking out of the window (no. 9); a child not doing as well as expected in arithmetic (no. 14); and a group not getting started on a project (no. 15); whereas 37% of teachers' decisions in the first term and 40% in the second term occurred on these critical incidents.

However, incidents 1, 4 and 9 involve the most decisions for both students and teachers, and both student and teacher responses suggest the importance of distinctions concerning whether children are attending, understanding their task, interested in their work and able to do the work, and similar distinctions occur for all three incidents: the students' and teachers' concern would appear to be with the management of learning - keeping the children busy and dealing with possible interruptions to that 'busy-ness'. Interestingly, some critical incidents, similar in nature to those attracting much decision-making, in fact incur little decision-making: for example, critical incident 5 (a child has a whole exercise wrong) is similar to number 4 and 14, yet has only a moderate amount of decision-making, and similarly with critical incident number 12 (group giggling), which is similar to number 1.

Clearly some critical incidents attract much decision-making and others attract little. Those involving many decisions are perhaps more common, they may be perceived in a more complex manner by teachers, or have a greater number of variations associated with them, and procedures for coping with them may perhaps be more clearly differentiated in these cases, whereas in other, possibly less common, incidents, fewer variations of the incident may be identified and teachers and students may think only in terms of a simple response.

In the case of students, the least decision-making, often amounting to a simple response with no distinctions, occurred on incidents 3 (class finishing work early), 7 (teacher unable to answer pupil's question), 8 (child reporting pencil case stolen), 16 (pet rabbit brought in), 17 (lesson not evoking enthusiasm) and 19 (wet playtime). These incidents accounted for 10% (1st term) and 11% (2nd term) of the students' decisions. With teachers, however, 27% (1st term) and 19% (2nd term) of their decisions occurred on these critical incidents, and teachers made fewest decisions on mostly other critical incidents: number 2 (girl tells of boy swearing), 7 (teacher unable to answer pupil's question), 10 (poor child gets exercise completely right), 13 (class laugh at child's reply), 14 (child does unexpectedly badly in arithmetic) and 16 (pet rabbit brought in).

Differences in the numbers of decisions made on the two testing sessions occur on different critical incidents for different students and teachers. Only in the case of critical incidents 2 and 15 are large changes common for several students. The total number of decisions made on these incidents was 9 and 17 in the first term and 4 and 9 in the second term respectively: this trend towards less decision-making on these incidents brings them more into line with the very low level of decision-making which the teachers seemed to associate with these incidents. On 68% of all critical incidents students made the same number of decisions on both test occasions; in the case of the teachers the figure is 69%: consequently, for both teachers and students there is a fair degree of stability, although much of this stability arises from the critical incidents where consistently little or no decision-making occurred.

Many of the students' and teachers' responses to critical incidents were common to a large proportion of the sample. For example, most of the sample responded to the group giggling (incident 12) by asking them to share the joke. Several pupil labels were also repeatedly mentioned together with stereotyped ways of dealing with them: for example, both teachers and students reported ignoring the behaviour of"disturbed" children or those "from a poor home background", sympathetic responses were thought to be appropriate for the "sensitive child" or "the child who needs reassurance", whereas "daydreamers" were generally met with firm reprimands.

Most of the decisions which teachers and students made involved either situational or child-related distinctions. For example, a teacher might say, "if it was getting near the end of the lesson, I'd let him day dream" or "if it was a formal lesson, I'd tell him to be quiet and get on" (situation distinctions), or she might say "if he was a regular day-dreamer, I'd move him to sit beside me", or "if he wasn't paying attention, I'd tell him to listen" (child distinctions). Furthermore, some child distinctions referred to child "types" or to apparently stable characteristics of the child, whereas other child distinctions referred to less stable characteristics which one might imagine to refer to most children at some time or another: examples of the former would be "if he was the type who would try to annoy me, I'd be very firm" and "if she was a sensitive child, I'd ask everyone if they'd seen her pencil case"; examples of the latter would be "if he wasn't paying attention I'd give him a telling off" and "if she didn't understand, I'd go over it again".

To investigate the relative extent of the factors which teachers and students reported would influence their decision-making, the decisions which teachers and students made were categorised into conditional either on situation, child related or child type factors. An "other" category was also used which accounted for the occasional reference to teacher's mood, or the occasions where several conditions, of various types, were given for one action. The coder reliability in making this categorisation was assessed for three scripts, coded after an interval of one month, resulting in reliability coefficients of 85%, 90%, and 88%.*

The results of the classification on both test and retest data for students and teachers are shown in Tables 5.6, 5.7, and 5.8. The classification of the students' responses in the first test showed that most decisions were conditional on situations (41%), whereas 33% were conditional on qualities of the children, and 24% on child type with 2% on other factors. One third of the child-type decisions occurred in incidents 6 (child produces four sentences for creative writing) and 11 (child repeatedly wants to know if he's doing the right thing): the former was due to one student's emphasis on child types (e.g. "type who'll try to get away with as little as he can", "imaginative type"), and the latter was due to quite a common typing (four students used it) of the "child who needs reassurance". Child distinctions were most evident in incidents, 2, 4, 14 and 15 where they were frequently concerned with whether the child, for example, was attending, had understood or was upset. Situation distinctions were most frequent in managerial incidents (especially dealing with noise and attention): for example,

* calculated by reliability = $\frac{\text{N. of times identical coding made}}{\text{Total N. of 'decisions'}} \times 100\%$

STUDENT

CRITICAL INCIDENT	1				2				3				4				5				6				7				8				TOTALS			
	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O
1	1		1		1	1							1				1	1			2				1	1			2				9	3	1	0
2		3	1			2				1	1				1																		0	6	3	0
3																																				
4		1	1						1	1	1				2		1	1				3				2							2	8	4	0
5					1					2								1			1												2	3	0	0
6	1		1								4																						1	0	5	0
7									1				1				1																3	0	0	0
8																			1						1				1				2	0	1	0
9	1		1							1								1			2				2				2	1	1		7	3	2	0
10	1		1							1								1													1		1	2	2	0
11			1								2										1				1		1			1	1		2	1	5	0
12							1		1									1			2								2				5	1	1	0
13		1							2		1																		2				4	1	1	0
14		2	1							3				1				1								2				1			0	10	1	0
15	1		1						4				1	2				3		1						2	1		1				7	7	2	1
16									1										1		1												2	0	1	0
17	1												1								1												3	0	0	0
18				1					2							1			1										1				3	0	1	2
19			1										1																				1	0	1	0
20	1				1						1										1												3	0	1	0
21							1			1	1																						0	1	2	0
TOTALS	7	7	10	1	3	3	2	0	12	10	11	0	5	3	3	1	3	10	3	1	11	3	0	0	5	7	2	0	11	3	3	0	57	46	34	3

Table 5.6

Classification of Students' Decisions on First Test of Simulated Critical Incidents.

SD_n = 'situation decisions'
CD_n = 'child-related decisions'
TD_n = 'child type decisions'

CRITICAL INCIDENT	STUDENT 1				2				3				4				5				6				7				8				TOTALS			
	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O	SD_n	CD_n	TD_n	O
1	1		1		1												1	1			2				1				2				8	1	1	0
2		1			1						1												1										1	1	2	0
3																					1												1	0	0	0
4		1	1			1				2					2		1	1		1		2				2			1				2	9	3	1
5										2							1						1					1					1	2	1	1
6	1		1		1						4								1														2	0	6	0
7									1							1																	1			1
8																			1						1				1				2	0	1	0
9	1		1							1			1	1	1				1			2			1								3	4	3	0
10		1								1								1													1		0	3	1	0
11		1									2										1												1	1	2	0
12						1			1				1	1	1			1			1												3	3	1	0
13									2		1																						2	0	1	0
14		2	1			2				3																1							0	8	1	0
15		2							4											1						1			1				5	3	0	1
16																			1														0	0	1	0
17									1									1			1												2	1	0	0
18				1												1			1		1								1				2	0	1	2
19	1												1												1								3	0	0	0
20	1	1			1																1					1							3	2	0	0
21			1		1					1	1			1												1							1	3	2	0
TOTALS	5	9	6	1	5	4	0	0	9	10	9	0	3	3	4	2	3	5	5	2	8	4	2	0	4	6	0	1	6	0	1	0	43	41	27	6

<u>Table 5.7</u>

<u>Classification of Students' Decisions on Second Test of Simulated Critical Incidents.</u>

SD_n = 'situation decisions'
CD_n = 'child-related decisions'
TD_n = 'child type decisions'

CRITICAL INCIDENT	TEACHERS (TEST 1) 1				2				3				4				TOTALS				TEACHERS (TEST 2) 3				4				TOTALS			
	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0	SD_n	CD_n	TD_n	0
1	1	3			1				1		1		1		2		4	3	3	0	1	1			2		1		3	1	1	0
2															2		0	0	2	0						1	1		0	1	1	0
3		2								1							0	3	0	0					2				2	0	0	0
4		2					2			2					1		0	4	3	0		1	1			1	1		0	2	2	0
5		1				1								2			0	4	0	0		1	1			1	1		0	2	2	0
6	1						2				1			1	1		1	1	4	0		1	1			1	1		0	2	2	0
7					1								1				2	0	0	0					1				1	0	0	0
8	1					1	1		1		1				1		2	1	3	0			1				2		0	0	3	0
9	2		1		1		1				1				2		3	0	5	0		1	1				2		0	1	3	0
10																	0	0	0	0									0	0	0	0
11			1		1		1				1						1	0	3	0		1						1	0	1	0	1
12	1		1		2												3	0	1	0									0	0	0	0
13											1						0	0	1	0									0	0	0	0
14										1							0	1	0	0		1							0	1	0	0
15	1									1			2				3	1	0	0		1			1		1		1	1	1	0
16					1												1	0	0	0									0	0	0	0
17	1				1				1	1			1	1		1	4	2	0	1	1	1							1	1	0	0
18									1		1						1	0	1	0	1		1						1	0	1	0
19		1			1						1						1	1	1	0									0	0	0	0
20		1							1								1	1	0	0	1								1	0	0	0
21						2	1				1						0	2	2	0			1					1	0	0	1	1
TOTALS	8	10	3	0	9	4	8	0	5	6	9	0	5	4	9	1	27	24	29	1	4	9	7	0	6	4	10	2	10	13	17	2

Table 5.8.

Classification of Teachers' Decisions on First and Second Test of Simulated Critical Incidents

SD_n = 'situation decisions'
CD_n = 'child-related decisions'
TD_n = 'child type decisions'

talking was frequently permitted in certain subjects, and giggling was acceptable if it was at the end of the day, or related to something humorous in the children's work.

Teachers' decisions in the first test classified more evenly throughout the three main categories (33%, 30% and 36% respectively). Incidents where several child-type decisions were involved often coincided with those where students had also made child-type decisions (e.g. incident 6, child producing short simple sentences for creative writing; 9, child looking out of the window; 11, child coming to ask if he's doing the right thing). Possibly, both teachers and students view certain behaviour as being most characteristic of particular types of pupils. Out of all the decisions identified two thirds concerned child qualities or child types.

In the second test, the proportion of decisions in the three main categories is 37%, 35% and 23% for the students, and 24%, 31%, 40% for the teachers. Due to the small sample of teachers involved, comparisons between first and second tests could be misleading but there appears to be a trend away from the use of situation criteria in decision-making, for students at least. Approximately two thirds of all decision-making relates to child characteristics or typologies, teachers appearing consistently to make more decisions based on child types than students in both test sessions.

At the time of each test, students were also questioned about their conceptions of the teacher's role and about their views concerning the teacher they would like to be (see

Appendix I for questions asked). All students paused for a while before answering the questions and tended to respond in a rather clichéd manner. For example, on the first test all students reported the teacher's role as being "a helper to learn", and six also saw the teacher as a social educator (e.g. "socialising the children", "giving them pointers on how to live"). Few further comments were made, and several students reported difficulty in answering the question. It seemed that either the notion of a teacher role did not correspond to the ways in which students thought about teaching, or that their conceptions weren't easily verbalised.

The teacher-ideal also seemed to be quite well stereotyped with, in the first test, three main attributes: an ability to get on well with the children (reported by all students), a wide knowledge of the primary curriculum (reported by four students) and good management and control of the class (reported by four students).

On the second test, students' perceptions of the teacher's role appeared to have hardly changed, but when talking of their ideal-teacher, the need for firm control was mentioned by six students (instead of four in the first test), and the need for a good relationship with "respect" from the children was additionally reported by five students: these findings coincide with the literature onstudents' changing concerns during training and teaching practice (e.g. Gibson, 1977 ; Doyle, 1977).

During the interviews, one other qualitative difference between teachers and students was noted by the researcher: the teachers frequently remarked, "with 35 children, there are 35 responses" or "You'd have to know the actual child". The importance of knowing the child in deciding how to respond was repeatedly reported by the teachers and rarely by students. Teachers also frequently attributed motives to pupils (a feature shared by the two students who made the largest numbers of decisions*) such as "if he did it to annoy me ...", "if he was trying to disturb them ..." and sometimes suggested they would have insights into the pupils' behaviour, in such statements as "he might be the sort of child who is affected by my disappointment" (similar findings are noted by Stebbins (1971)). It seemed to the researcher that, for teachers at least, knowing the children, and attributing them with motivations played an important part in their classroom decision-making.

Conclusions from Pilot Study 2

In stating what they need to know in order to make up their minds what to do, teachers and students are providing the context in which they would follow a particular action, and clearly the characteristics of pupils are an important part of that context.

* the occurrence of students with some previous teaching experience amongst those making more decisions and attributing motivations to pupils may be indicative of a developmental trend.

Although the method is clearly open to the criticism of all laboratory-type methods*, and the sample used here was very small, there is a consistent finding that teachers appear to discriminate their environment and respond to it in a greater variety of ways than do student teachers and that the discriminations, which determine teachers' responses, most often concern pupil characteristics, whereas this trend is less pronounced with students.

PILOT STUDY 3

As the previous study suggested a rather close relationship between teachers' classroom decision-making and their perception of pupils, a further study was carried out to investigate the relationship in greater detail. The study was more naturalistic in design, and attempted to come to some understanding of how one teacher 'made sense' out of her classroom, and in particular, how she perceived her pupils, how she interacted with them, and how she accounted for her own behaviour.

The class was a primary three in a school situated in a middle-class suburb of Edinburgh. The investigation took place over a period of three weeks and it was intended to be fairly 'loosely-structured', at least initially (i.e. through talking to the teacher and observing the classroom, it was hoped to develop an understanding of the teacher's

* see Snow (1974).

world rather than test explicit hypotheses). The first week was spent matching the pupils' names to faces, identifying the pupils' usual seating positions (the class tended to be very mobile at times) and observing and noting classroom interaction. During the second week, the interaction between the teacher and individual pupils was recorded systematically over a total period of ten hours. An observation schedule was constructed for this purpose by modifying that developed by the researcher on a previous occasion (Calderhead, 1972) - see Appendix IIa for modified version - in the light of observations made during the first week in the classroom, and the schedule appeared to account for most of the classroom interaction observed. The original schedule had been developed from a model of classroom processes constructed from observation of Scottish primary schools; it could also be administered reliably* and required a relatively low level of inference on the part of the observer. The third week was spent collecting the teacher's comments and opinions about the children, and also involved taking a tape-recording of one of the teacher's lessons which was used to stimulate a running commentary.

In considering the teacher's comments on the pupils and the distribution of the teacher's interaction throughout

* observer reliability, assessed on the coding of three scripts formed from tape recordings of classroom verbal interaction, coded at fortnightly intervals, averaged 98% and inter-observer reliability with a second observer averaged 94%. See Appendix IIb for method of calculation.

the class, two groups of pupils appeared to receive a disproportionately large amount of interaction and were perceived in characteristic ways. The first group consisted of three boys who were frequently grouped together by the teacher when talking about the children: on one occasion they were referred to as "real boy types" and on another as "nice, but mischievous".

During the period of systematic observation, these three boys (out of a class of thirty) engaged in 22% of the teacher's dyadic interactions, mostly of an instructional question nature, but also including several disciplinary comments, and, in the case of two of the boys, a comparatively large amount of volunteering of information (usually calling out without formally addressing the teacher). During two one-hour periods of observation, the teacher also reprimanded these two boys on less than 20% of the occasions when they called out, whereas other children were virtually always reprimanded on similar occasions.

The second group were collectively referred to by the teacher as "the remedials" and were described as "slow" and "easily confused": this group of four (two boys, two girls) received 20% of the teacher's dyadic interactions, each receiving a relatively high proportion of questioning, feedback comments, and disciplinary remarks. The remainder of the class received fairly similar amounts of interaction, and no other marked groupings, either in terms of the way the teacher spoke about the pupils, or in terms of the interactions in which they engaged, were noted, although two children (one boy/one girl) were regarded as "highly intelligent", and another boy as "very withdrawn", and all three received slightly below average amounts of interaction.

It was anticipated that a running commentary on a tape recording of one of the teacher's lessons could possibly give some insight into the decision-making mediating the teacher's different groupings of pupils and her different behaviours towards them in the classroom.

The tape-recorded lesson consisted of an oral revision of the previous day's arithmetic lesson,* and lasted about ten minutes. General notes on the lesson and the classroom interaction were taken by the observer to facilitate later recall of the situation. The commentary was given approximately one hour after the lesson was tape recorded. In giving her commentary, the teacher initially explained**, "First thing in the morning the kids are still sleepy. They need wakening up and I'm choosing the quick, eager people *** to get things going". During the lesson, the teacher talks quite fast and enthusiastically. When a child answers correctly the teacher repeats the answer and generally says "Good". After an example of this on the tape recording, the teacher comments "I'm trying to encourage them to put their hands up." After asking one question, very few

* it was customary for this teacher to start the day with a revision of previous arithmetic work and of arithmetic tables.

** words spoken by the teacher during the commentary are underlined.

*** this seemed to refer largely but not exclusively to the "real boys" hands go up, the teacher repeats the question and pauses. During the commentary, the teacher explains, "I'm waiting for more people to put their hands up". After the first four minutes, the teacher asks Kirsten (a "slow" child) to answer and the teacher comments, "I wanted to see if she'd understood". Kirsten answers wrongly and the teacher simplifies the question, "to help her get the right answer". Kirsten doesn't reply and when an answer is still not forthcoming after further encouragement, the teacher choses another "slow" child, Malcolm, to answer ("He looked as though he knew the answer"). This process is repeated when the next question is again addressed to Kirsten ("An easy question, I thought she would do it"), and eventually to Inga who answers wrongly and then to Michael, (one of the "real boys"). The teacher comments, "I was expecting both Inga and Michael to give me the right answer to speed up the lesson". When the teacher asks the next question, Kirsten puts up her hand and the teacher asks her, "It gives her a chance to show she can do it". The teacher repeatedly praises Kirsten for giving the right answer "I wanted to boost her confidence". During the lesson, the teacher, frequently claps her hands and says "Come on" and shouts out comments such as "Graham, stop fiddling", "Sit down on your bottom", "Don't call out" and "Malcolm, you're sleeping". During the commentary, the teacher explains that she is trying to "keep everyone's attention on the work" and "to keep order and stop them getting too excited and getting out of their seats."

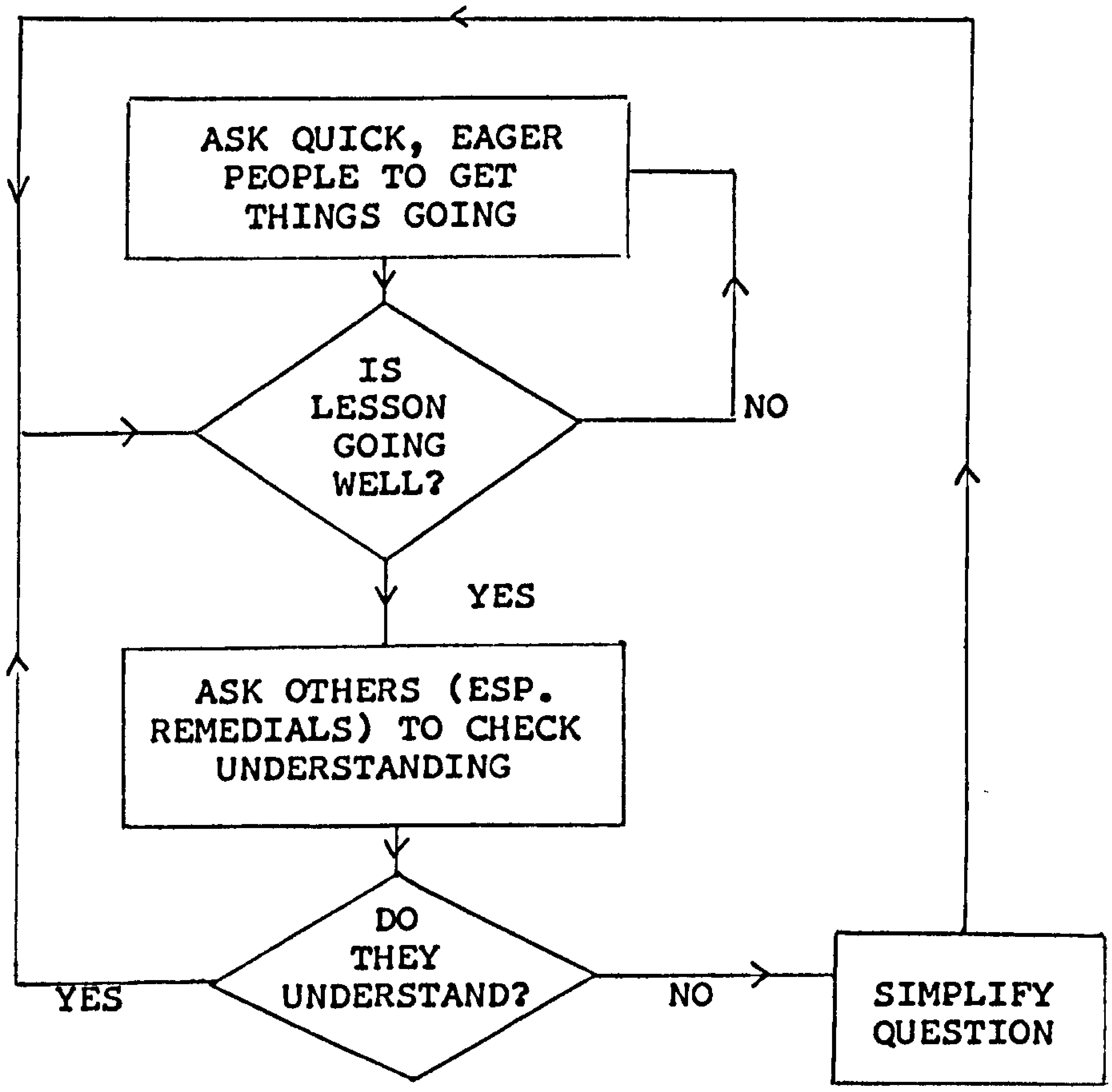
The teacher's comments about her lesson seem to centre around four main concerns:

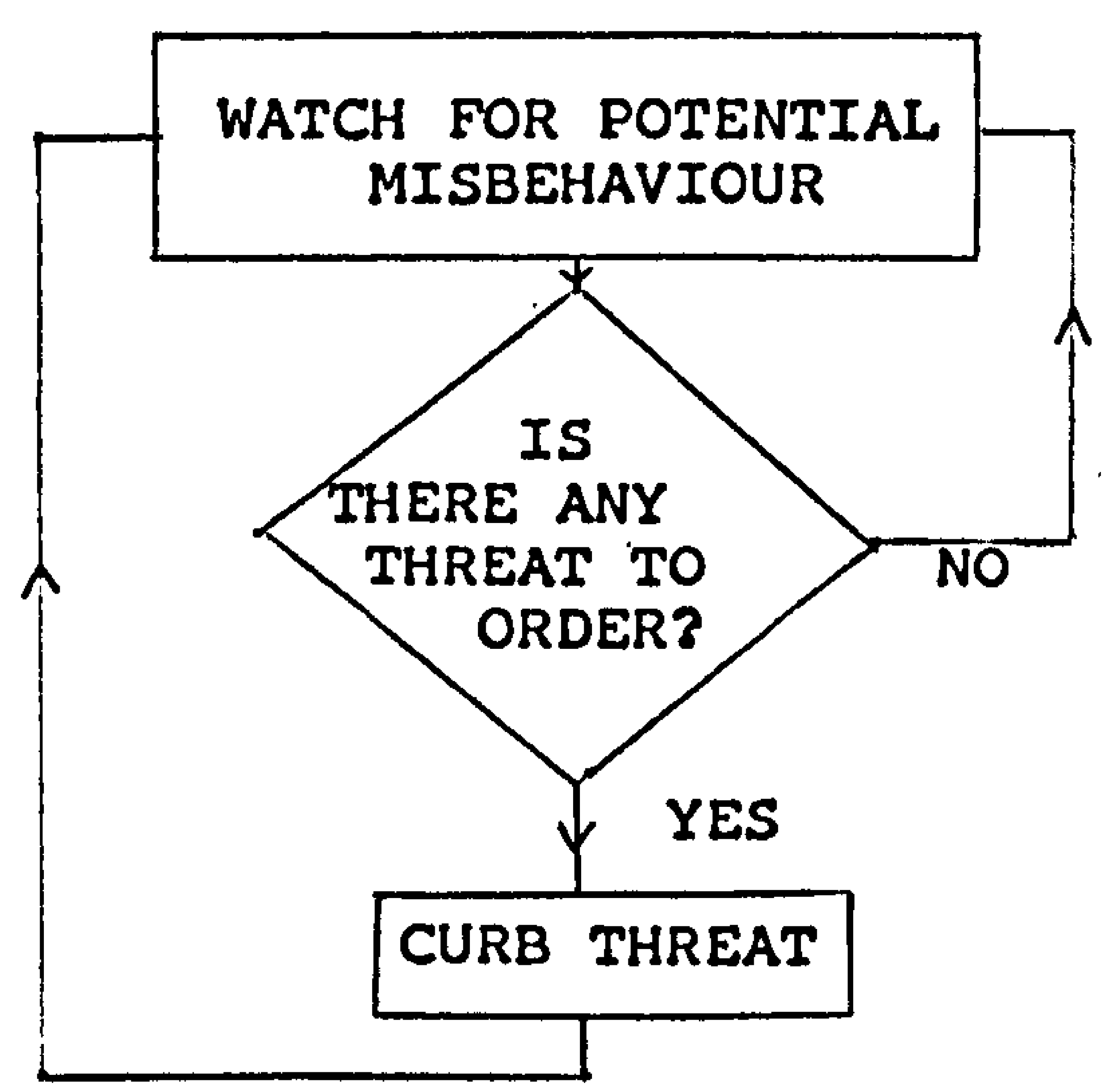
1) to maintain the flow of the lesson - asking the "quick, eager people" to get it going and going back to them when the lesson slows down;
2) to ensure everyone's attention is on the questions asked - giving frequent reprimands to possible day dreamers;
3) to ensure everyone understands - checking that the remedials have understood and simplifying the questions if they are not able to answer;
4) to check any threat to good order in the classroom - keeping the children in their seats.

If we consider these four aims to be the teacher's main concerns at the time of teaching, a decision framework could be produced as in figure 5.1 to represent the teacher's decision-making.

This pattern of decision-making did seem to the observer to be quite characteristic of the teacher at certain times: every morning started off with the rapid, enthusiastic question-answer sequence, frequently involving the same children at the beginning, and always involving at least two of the remedials after about the first five minutes, and similar comments being made to keep the children from shouting out, getting out of their seats, or daydreaming.

This decision framework could help to explain why the "real boy" types and the remedials received more instructional questioning and disciplinary comments than the others: it might possibly be that in the





both decision frameworks appear to operate in parallel.

<u>Figure 5.1:</u> <u>A Decision Framework derived from the teacher's commentary upon her lesson.</u>

case of the "real boys", questions were addressed to them for quick answers, and the disciplinary comments were frequently to keep them in their seats or to stop them shouting out, whereas in the case of the remedials, disciplinary comments were often to wake them up or maintain their attention and instructional questions were to check they were following .

Although it would seem from the decision framework that the teacher only requires two groups of pupils, one that she can call upon to maintain the flow of the lesson, and one where she can check on understanding (possibly on the assumption that if the remedials have understood, the whole class probably have), the teacher's classroom decision-making is obviously not as simple and straightforward as this. In some cases it is quite complex, for example in the case where a remedial girl, twice unable to answer the teacher's question, is asked when she puts her hand up, and praised highly when she gives the right answer; the teacher is clearly not only concerned with whether the girl is "remedial" or "quick and eager", but is here perhaps concerned with the child's confidence. It may be that some decisions are 'routinised' and occur regularly in the course of teachers' lessons, others occur only in response to particular situations or configurations of cues which occur more rarely. It is also interesting to note that not all disruptions meet with reprimands, which may suggest that the teacher also makes decisions concerning whether particular disruptions (possibly involving particular children or involving different degrees of disruption) warrant a reprimand.

It was decided to experiment further with the stimulated commentary technique and to look for other examples of what appeared to be 'routinised' decision-making. Two teachers were asked to listen to tape recordings of their own lessons and were given the instruction: "If while you're listening to the tape recording, you can remember what thoughts were going through your mind at the time, or what reasons you had for doing what you did, please say what these are. You can stop the tape recorder at any time to expand your explanation."

The first school in which this further study took place was in a new town in Central Scotland, with an intake from a large council estate. The teacher had a primary seven class and was giving a history lesson on the American Civil War; the researcher observed the lesson and made notes on which interactions were addressed to which pupils. The teacher spent much of the time asking questions and started the lesson by asking for the names of the two armies, following this by asking for their nicknames and then for what the differences were between the two sides. During the commentary, the teacher explained, "We've been over this before, but you can see that many of them don't know the answers. You have to go over things again and again, three or four or even more times before they begin to take it in." Several questions are addressed to Paul who puts his hand up after almost every question. After Paul has answered a question, the teacher explains "Paul is a pest at times and I have to keep him down a lot, but he listens and is interested. You can always rely on him to answer your questions".

After another question which is twice answered wrongly, Paul is again asked, and the teacher comments "He was the only one who knew".

Although this teacher gave a very sparse commentary from which it is difficult to draw conclusions, it does seem that the teacher might be using a similar mechanism to control the flow of her lesson, relying on Paul to keep the lesson going when no one else can answer.

The second teacher who gave a running commentary also taught a primary seven class in a school drawing on a predominantly middle class area. She was giving a lesson on prefixes, stating an example of a prefix, asking the children for words which have that prefix, asking them to give the meanings of the words and then to guess what the prefix might mean. She started the lesson by clapping her hands and saying, "Right, settle down." and later commented "I was quietening them down to start, otherwise they don't listen". After explaining what a prefix is, she says "Anti is a prefix. Who can think of a word with anti in it?" While the children put their hands up the teacher writes "Anti" on the board, and then asks Billy who has his hand up. The teacher writes each word up on the board and after the third word is given (all of the first three questions were answered by boys who had their hands up), she comments "I'm asking the regulars, the ones I know know the answer so that the others can see what to do". One of the words given is, 'anti-freeze' and the teacher asks, "Has anyone heard the joke about how you make your anti-freeze?" After some answers of "No" and "Tell us" the teacher says "You swipe her woolly knickers." The class laugh and the teacher comments, "They're a bunch you can enjoy a laugh with and they won't take advantage of you". The teacher later asks David, who hasn't put his hand up, for a word with the prefix 'pre'. The teacher explains "David is one of the poor ones. I wanted to see if he'd cottoned on yet". David doesn't answer and the teacher repeats her question emphasising the word 'prefix'. "I thought he'd have guessed I was giving him a clue but he didn't". Later, another question is addressed to Fiona and the teacher comments "Another poor one". At another point, while the teacher is talking, some boys start talking to each other, the teacher snaps her fingers in their direction and says "A-ah". She comments "They were getting a bit lively".

Again, although the teacher makes few comments during the fifteen minute tape recording, she seems to have groups of "regulars" and "poor ones" who possibly serve different functions during the course of the lesson.

Although different subject areas are being followed in each lesson, the format of the lesson is similar, with the whole class being taught, the teacher asking many questions and the pupils answering. This format, which seems to the observer to be typical of much of the teaching in the schools which were studied, may be responsible for the similar patterns of interaction amongst the pupils.

Conclusions from Pilot Study 3

Although lacking in research rigour, this study would appear to confirm that the distribution of a teacher's interactions with pupils in the classroom may be associated with the ways in which teachers perceive the pupils, and that teachers may, through stimulated commentary techniques, be able to state their reasons for interacting with particular pupils on particular occasions. This study also raises the suggestion that teachers may have apparently routinised sequences of behaviour, which are associated with certain differentiations amongst pupils, and which enable teachers to fulfil particular management or teaching functions.

Pilot Study 4

In view of the close relationships amongst teachers' perceptions of their pupils, teachers' classroom decision-making and their classroom interaction, suggested by the previous pilot studies, it was intended that the present study would provide a more detailed, quantitative investigation of these relationships. A study of one primary seven classroom* was made, piloting a variety of methods for accessing and reliably quantifying teachers' and pupils' perceptions, and, considering the relationship of these measures to observed classroom behaviour.

* the same teacher and classroom as the final running commentary in Pilot Study 3.

Procedure and Methods.

Two days were initially spent in unstructured observation, during which notes were made on what appeared to be critical incidents occurring in the classroom. It was intended that these would form the basis of a later interview with the teacher in an attempt to access a wider range of the teacher's cognitions than had been revealed by the stimulated commentary approach. The frequency and distribution of teacher-pupil interactions were noted using the schedule in Appendix II over a period of four quarter-day sessions, spread over three days and covering all parts of the school day. In the second week, Marton's method of accessing cognitive structures (as used by Lundgren (1975)) was piloted: the teacher was asked, "Would you say the names of the children in your class as they come into your head - not in order of seating, or register order, but just as they come into your head. I am going to tape record your reply". Marton assumes that information will be retrieved according to its perceived similarity, and hence groups of names said together by the teacher could reflect the teacher's mental typology of pupils. On a separate occasion during the second week, Kelly's (1955) method of triadic elicitation was used to obtain the constructs used by the teacher in construing her pupils, and the teacher was then asked to rate each pupil in the class on these constructs on a five point scale. On yet another occasion, also during the second week, an attempt was made to externalise the teacher's constructs used in perceiving pupils, by asking the teacher to suppose that the observer was thinking of a pupil in the class and the teacher could ask as many questions as she liked to try to identify the pupil, assuming the observer knew the class in the same way that she did.* The teacher's questions (constructs) were recorded, and one construct which was elicited by this method but not by Kelly's triadic elicitation was added to the rating scales. A further day was spent in unstructured observation noting down apparent critical incidents and these notes of recent incidents together with the previous observation notes, formed the basis of an interview with the teacher in an attempt to gain some insight into the teacher's rationale for her classroom behaviour. During the third week, pupils were observed over a period of two days and the nature of their classroom behaviours was noted - this resulted in the observation that the pupils' overt behaviour seemed to differ only in terms of talking to peers (some were silent virtually all the time they were in the classroom and others talked when they had no work to do) and in terms of attending** (some children gave the overt appearance of listening when the teacher was addressing the class, others appeared to be distracted, gazing about the room, writing in their books, or swinging on their chairs). All other frequent behaviours, apart from characteristics of their

* This '20 questions' method was derived from several reasoning experiments - see Wason and Johnson-Laird (1966).

** Some researchers have found pupils in English schools slightly more varied in their behaviour e.g. Boydell (1975).

written work, seemed to be covered by the teacher-pupil interaction schedule. To systematically investigate differences in pupils' classroom behaviour, whether the pupils were appropriately* attending/not attending or talking/silent was noted every minute for one hour for a total sample of nine target pupils, selected to include different abilities throughout the class. A sample of four pupils whose behaviour had been monitored, were interviewed, to ascertain their views of classroom processes and particularly their attitude to teacher, school and peers. As a result of the data obtained from these interviews, the class was visited a week later and sociometric** data was collected from each member of the class (pupils were asked to write down the names of those people in the class they would like to sit with in their group, and were also asked who in the class they thought to be most like themselves). Pupils were also asked to rate their like/dislike of school on a 1 to 5 scale: it was anticipated that this might also distinguish groups of pupils within the class. It was expected that teachers would be unwilling for pupils' attitudes concerning teachers to be researched, and consequently, apart from the four interviews with pupils, this area was not pursued.

* i.e. during periods of instruction and private work.

** although the term 'sociometric' is used to apply to a variety of techniques, the term is used here to refer to data referring to perceptions of group structure, and more specifically to pupils' perceived friendship groupings - see Remmers (1963), p. 345.

Results

Kelly's triadic elicitation revealed only three constructs (see Table 5.9) after ten triads. The 'twenty questions' method also revealed three constructs (see Table 5.10), one of them differing from those in the previous table. After giving these three constructs, the teacher was asked if she thought there were any other important ways in which the pupils differed from one another, and she commented that the features already mentioned would be sufficient to identify almost anyone in the class. Five-point rating scales were constructed from all four elicited constructs and the teacher rated the pupils on each scale. It was intended to use this data to construct groups which may correspond to the teacher's groupings of the pupils.

Since the correlations amongst the constructs were generally, though not entirely, positive and significant, (see Table 5.11) a total construct score was formed for each pupil by summing the ratings, and pupils were then put in rank order as a first step towards dividing the pupils into similar clusters (e.g. if a pupil was rated 4, 3, 5, 4 on the four constructs the total construct score was 16). The moderate intercorrelations of the construct scores enabled a classification to be easily made in this way. A group with relatively low total scores consisting of girls but for one exception, was first of all selected as a homogeneous group, rated 1 or 2 on all constructs except for one girl who was rated 3 on confidence but 1 on all other constructs.

1) High intelligence - low intelligence

2) Confident - lacking in confidence

3) Quiet - boisterous

Table 5.9

Constructs revealed by Triadic Elicitation

1) Quiet or noisy

2) Intelligent or unintelligent

3) Eager or unenthusiastic*.

* this construct was added to the repertory grid, together with the 3 constructs in Table 3A.

Table 5.10

Constructs revealed by '20 Questions'

Construct	2	3	4
1	0.5	0.3	0.5
2		-0.2	0.2
3			0.4

rho

Table 5.11

Intercorrelation Matrix of 4 constructs used in Rating Scales

The next pupils to be grouped were those with relatively high total scores, although these were not initially a very homogeneous group (e.g. compare 4-4-2-3 with 3-1-5-4, which both have the same total score). From these pupils one group was formed by including some moderate total scorers who shared a below average intelligence rating, a 3 or 4 confidence rating, and a 2 quietness rating, although eagerness ratings in this group consequently spanned a wide range. Of the remaining pupils, more than half had all ratings of 3 or close to 3, and one group could be formed which shared a 2 or 3 rating on intelligence, a 1 rating on confidence, a 4 or 5 rating on boisterousness and a 2, 3 or 4 rating on eagerness, and were all boys. This resulted in the final grouping (see table 5.12). Some pupils were difficult to link with particular groups and in the case of Cameron and Brian the classification was made considering what the observer knew of the teacher's spoken opinion of them. Although the classification of some of the pupils is fairly arbitrary* the result seemed quite meaningful to the observer, broadly classifying the pupils into groups of quiet intelligent girls, boisterous boys, remedials and 'grey faces', and also to the teacher who, when presented with the clusters at a later date, agreed that they seemed real, homogeneous clusters.

The clusterings obtained using Marton's cognitive

* a more systematic approach would obviously be desirable although the method adopted here seemed appropriate for the small amount of data to be processed.

structures approach (see Table 5.13) also group pupils together in the same clusters as formed above in all but one case, where two girls who have the same surname are grouped together but are in fact rated quite differently. When asked afterwards if she was aware of any reasons for giving the pupils in the order she did, the teacher quoted one instance where she said two names together because she remembered they both went swimming together, and another instance where she recalled two boys together because of the same Christian name. Clearly there can be various reasons for the order in which teachers recall their pupils; and as Lundgren points out, some pupils' names are never recalled. However, there is a fair degree of correspondence between these groupings and those developed from the teachers' ratings of pupils.

Most of the recorded classroom interaction fell into the category of instructional questioning, and Table 5.14 shows the interactions in which each child was engaged, together with the totals for each cluster and the totals for the class.

The six 'quiet intelligent girls' engaged in little interaction and that which did occur was virtually all of an instructional question type. Billy and Mark S. ('boisterous boys') received a very large number of questions, mostly instructional, but also some managerial; more than three times as much interaction occurred with these two than with all of the six girls noted above; with one exception all the volunteering of information came from members of this cluster. All but one of the recorded disciplinary remarks were addressed

	Total Construct Score		
(5-4-2-4)	15	David C.	
(4-4-2-4)	14	Ian McA.	
(4-4-2-3)	13	David L.	Below average intelligence, average or less confidence, quiet, varying eagerness.
(4-3-2-3)	12	Fiona C.	
(4-3-2-2)	11	Alan	
(4-3-2-1)	10	Davina	
(3-1-5-4)	13	Mark S.	
(2-1-5-4)	12	Gordon	
(3-1-5-3)	12	Billy	Average or above in intelligence, confident, boisterous, average eagerness.
(3-1-2-4)	10	Cameron	
(3-1-4-2)	10	Mark P.	
(2-1-4-3)	10	Timothy	
(3-2-2-2)	9	Caroline	
(3-2-2-2)	9	Gillian	
(3-3-2-2)	10	Anette	
(2-3-2-3)	10	David G.	Generally average intelligence, average confidence, average or above in quietness, average or above in eagerness
(3-4-2-2)	11	Doreen	
(3-4-1-3)	11	Derek	
(4-1-3-3)	11	Brian	
(3-3-3-2)	11	David Gr.	
(3-3-2-3)	11	Linda (Bk)	
(3-3-2-3)	11	Linda (Fr)	
(3-3-2-3)	11	Patricia	
(2-1-2-1)	6	Joan	
(2-1-2-1)	6	Fiona	
(1-3-1-1)	6	Diane	Above average in everything
(2-2-2-1)	7	Lorraine	
(2-2-2-1)	7	Ian G.	
(2-2-2-1)	7	Ann	
(2-2-2-2)	8	Kirsten	

<u>Table 5.12</u>

<u>Clusterings obtained from Rating Scale data</u>

(ratings on each of the four constructs are shown in brackets, given in the order: intelligence, confidence, quietness, eagerness)

(15)	David C.	
(14)	Ian McA.	
(11)	Alan L.	2 secs.
(10)	Timothy T.	2 secs.
(10)	Mark P.	
(13)	Mark S.	2 secs.
(6)	Diane L.	
(6)	Fiona G.	
(8)	Kirsten G.	2 secs.
(13)	David L.	
(10)	Davina S.	
(11)	Patricia S.	2 secs.
(9)	Gillian D.	
(11)	Linda C.	2 secs
(10)	David Ga.	2 secs.
(12)	Fiona C.	3 secs.
(6)	Joan B.	
(7)	Lorraine S.	
(7)	Ian G.	2 secs.
(12)	Gordon R.	
(12)	Billy M.	10 secs.
(11)	David Gr.	

Table 5.13

Tape Recorded Groups (Total Construct Score in Brackets) with approximate time intervals between reported groups.

PUPIL	Q_I	Q_M	D_M	F	Disp	VIA	VIR	CQIR	CQMR	Inst	Total
David C.	3	1	3	3	3	1				7	21
Ian McA	6	1	1	2	2					3	15
David L	5	3	2	1	1						12
Fiona C	8	1	1								10
Alan	14	1		2					1		18
Davina	6			3	2						11
TOTAL	42	7	7	11	8	1	-	-	1	10	87
Mark S	22			1							23
Gordon	7	1				1					9
Billy	33	1	1		1	1			1		38
Cameron	8		1	2		1					12
Mark P	10	1					1			1	13
Timothy	7	2	2	2						1	14
TOTAL	87	5	4	5	1	3	1	-	1	2	109
Caroline	5	1		1							7
Gillian	3	1								1	5
Anette*		2									2
David Ga	12	1									13
Doreen	4	1	1								6
Derek	3	2									5
Brian	10		1							1	12
David Gr.	15										15
Linda (Bk)	1										1
Linda (Fr)	12									1	13
Patricia	3										3
TOTAL	68	8	2	1	-	-	-	-	-	3	82
Joan	3									1	4
Fiona	4										4
Diane	1										1
Lorraine	3										3
Ian G.	4					1					5
Ann	3										3
Kirsten	-										0
TOTAL	18	-	-	-	-	1	-	-	-	1	20
CLASS TOTALS	215	20	13	17	9	5	1	-	2	16	298

* absent on 3 of the 4 observation sessions.

Table 5.14

Interactions in which Pupils Engaged, and Total Number of Interactions for each Cluster to the remedials, who also received most of the recorded periods of individual instruction and a high proportion of the supervisory feedback comments. Interaction with the "average-in-everything" cluster varied in quantity and nature but never exceeded relatively modest proportions. The nature of the interactions and their distribution are in keeping with the observations of Boydell (1974) and Garner and Bing (1973) respectively.

Until the observer became used to what was normal behaviour in the classroom, critical incidents were difficult to identify and even after several days of observation they still seemed to occur infrequently. One possible explanation for this could be the fact that the teacher was an experienced one, with seven years experience, and this study took place in the third term when both teacher and pupils appeared to have established well-organised, smoothly operating daily routines. Another difficulty lay in knowing exactly what the teacher was attending to, for example when walking round the class looking at pupils' work.

The nine critical incidents which were identified fell into three categories:

1) a child not paying attention;
2) children talking when everyone had work to do;
3) a child shouting across the room.

The teacher was asked what she would normally do in each case and what would influence her reaction. Her answer for each case was the same: "I'd come down on them like a ton of bricks", although she added that her reaction to talking was generally to tell them first of all to be quiet and if the noise continued "to read the riot act" and when it was very bad to "give them something extra to do". In the case of the boy shouting across the room, she also stated that if he had done it accidentally in excitement she would have let him off with it.

When asked if she was aware of any other critical incidents which occurred in the classroom, she gave 2 examples: 1) where a child was unable to do the work - in which case her response would be "either to help him or to find something else for him to do, depending on the child"; and 2) where a child had finished his work more quickly than she expected - in which case her reaction would be to "leave what I'm doing and deal with him". The teacher's replies in all cases were quite simple and did not show evidence of any complex decision-making. She seemed to be largely concerned with keeping the class busy and occupied, or in her own words, "keeping the class happy". This concern could explain some of the patterns of interaction noted earlier - leaving the quiet intelligent girls to get on, frequently questioning the boisterous boys (possibly because they do volunteer a lot, or as a means of ensuring they don't direct their energies elsewhere), and instructing and supervising the remedials to ensure that they can do the work.

When asked how she went about choosing pupils to answer her questions, the teacher pointed out that the reason for this could vary and gave five examples of possible reasons for asking a pupil a question:

1) "because I know they know the answer - I can see it in their expression"
2) "because I think they don't know the answer - and I want to see what they don't know"
3) "to get a quiet person to speak"
4) "to boost a child's confidence - for example, a poor child who you think knows the right answer"
5) "I might avoid choosing someone because they've always got their hand up"

At this point, the interviewer mentioned that Billy frequently put his hand up, and the teacher commented that she generally tried not to ask him because she did not want to give him too much attention. When it was pointed out that during the periods of systematic observation, she interacted with Billy three to four times more than with most other children in the class and as much as ten times more than some, she appeared to find this difficult to believe.

In the systematic observation of the behaviour of nine target pupils* over the period of one hour, few differences emerged between them (see Table 5.15) although the "boisterous boys" and "remedials" were slightly more noisy and inattentive than the others.

Four of these children were interviewed to explore their cognitions especially in the areas of attitudes to school, teacher and each other: David C. (one of the remedials),

* including pupils from each cluster

TARGET PUPILS	SILENT	ATTENDING
David C	48/60	42/60
Davina	51/60	45/60
Gordon	43/60	43/60
Billy	40/60	35/60
Gillian	58/60	56/60
David Ga	53/60	50/60
Linda Fr	57/60	54/60
Lorraine	59/60	58/60
Ian G	55/60	55/60

Table 5.15

A measure of the degree to which 9 'target' pupils were silent/inappropriately talking and attending/not attending during 1 hour's observation.

(Observations noted every minute; scores shown as number of occasions silent and attending out of 60).

Billy (a 'boisterous boy'), Gillian (average group), and Lorraine ('quiet intelligent girl'). Their attitudes to school, work and the teacher were surprisingly similar - they all liked school because they became bored when at home, they each had their own favourite subject, they liked their teacher and all thought that a good teacher was someone who was strict but "could enjoy a joke now and then". However, when asked who they would like to sit and work with, and who they thought was most like themselves, each gave a list of children who were perceived similarly by the teacher (not simply in terms of intelligence, but often on all four dimensions). Lorraine, who in fact sat at a table with Gordon* wanted to work with Fiona G., Joan, Diane and Ann (all quiet, intelligent, average or above in confidence, eager girls) and thought that Fiona was the person in the class most like herself and couldn't think of anyone most unlike herself. Gillian, who sat beside Carolyn, wanted to work with Doreen, Lynda C. and Joan (former two are also "average-in-everything"), and wasn't sure who was most unlike her. Billy, wanted to work with Alan, David Gr., Timothy, and Mark. S. (all "boisterous boys" except David Gr.), two of whom were already in his group, and thought Timothy was the person most like himself and David C. ("remedial") most unlike himself. David C. (remedial) said he would like to sit next to David L. (remedial) whom he already sat beside and didn't understand when asked who was most unlike him, but replied

* see class seating plan - Appendix III - seating arrangements were decidedlargely by the teacher, based on a mixture of maths groups, behaviour and children's preferences, the latter only determining where at a particular table the child would sit, given the teacher's approval.

that he didn't think he had difficulty in getting on with anyone.

In order to identify any rules which guided their behaviour in the classroom and to explore their awareness of critical incidents, the pupils were asked: "What are you allowed to do or not to do in the classroom and why?" Gillian found the question difficult to answer and said little during the interview, Lorraine mentioned that "eating in class, speaking while the teacher's speaking or messing about" was not allowed and that "you'd get a telling off or possibly the belt, if you were caught". Billy also stated that talking was not allowed and "the teacher would give you a telling off if she caught you". David C. thought you weren't allowed "to do nothing" and explained that he was often shouted at for not being quick enough at getting his books out. The three who responded to the interview were aware of having to obey rules regarding their behaviour in the classroom, and were aware that if they broke the rules they were likely to be reprimanded. Lorraine said she tried not to break the rules, Billy said he didn't usually break them, and David said he couldn't really help being a bit slow.

As a result of the pupil interviews, which seemed to indicate pupil friendship groups similar to the groupings derived from the teacher's ratings, the whole class was asked, under confidential 'class test type' conditions, to write down the names of those people they thought they would prefer to work and sit beside, who they thought was most like themselves, and to rate their liking of school on a 1 to 5 scale (explained to the children in terms of ranging from "really enjoy school" to "having a strong dislike of school"). Apart from all four of the remedial boys who wanted to work with the 'boisterous boys' (this feeling was not reciprocated by any of the 'boisterous boys') all the children gave lists where the majority (an average of 82%) of those named came from the same teacher clustered 'type'. Those perceived to be most like self were from the same cluster twenty six times out of thirty. There was no discernible pattern, however, in the degree to which children rated their liking of school, most of the class recording a moderate liking of school; some, however, possibly looked upon the rating as an opportunity to claim mischieviously and falsely that they had a strong dislike of school.

Conclusions from Pilot Study 4.

The data collected from the study of one teacher cannot result in generalisations, but several interesting observations have been noted.

Firstly, it seems possible to relate meaningfully, and with some degree of objectivity, the differences in teacher-pupil interactions to the different perceptions the teacher has of 'groups' of pupils, and both these perceptions and the classroom interactions may relate to the aims or major concerns of the teacher.

Secondly, the group structure which was derived from the teacher's ratings of the class appears to have much in common with the friendship groups of which pupils may be aware. This type of finding has been accounted for by

Barker-Lunn (1970) and Nash (1973) in terms of teachers influencing the friendship cliques of pupils by influencing the pupils' self-concepts. Willig (1963) and Dietrich (1964) also investigated the sociometric structure of primary school children and found level of ability and I.Q. to be among the common factors amongst the members of pupil friendship groups. Several studies, mostly with older children, have suggested that pupils seek friends who are in some ways similar to themselves (e.g. Hollingshead, 1949; Newcomb, 1962; Lacey, 1970; and Argyle and Lee, 1972), and more recently, Cohen (1977) has suggested that the homogeneity of child-developed clusters is due to homophillic selection rather than conformity pressures or group leaving by deviates. If ability is an important factor for pupils in their choice of friends, and if they are largely dependent on their teacher for cues relating to their ability, it may seem reasonable to suppose that teachers influence the group structure of the class. However, studies such as Nash (1973), relating group structure or aspects of pupils' self-concepts to teachers' ratings of pupils have not in fact investigated the causal mechanisms involved, and as noted in Chapter 4, pupils may be influential in determining how teachers perceive and interact with them; the formation of friendship groups may in fact involve the interaction between several teacher and pupil variables and this area of research clearly requires much further investigation directed towards illuminating the mechanisms involved.

The results of this case study and their possible interpretations were presented to the teacher, who commented that they seemed "real enough" and "quite commonsensical".

Finally, this study has suggested that rating scales comprising teachers' constructs may be useful in identifying groups of pupils in the class which are meaningful to teachers, and that the observation schedule outlined in Appendix II can successfully discriminate amongst the interactions engaged in by different pupils within the class.

CHAPTER 6 THE DEVELOPMENT OF A MODEL OF CLASSROOM DECISION-MAKING

It would be impossible to draw firm conclusions from the preceding exploratory studies, but they possibly provide some insight into the nature and content of classroom decision-making as well as indicating the feasibility of adopting various methods of accessing and quantifying relevant variables. The purpose of this chapter is to assimilate the observations of these pilot studies, together with the results and observations of the research reviewed in chapters 2 and 4; to develop a clearer notion of the processes of classroom decision-making and to build from the available evidence an appropriate conceptual framework which might serve to generate further testable hypotheses: it is intended that the model be more specific than that noted in chapter 3 but that it should fulfil the previously listed criteria of clarity, usefulness and appropriateness.

Several observations concerning classroom decision-making recur, sometimes frequently, in both the exploratory studies and the existing literature. These are noted below, together with the known sources of support, to form a summary of what may be termed the 'knowledge' of teachers' classroom decision-making as it presently stands.

1) Much classroom decision-making appears to be spontaneous, in the sense that it is a quick reaction to a particular situation without opportunity at the time for the consideration of alternatives (Bishop and Whitfield, 1972; Jackson, 1968;

Pilot Study 1); but teachers do report thinking at other times, such as before and after lessons, about how to deal with classroom situations (Jackson, 1968; Pilot Study 1), and teachers appear, in some cases, to have formulated rules for action in certain classroom situations (Hargreaves et al 1975; Pilot Study 1).

2) Many of teachers' decisions relating to classroom interaction appear to be strongly influenced by the individual teacher's knowledge or assessments of pupils (Stebbins, 1970; Garner and Bing, 1973; Hargreaves et al, 1975; Sharp and Green, 1975; Pilot Studies 1, 2, 3, 4).

3) The ways in which teachers perceive their pupils seem to be fairly similar (Morrison, McIntyre and Sutherland, 1965; Nash, 1973; Wood and Napthali, 1975; Taylor, 1976) and may relate to the ways in which teachers conceive their tasks (Sharp and Green, 1975; Hargreaves et al, 1975). Some studies have also suggested that, given the areas in which teachers assess pupils, their assessments are also quite accurate when compared to objective test scores (Willis, 1972), and relate to observed classroom behaviour (Brophy and Evertson, 1974).

4) Teachers can give reasons for some of their behaviour. These vary in their specificity but some suggest that teachers may engage in routine sequences of behaviour in which the

teacher differentiates amongst pupils in particular ways (Pilot Studies 3, 4). In addition to those pilot studies, several projects have suggested a relationship between teachers' perceptions of pupils and their interaction with them (Silberman, 1969; Brophy and Good, 1974).

5) Many of the reasons given by teachers, which involve differentiations amongst the pupils, are concerned with the teaching (or perhaps more accurately, management) of the class as a whole rather than the instruction of the differentiated pupils, i.e. teachers appear to differentiate amongst pupils for class management purposes, rather than for diagnostic and instructional treatment purposes (Hargreaves et al, 1975; Lundgren, 1972; Pilot Studies 3 and 4).

6) Teachers appear to have more complex ways of construing pupils and situations than student teachers: teachers talk more about pupils, and more variables are considered in the simulated decision-making of the former (noted by Bishop, 1970; and in Pilot Study 2).

7) There appear to be similarities between the ways in which a teacher perceives her pupils and the ways in which her pupils perceive themselves, and the pupils appear to "group" themselves with others perceived similarly by the teacher (Nash, 1973; Pilot Study 4).

Attempts to ascertain teachers' conceptions of their goals, aims or teaching role through interview techniques tended, in the pilot studies, to result in very general clichéd responses which did not appear to discriminate amongst teachers: this, together with the spontaneous, 'unthinking' way in which many classroom decisions appear to be made, would suggest that the logical models of teachers' classroom decision-making outlined in chapter 2, where teachers evaluate available alternative actions with respect to a set of goals or objectives, are particularly inappropriate. In contrast, it would seem that many of teachers' everyday classroom decisions are made unreflectively, at least at the time, and appear to be dealt with in a routine, rule-governed way, where the teachers' assessments of her pupils are an influential determinant of the outcome. For example, the misunderstanding of one pupil may, because of the way in which the teacher perceives him, suggest inattention or lack of effort and result in the adoption of a particular teacher response, whereas the misunderstanding of another may suggest that the work, or this particular problem is too difficult, and give rise to other teacher responses. The movement of one pupil across the room may alert the teacher to potential misbehaviour or time-wasting, whereas the movement of another may go almost unnoticed. Similarly, the need for a quick answer at a particular moment in a lesson may bring to mind certain pupils who tend to listen and volunteer information, whereas before embarking on another part of a lesson the teacher may wish to check that everyone has comprehended the lesson so far, which may bring to mind those pupils most likely not to have understood.

If teachers' classroom decision-making is conceptualised in this way, it has much in common with conceptualisations of person perception, interpersonal interaction and human information processing. Such concepts, for example, as "automatised behaviour" (from Argyle's (1969) account of interpersonal interaction), "heuristics" (from Newell, Simon and Shaw's (1958) account of human problem solving) and "trait package" (from the attribution theory of Jones and Nisbett (1972)) would seem particularly appropriate in describing the classroom 'decision-making' processes (or perhaps, more accurately, cognitive processes) in which teachers engage.

Some aspects of Argyle's theory of social interaction may be considered similar to the process of classroom decision-making. Argyle suggests that social interaction is analogous to motor skills in that it is goal-oriented and continuously monitored and modified as a result of sensory feedback; it is assumed that behaviour is hierarchically organised and that frequent use of a social skill results in automatised behaviour where the lower levels of behaviour have become "freed from continuous sensory control" and "more conscious attention is given to the performance of the larger units; their strategy is carefully planned where the lower levels are run off unthinkingly ....."

(p. 185). Argyle suggests that if one considers the motor skill of driving a car, driving to Aberdeen has a higher position in the hierarchy than turning the steering wheel, the latter becoming automatised in the case of an experienced driver. Due to the demand throughout the day for immediate responses, one would expect much of a teacher's behaviour to become automatised. As Jackson (1968) points out, teachers often appear to be "playing the melody by ear" (p. 145).

However, the process of classroom decision-making differs in several respects. Experienced teachers may well think in terms of 'doing a lesson' rather than in terms of making certain statements and asking certain questions, but some parts of the lower levels in the hierarchy may not be automatised; for example, the teacher may unthinkingly begin the lesson by asking able, eager, pupils but may have to make conscious decisions regarding what are appropriate questions to ask. The behaviours in which teachers engage (e.g. asking questions of particular pupils, asking questions about particular subject matter and asking questions phrased in particular ways) do not neatly fit a hierarchical structure and the information processing demands upon the teacher may be more complex than can be accounted for by a model like Argyle's.

Information processing theorists, such as Newell, Shaw and Simon (1958), and deGroot (1965), use the term "heuristic" to describe the rules which people and machines can use to find adequate solutions to problems. Although information processing theorists have been largely concerned with identifying general problem solving heuristics at a high level of abstraction, some of the less specific reasons which teachers give for their behaviour do seem similar to the examples of chess players' heuristics or 'rules for action' elicited by deGroot from subjects giving running commentaries on chess games (c.f. deGroot, 1965, p. 299: "Try to get an attack"; Pilot Study 1: "You have to show them who's boss"). Some more specific rules, such as asking bright, eager pupils at the beginning of the lesson, may act as more precise guides to teachers in formulating their actions.

The concept of "trait package" is used by person perception and attribution theorists (e.g. Jones and Nisbett, 1972) to denote a number of human qualities associated together, such that when a person is attributed with one quality, the others are often inferred to apply as well. Jones and Nisbett suggest that people (including psychologists) generally think of personality in terms of "trait packages" even though no high correlations have ever been found between traits and behaviour to justify the usefulness of such a concept. The term "trait package" seems particularly appropriate for describing teachers' perceptions and expectations of pupils where halo effects have been repeatedly reported, and a few constructs have often been found to predominate.

Borrowing some seemingly appropriate concepts from the theories of social interaction, person perception, attribution and information processing, and using the available knowledge of teachers' cognitions and behaviour, it seems possible to build up a more precise theoretical framework for understanding classroom decision-making which more closely resembles actual classroom practice than do the many logical models noted in chapter 2.

Given the observations noted earlier, one can in fact construe teachers' classroom decision-making as the use of a number of heuristics which result in the performance of partly automatised sequences of behaviour in response to the perception of configurations of cues amongst which the traits of pupils rank high in importance. This suggests teachers have a repertoire of behavioural routines, which, when put into operation in 'spontaneous decisions' are dependent on the teacher differentiating amongst pupils in particular ways. Student teachers appear to have less of a concern about pupil traits, and perhaps some of the initial difficulties experienced by student teachers in their classroom interactions could be interpreted in terms of the students' different cognitive state i.e. a comparative lack of appropriate heuristics, automatised behaviour sequences and the integration of associated ways of differentiating amongst pupils. Although this presents a somewhat global, oversimplified model of teachers' decision-making, and of the differences between teachers and student teachers, several questions can now be derived from the model concerning the process of learning to teach. Do teachers' and student teachers' perceptions of pupils differ? How do student teachers' perceptions of pupils change over time? How do patterns of classroom interaction relate to the teacher's and student teacher's perceptions of pupils? Is there a relationship between the ways in which a teacher perceives and interacts with her pupils and the rules or heuristics which guide her action? How do student teachers develop such heuristics? What negotiating power do pupils have in influencing teachers' and students' cognitions?

It was intended that several of the hypotheses which could be generated by the above model and which related to the process of learning to teach, be tested in the main study of this project.

CHAPTER 7 HYPOTHESES AND RESEARCH DESIGN FOR MAIN STUDY

The conceptual framework outlined in chapter 6 provides one way of looking at teachers' classroom decision-making. Being derived from empirical classroom research and adopting concepts which have been clearly defined within related fields, it is thought to provide an appropriate, though neither complete nor perhaps very detailed account, of teachers' classroom decision-making processes.

The explanatory and predictive power of the model may be restricted to certain types of classroom behaviour, the limits of which are presently unknown, and like most models concerning classroom processes it is impossible to devise a rigorous test of it. However, several hypotheses which can be derived from the decision-making model can be tested, and one of the functions of the main study of this project was to construct a series of hypotheses from the model, relating to the ways in which it is thought student teachers may learn to teach, and to carry out a test of these hypotheses, which, if supported, may also indicate support for the model itself. The criteria determining the acceptance of the model, however, may rather concern whether the model can illuminate, or clarify, the understanding of classroom decision-making, and whether it serves any practical function in the process of student teachers learning classroom skills. Consequently, the main study was also intended to adopt a descriptive function, in order to examine relationships amongst the data collected and better describe the process of teacher decision making.

The project, then, aimed to serve a hypotheses-testing and illuminative function, the former requiring a specific form of analysis and the latter requiring a broad description of the data. For example, the model in its present state would suggest a link between teachers' perceptions of pupils and classroom interactions; this can be formulated as a hypothesis and tested, but in so testing the hypothesis, much data would be generated which may be examined for indications of the ways in which particular perceptions relate to particular interactions, in turn leading perhaps to the proposition of more specific hypotheses: this illustrates the dual nature of the analyses undertaken here.

Hypotheses originally proposed

The decision-making model suggests that teachers use a number of rules, or heuristics, in classroom decision-making, which result in the performance of partly automatised sequences of behaviour in response to the perception of configurations of cues amongst which the traits of pupils rank high in importance. It is here assumed that if this is a valid representation of teachers' decision-making, relationships would be expected to be found between teachers' perceptions of pupils and teachers' classroom interaction and in turn between classroom interaction and teachers' reasons for action; furthermore, it would be expected that student teachers, learning to make classroom decisions, would have to learn to make perceptions of pupils, develop automatised sequences of behaviour and build up a repertoire of heuristics or decision rules, and to integrate these three components such that automatised sequences of behaviour become associated with appropriate pupil distinctions and that automatised behaviour becomes appropriate for the heuristics which the beginning teacher develops. Although "automatised sequences of behaviour" and "heuristics" present problems for their identification and quantification, classroom interaction can be identified and measured, as can teachers' reported reasons for their actions, and these could be taken as operational substitutes for the terms used in the model. With these considerations in mind, seven hypotheses were developed from the model, relating to the ways in which beginning teachers may learn to make classroom decisions:

1) Experienced teachers assess their pupils more quickly than beginning probationer teachers (i.e. attribute more qualities to more children, early in the term);

2) Experienced teachers' assessments of their pupils are more stable over time;

3) There are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them;

4) These associations are stronger amongst experienced teachers than probationers;

5) Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour;

6) The reasons, given by experienced teachers, which account for their classroom interactions are different from those, given by probationer teachers, which account for their classroom interactions;

7) There is a relationship between a teacher's assessments of his/her pupils and the pupils' perceptions of themselves and their friendship choices.

The relevance of the seventh hypothesis is not immediately apparent, but in pilot study 4 it was found that quite a strong relationship existed between a teacher's perceptions of her pupils and the pupils' friendship choices. Several speculations have been made about the influence teachers have on pupils' self-concepts and friendship choices (Nash, 1973) and, in contrast, about the influence which pupils exert over classroom interaction and the perceptions which teachers formulate of them (Brophy and Good, 1974). In view of such speculation and the strength of the association noted in pilot study 4, it was decided to investigate the relationship further, initially to ascertain the extent of its occurrence, and secondly to illuminate, if possible, something of the mechanism by which, and the extent to which, pupils may influence what beginning teachers learn and do in the classroom.

Research Design

The above hypotheses were tested in the following research design, which involved the collection of data concerning teachers' reported perceptions of pupils, teachers' ratings of pupils, classroom dyadic interaction, pupils' self-perceptions and friendship choices, and teachers' stimulated commentaries on their lessons.

Sample

Two primary schools took part in the research. Both were local authority schools in a small, but developing town in Central Scotland. The town, formerly a mining community, was largely populated by many commuters to nearby large towns and cities. The two schools were half a mile apart, one consisting of an approximately fifty year old building and a catchment area comprising the old central part of the town; the other was a new school, having been opened three years previously, taking in children from new council housing estates developing on the outskirts of the town. The old school had a role of over 700, and the new school of approximately 450: consequently, compared to primary schools generally, they were both relatively large. The schools were chosen on the grounds of ease of access for the researcher, who, during the period of the study, was a teacher in the new school.

The headteachers of the schools were approached regarding the project and were informed that it was a study of classroom interaction which might have some future relevance to teacher training; both headteachers agreed to participate in the project. A sample of twelve teachers* was requested consisting of six first year probationer teachers and six

* the term "teachers" is used throughout this report to refer to the whole sample, the terms "probationers" and "experienced teachers" being used for the separate halves.

experienced teachers, teaching in the P4-P7 range, and headteachers approached their staffs for volunteers. The teachers were not informed that comparisons were to be made amongst them.

A sample size of twelve was selected as a minimum size for the purpose of providing at least a reasonable test of the hypotheses, and from which any generalisations from the data could be formed, and at the same time being the maximum size of sample from which the researcher could collect the necessary data within the available time.

From the old school, one probationer and three experienced teachers agreed to participate in the project, the remainder of the sample being drawn from the new school; all of the teachers taught a class full-time in the P4-P7 stages. Of the six probationers, two were college trained with B.Ed degrees, four were university graduates with one year college training; all were aged twenty-one years to twenty-three years at the beginning of the project. One of the university graduate probationers had spent six months teaching English to German adolescents; otherwise the probationers' only teaching experience was that obtained during teacher training. All of the experienced teachers were college trained; most had taught for several years but one was in fact a second year probationer being included to make up the sample size; the mean length of teaching experience for the experienced teachers was 6.3 years at the start of the project, ranging from 1 to 15 years; ages ranged from 22 to over 55 years.

Before the project began, each teacher was visited individually and told of the data that was to be collected during the year; the teachers were given the opportunity to withdraw if they felt unable to participate, and none did.

Procedure

1) During the first two weeks of the school session 76/77, all teachers were visited during their "preparation time" and were given the instruction "Taking each pupil in the class in turn, either going through the register or taking them as they come to mind, give me your assessment of them in your own words. Describe them as they seem to you".

It was intended to consider the number of attributes, which teachers suggested concerning their pupils, and also to consider the nature of these attributes early in the first term; consequently the teachers' own words and what the teacher regarded as a sufficient and adequate assessment were important to achieve. Frequently after the first one or two descriptions, the teachers would ask if they were giving the right kind of information: when this occurred, the researcher asked "Is there any other information you could give which you regard as important?" In actual practice, this question was always answered negatively.

The teachers' assessments were noted by the researcher as close to verbatim as possible. A tape recorder would have been useful in the collection of such data, but since none of the teachers was known to the researcher and the data were to be collected within a short space of time, it was thought that the tape recorder would possibly have an inhibiting effect.

The data from the experienced and probationer teachers, as in all stages of data collection, were collected in ABBA sequence to maintain comparability between the two sets of data.

2) During the second to seventh weeks of the term (inclusive), each of the twelve classes was visited on three half-hour occasions, at different times of the day, and teacher-individual pupil interactions were noted using the observation schedule outlined in Appendix IIa. The interactions with individual pupils were noted on a seating plan of the classroom, and the names of the pupils in these seats were obtained from the teacher at the end of each session. The teachers were told that the researcher was observing classroom behaviour; and were asked not to teach any special subject, and to teach in their normal way. No feedback was given to the teachers concerning the interaction and the researcher was unaware of the teachers' perceptions of the pupils at the time of coding.

The observation schedule used was the modified version of that developed by Calderhead (1972) as used in the pilot studies, and this provided a record of the number and nature of contacts which each pupil in the class had with the teacher.

The teachers were not prewarned of the observer's visits, although they did know the number of visits involved.

One of the observation sessions occurred at the beginning of the school day, one after the morning break, and one at the beginning of the afternoon. These generally coincided with the start of a new lesson, or occasionally with a brief revision lesson reminding the children of what they had been doing previously. Consequently, the observation sessions generally included periods of intensive teacher-pupil interaction*, where the teacher was involved in teaching the whole class, and where it was anticipated that much teacher decision-making would be occurring. Teaching when part of the class was absent (e.g. handwork, when the girls were taught by a specialist teacher) was not observed, and little group teaching was observed. Group teaching was generally not adopted by the teachers in the sample except for one teacher who taught much of her project work in groups, and one other teacher who taught arithmetic in groups. In the cases where group teaching did occur, instructional sequences with each of the groups in the class came within an observation period, hence there was no distortion in the distribution of teacher-pupil contacts throughout the class as a result of only some group instruction being observed. With a sample of twelve teachers, 1½ hours per teacher was the maximum amount of time available to the researcher for observation, during the time limits of the

* it was generally found that lessons involved an initial period of instruction and/or discussion (usually lasting 10-20 mins.) involving teacher-pupil interaction, followed by a period of silent working where pupils worked individually in their seats with relatively little teacher contact.

study. This constitutes a fairly restricted amount of interaction data per individual teacher, but in effect, amounts to a sample of class teaching from three lessons for each teacher in the sample, and in terms of making comparisons between experienced and probationer teachers provides a sample of class teaching from eighteen lessons for each half of the total sample.

In pilot study 4 the intercorrelation of 1½ hour (approximately) sessions of classroom interaction recordings indicated product moment correlations between 0.30 and 0.67 in the total number of interactions engaged in by each pupil. This may suggest that the patterns of distribution of teacher pupil contacts may be reasonably stable and that a 1½ hour sample of teacher-pupil interaction, although far from ideal, may be fairly representative.

3) Using the assessments given by the teachers in part (1), an estimate was made of the five most common constructs for each teacher. During week six each teacher was asked to rate (using a five point scale) the pupils in his/her class on each of the five constructs, taking each construct separately*, and to point out any difficulties in the task. This method of eliciting constructs was considered to be less time-consuming than triadic elicitation and did not demand the teachers to invent constructs unrelated to their normal way of perceiving pupils.

To prevent teachers using personally meaningless constructs, they were asked to point out any difficulties

* to minimise any encouragement of halo effects.

in rating the pupils. It was found in pilot studies 1 and 4 that constructs tended to be considered by teachers in particular contexts and the context in which a construct was initially elicited was not always remembered by teachers when they were asked to rate pupils on the constructs*.

It was intended that this method would provide a more quantifiable set of data on teachers' assessments than the verbal reports recorded in part 1, and the process was undertaken towards the end of the period of classroom observations to avoid any influences on classroom interaction resulting from the teachers' possible increased awareness of pupil differences brought about by rating the pupils.

4) Also, during week six, the pupils of each class were asked to assess themselves on five point scales on the dimensions of intelligence, class behaviour, and interest in school work. The pupils were each given paper to record the information and were given the instructions:

"First of all write your name along the top of the piece of paper and underline it."

(pause)

"Now write the numbers 1, 2, 3, 4, and 5 in a line like this."

(demonstration on blackboard, another pause)

"I want you to keep your paper covered up. Don't tell other people what you're writing or let them see what you have on your paper."

(The children were spaced out as much as possible in the classroom)

* one teacher, for example, asked what was meant by "motivation" even though she had used the term herself, another asked whether quiet-noisy referred to classroom or outside-school behaviour.

"Now, I want you to think of how clever you are. If you think you are one of the cleverest people in the class, I want you to put a circle round the number 1." (demonstrate on board) "If you think you are cleverer than most people in the class, but some people are cleverer than you are, put a circle round 2."(demonstrate on board). "If you think you are in the middle and about as clever as most people in the class put a circle round 3."(demonstrate on board). "If you think most people in the class are a bit cleverer than you, put a circle round 4."(demonstrate on board) "If you think nearly everyone in the class is cleverer than you are, put a circle round number 5."(demonstrate on board).

"Now decide which number you should put your circle round and put your circle round <u>one</u> number only." (pause)

Instructions concerning what each number represented were repeated, before going on to the next instruction.

The same format of instructions was followed for "how well behaved you are in class" and "how interested you are in school work".

The children were then asked to draw a line and were given the instruction:

"I want you to imagine that you can choose the people in the class that you want to sit and work with in your group. Think who you would choose and write down their names. If there are two people in the class with the same first name, remember towrite down their second name as well. You can write down as many or as few names as you wish, but don't write more than six."

(pause, instruction repeated)

The children were asked to draw a second line, to separate the information given, and were then given the instruction:

"Think of the person in the class who is most like yourself - the person in the class who is the same type of person as yourself - and write down their name. If you don't think there is anyone in the class who is like you, or if you don't understand what to do, don't write anything, leave it blank."

On three occasions, children who had difficulty with writing were assisted in giving their answers by the class teacher.

This data was collected to provide some indication of the pupils' self-perceptions in the areas in which teachers appeared to assess pupils and to assess friendship groupings of the class. Friendship choices were limited to six in order to make the instructions to pupils more explicit and to facilitate data handling. The most-like self choice was employed as a crude check on whether the friendship groups reflected homophillic selection.

Questionnaire and rating measures of self concept, such as Barker-Lunn(1970), Brookover (1967) or repertory grid techniques, were discounted due to

i) their doubtful relevance to the major ways in which teachers perceived pupils and therefore the difficulty in relating changes in pupils' perceptions to changes in those of teachers;

ii) the large amount of time involved in administering and scoring the tests;

iii) the inappropriateness of some of the tests, or the difficulty in administering them, in the case of the younger children in the sample.

5) Data in parts (1) to (4) were collected again beginning in the third week of the second term. In addition, the last observation was taperecorded; another lesson of a similar nature was also tape-recorded and on this occasion the tape-recording was played back to the teacher within an hour of the end of the lesson, and the following instruction was given to the teacher:

"I would like you to listen to the tape-recording of your lesson, and to think of what was going on in your own mind while you were teaching. If you are aware of your reasons for doing what you did, I would like you to tell me. You can stop the tape recorder at any time when you want to explain something".

It was thought that the subject matter being taught might influence the reasons given by teachers for their behaviour. Consequently, on the tape-recorded sessions, all the major areas of the curriculum were sampled, and experienced teachers and probationer teachers were matched as shown in table 7.1. For the tape-recorded lessons, teachers were given prior warning of the researcher's visit and the visit was timed as much as possible to coincide with the teacher's usual period for the appropriate subject in order to avoid situations such as doing arithmetic on Friday afternoons, which, it was thought, could possibly influence classroom behaviour.

Prob.T.	Class	Exp.T.	Class	Subject
1	P4	8	P4	Creative Writing
2	P4	7	P4	Interpretation
3	P5	10	P6	Arithmetic
4	P5	11	P7	Arithmetic
5	P5	9	P6	Project Work.
6	P7	12	P7	Project Work.

Table 7.1

The class level of the sample of teachers and the subjects taught during tape-recorded lessons

The Methods adopted, and their reliabilities and validities

1) Measuring the quantity of attributions

a) Method

The scripts of the teachers' assessments were read and the number of attributions concerning each child were noted. Duplications, where the teacher repeated an attribute already suggested of the same child, were discounted, as were elaborations where the teacher was adding a minor detail to something already said, such as giving an example (e.g. "He's very poor at arithmetic, in fact he got none of his sums right today"). Irrelevancies, where the teacher had obviously digressed (e.g. when talking of how she came to know the child's mother), were also discounted.

b) Reliability

The reliability of this method of coding was assessed by coding three scripts, selected at random, on three occasions at fortnightly intervals. Product moment inter-correlations gave values of r ranging from 0.93 to 1.00, the mean correlation for each script being 0.97, 0.99 and 0.95. Differences in coding were largely due to a difficulty in discriminating some cases of duplication and elaboration. Two coders coding three scripts resulted in inter-coder reliability coefficients of $r = 0.96$, 0.89, 0.93.

c) Validity.

The validity of the method is difficult to assess. In as far as it seems reasonable that teachers will state more attributes when they know more about a child, the method has face validity. One might expect factors such as teacher confidence to influence this measure. However, the similarity in the mean number of attributes per pupil for the experienced teachers in the first and second terms and the approximate maintenance of rank order amongst the teachers on this measure suggests that what is being measured has some degree of stability.

2) Coding the content and form of the attributions.

Method

In order to investigate and describe possible differences in the attributions of experienced teachers and probationers, a category system was developed as shown in Appendix IV. This distinguished between the nature (content)of attributions (e.g. personality, ability) and their form (e.g. simple description or use of labels). These categories were devised after an examination of the data, and they appeared to account for the differences noted amongst teachers' attributions. To illustrate, a teacher might describe a child as "bright" - this would be categorised as:

content = general ability; form = simple description.

A comment such as "better-behaved than he was at the beginning of the year" would be categorised:

content = general behaviour; form = personal comparison

A comment such as "he likes to do nothing if he thinks he can get away with it" would be categorised:

content = attitude to work; form = motive attribution

A comment such as "a chatterbox" would be categorised:

content = specific behaviour; form = label

Further examples of categorisations and further explanation of them are given in Chapter 8 and Appendix IV. The system requires the coder to make nine distinctions concerning content and four concerning form.

Reliability of the Category System

Three scripts of teachers' assessments were chosen randomly (teacher 12 and probationers 4 and 5) and were coded on two separate occasions separated by a three week interval, the number of attributions each pupil received, as coded earlier, being known to the coder on both occasions.

A percentage reliability was calculated in accordance with the formula

$$\text{reliability} = \frac{(\text{total N of attributes} - \text{N of inconsistent codings})}{\text{total N of attributes}} \times \frac{100}{1}$$

The percentage reliabilities were 95%, 90%, and 94%. Reliabilities for coding on content alone were 96%, 95% and 96%, and for coding on form alone were 99%, 95% and 96%. Consequently, the reliability of each 'dimension' of coding is approximately the same, and the above results would suggest that inconsistent codings occur on average at the rate of one in fifteen codings.

Some of the inconsistencies arose from such doubts as to whether "lively" referred to Personality or General Behaviour, whether "slow" should be coded as General Ability or Attitude to Work, and whether "remedial" was a Label or a Simple Description.

The category system requires a certain amount of inference at times, but the great majority of teachers' attributions can be very reliably coded. Using a second person to code the three scripts, an inter-coder reliability coefficient was also calculated with the results 95%, 93%, 95%.

Validity

Face validity is assumed for this method. However, it is perhaps difficult to attribute significance to the different forms of attribute. For example, when two teachers attribute the same quality to a pupil, one as a simple description, the other as a label, does this reflect different superficial speech habits, the attribution of a temporary as opposed to permanent quality, or a difference in confidence that the teacher has in her assessment? Should the attribution of motives be taken to suggest a strong pupil control ideology or a teacher's high degree of familiarity with the pupils? Clearly, various interpretations are possible, and these are left to the reader: the fact remains that these differences do seem to occur in teachers' reported assessments of their pupils, some of which have been noted by other researchers (e.g. Stebbins, 1970) and the use of the above schedule was intended to investigate possible patterns in their occurrence.

3) The Classroom Observation Schedule

Method

The interaction between teacher and individual pupils was categorised according to the ten categories in Appendix II, and was noted on a seating plan of the classroom, in order that a record could be kept of the nature and number of interactions in which each pupil was engaged. Routine procedures, such as registration and collecting of dinner money were ignored, and interactions with the whole class or groups of pupils were also not recorded.

Reliability

The reliability of coding interactions on a seating plan was not assessed due to the technical difficulties of reproducing classroom dyadic interactions. However, the reliability of coding three scripts of lessons on three occasions, at fortnightly intervals, using the categories in Appendix II applied to dyadic interactions, resulted in mean percentage agreements for each script of 98%, 97% and 98%. (See Appendix IIb for method of calculation).

Reliability between coders on the same 3 scripts gave mean percentage agreements of 94%, 92%, and 94%.

Validity

The validity of observation schedules is difficult to assess. As discussed in chapter 3, classroom observation schedules place a structure upon classroom behaviour in accordance with a set of predetermined behaviour categories. What is perhaps most important is whether these categories are appropriate for the purposes involved. The categories were first of all adapted from a model of classroom teaching developed and tested in Scottish primary schools, and with two main considerations in mind: to quantify teacher-pupil dyadic interactions and to account for the different types and amounts of interaction engaged in by different pupils. The schedule also has the advantages of requiring relatively little inference upon the part of the observer, and of being easy to use in practice. Other observation schedules designed to study teacher-pupil dyadic interaction (e.g. Jackson and Lahaderne, 1967; Garner and Bing, 1973; Good and Brophy, 1970), tend to have either very broad behaviour categories or several categories which would appear to be poor discriminators amongst pupils. For example, Jackson and Lahaderne made the distinctions between instructional, managerial and prohibitory contacts; Garner and Bing distinguished work, procedural, disciplinary and response opportunity contacts; Good and Brophy distinguished work, procedural, self-reference contacts and four different forms of feedback. Several distinctions are common to all of these schedules and to the one employed in this project, such as the distinction between instruction and management (or procedure) and the classification of disciplinary or prohibitory contacts. In the case of the Good and Brophy schedule, the closest in resemblance to the schedule adopted here, the categories of self-reference and praise and process feedback, which have no corresponding categories in the adopted schedule, were found by Luce and Hoge (1978) to be infrequently occurring behaviours in their sample of five classrooms; and even with 7½ hours observation data from each classroom, these categories could not be used to discriminate amongst pupils in terms of their classroom interaction. The only distinction which occurs in the Good and Brophy schedule and not in the adopted one and which was found by Luce and Hoge to occur at a reasonably frequent level was 'criticism' which was distinguished from other forms of feedback.

Consequently, the schedule employed in this project includes the major distinctions present in other schedules devised for similar purposes, and also includes some additional distinctions. Since the schedules noted above have all successfully measured differences in the distribution of teachers' interactions with pupils, it could be asserted that the adopted schedule is appropriate for the purpose for which it was devised.

4) Rating Scales

Method

In the case of teachers' ratings of pupils, the five most commonly used constructs (in some cases, there were only four as attributions which were made on less than three occasions were ignored) were selected from the teachers' reported assessments of the pupils. Teachers were presented with the five (or four) constructs and five point rating scales and were asked to rate every pupil in the class on each construct before going on to the next.

In the case of pupils' self-ratings, the scales provided to the pupils were determined by the researcher and were chosen because of their wide use by teachers in perceiving pupils. It is not known whether intelligence, behaviour and interest in work are important constructs to pupils, although it is assumed that children will understand the constructs and be able to reliably rate themselves on them.

Reliability

Rating scales can take various forms. It has been argued by Bannister and Fransella (1971) that concepts of reliability and validity of rating scales are meaningless within the framework of personal construct theory: they suggest that differences between a test and retest of a person's constructs could be as easily attributed to the person's changing perception as to lack of reliability of the method, and validity can only be considered with reference to each individual's construct system. However, one would anticipate that persons' construct systems would in many circumstances be reasonably stable, and that the method could be considered inductively to be valid if its validity could be demonstrated in a number of cases. As noted in Chapter 3, many forms of rating scale have been used, and in the case of some scales test-retest reliability, and predictive and concurrent validity, have been demonstrated to be high.

In the present study, moderate to high correlations between the first and second term data in both the teachers' and pupils' ratings could be interpreted in terms of the method being reliable; but no specific reliability trials were carried out, as the method has been sufficiently widely used and examined for its reliability to be assumed.

Validity.

By constructing the teachers' rating scales from their reported assessments of the pupils, it was anticipated that the scales would be more meaningful to them than scales provided by the researcher and hence the scores would more validly reflect the teachers' perceptions. In order to provide comparable data, the scales for the pupils' self-assessments were supplied by the researcher, but were communicated to the children in a form which was intended to facilitate a simple and uniform interpretation on their part.

Although these precautions were intended to improve the validity of the data collected, face validity was assumed and no attempt was made to assess it.

5) Sociometric Test

Method

All pupils were asked to list the names of those they would like to sit and work with in their group, and to note the name of the person in the class most like themselves In the case of the latter question a number of pupils were unable to reply, 44% in the first term and 36% in the second term did not respond.

Reliability

No reliability measures for the sociometric data were employed in this project. Cohen (1976) quotes a number of research studies suggesting that test-retest reliability is generally high, but, as Remmers (1963) points out, the degree to which sociometric retests are measuring memory rather than group structure is unknown.

Validity

The degree to which the pupils' group choices reflected choices of pupils perceived similar to self was assessed by the extent to which the like - self choice appeared in the group choice. This in fact occurred on average in 79% of cases per class in the first term and 78% in the second. Although this is not a very rigorous test of the homophilic selection assumption, it was thought that a more detailed investigation of pupils' perceptions and group choices would be excessively time-consuming and would, in any event, have doubtful value due to the difficulties of obtaining such data from children.

6) Stimulated Commentaries

Method

A tape-recording of the teacher's lesson was played back to each teacher with the instruction to give any reasons she had at the time for doing what she did. The commentaries were noted and later coded, first of all in terms of whether the reason for the behaviour suggested that the teacher was differentiating amongst pupils in her interactions, and in terms of the kind of interaction and pupil distinction involved (question, direction; high ability, inattention etc.), and then in terms of the nature of the reason given (i.e. the function which the behaviour was reported to serve). A more detailed explanation of the categories is provided in chapter 10. It was assumed that only those interactions which were reported to involve pupil differentiations would be likely to provide reasons for the overall differences in the distribution of pupil contacts.

Reliability

The inter-and intra-rater reliability of coding teachers' commentaries, in terms of the few categories involved, was assessed on all twelve commentaries on two occasions one month apart, and achieved levels of agreement of over 95% in all cases, calculated by the formula

$$\frac{\text{Total N. of Comments} - \text{N. of Inconsistent Codings}}{\text{Total N. of Comments}} \times 100\%$$

Validity

It was originally intended to check the validity of teachers' commentaries by comparing teachers' reasons for their actions against the first tape-recorded lesson for which no commentary was given. However, the reasons given by teachers were of such a nature that they could in fact only be substantiated in a few cases where they referred to such factors as the ordering of either subject matter or teaching tactics. Consequently, the validity of the commentary data rests upon the assumption that teachers can and do give truthful, accurate reasons for their behaviour.

Analysis

Table 7.2 itemises the analyses performed on the data, firstly as a test of the hypotheses and secondly as a descriptive analysis of the data. In order to facilitate the interpretation of results, a full account of each part of the data collection and analysis is also given at the beginnings of chapters 8 to 11, which consider the results of the analyses in terms of teachers' perceptions of pupils, the relationships of these perceptions to the distribution of classroom interactions, the relationship of teachers' reasons for their behaviour to teachers' perceptions of pupils and the distribution of classroom interactions, and the relationships between teachers' perceptions of pupils and pupils' perceptions of themselves, respectively.

<u>Hypothesis 1</u> Experienced teachers assess their pupils more quickly than beginning probationer teachers (i.e. attribute more qualities to more children, early in the term).	<u>Hypothesis-testing</u>: The mean number of attributions was calculated for both experienced and probationer teachers in both first and second term data. On the basis of hypothesis1, a difference would be expected in mean and range between experienced and probationer teachers in the first term but either no difference or less of a difference in the second. <u>Descriptive analysis</u>: The nature of the attributes was also investigated as a means of gaining further insight into the ways in which teachers' perceptions of pupils change.
<u>Hypothesis 2</u> Experienced teachers' assessments of their pupils are more stable over time.	<u>Hypothesis-testing</u>: The teachers' ratings of pupils made in the first and second terms were correlated, where possible.* A higher correlation between the two terms' data was predicted for experienced teachers than for the probationer teachers. <u>Descriptive analysis</u>: Factor analysis of the teachers' ratings were performed to investigate possible structures in the ratings of pupils.
<u>Hypothesis 3</u> There are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them.	<u>Hypothesis-testing</u>: It was predicted that a cluster analysis of each teacher's rating data would provide clusters of pupils receiving significantly different amounts and types of interaction. <u>Descriptive analysis</u>: An analysis of the types of interaction in which experienced and probationer teachers engaged was carried out to provide a description of the ways in which the classrooms differed, and hence providing a context in which to interpret other results.
<u>Hypothesis 4</u> These associations are stronger amongst experienced teachers than probationers.	<u>Hypothesis-testing</u>: It was predicted that the differences in interaction received by different clusters would be greater amongst experienced teachers than probationers.

* some constructs changed between first and second terms.

<u>Table 7.2</u>

<u>A summary of the hypotheses and the analyses performed on the data.</u>

Hypothesis 5 Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour.	Hypothesis-testing: It was predicted that when giving running commentaries on tape recordings of their lessons teachers would give reasons for selectively interacting with pupils and that these reasons could explain some of the unequal distributions of teacher-pupil contact recorded in their classrooms. A Fisher exact probability test was used to assess the extent to which teachers giving particular reasons for interaction displayed particular classroom interaction patterns. Descriptive analysis: The possible relationship of teachers' use of particular constructs with particular reasons for action was also investigated.
Hypothesis 6 The reasons given by experienced teachers which account for their classroom interactions are different from those given by probationer teachers which account for their classroom interactions.	Hypothesis-testing: It was predicted that where reasons, given by the teachers, appeared to explain the unequal distribution of teacher-pupil contacts in their class, the reasons from the probationers would be different from those of the experienced teachers.
Hypothesis 7 There is a relationship between a teacher's assessments of his/her pupils and the pupils' perceptions of themselves and their friendship choices.	As a result of the analysis of other data, this hypothesis was modified into 5 related hypotheses which were tested using a cross-lagged panel analysis, and by measuring the degree of stability in pupils' friendship choices between terms and the extent of congruence between clusters derived from teacher ratings and clusters derived from the friendship choices of the pupils. Chapter 11 outlines the rationale for the development of the hypotheses and their analysis.

Table 7.2 (cont'd)

CHAPTER 8 TEACHERS' PERCEPTIONS OF THEIR PUPILS.

A. Summary of Relevant Hypotheses, Research Design and Data Analysis

Hypotheses

1) Experienced teachers assess their pupils more quickly than beginning probationer teachers (i.e. attribute more qualities to more children, early in the term).

2) Experienced teachers' assessments of their pupils are more stable over time.

Research Design

During the first two weeks of term, each teacher was given the instruction "Taking each pupil in turn, either by going through the register or taking them as they come to mind, give me your assessment of them in your own words. Describe them as they seem to you." The teachers' descriptions were noted by the researcher.

The five most commonly used constructs were selected from each teacher's descriptions (constructs used three or fewer times being discounted due to their infrequent use and possible inapplicability to the whole class), and during week 6 each teacher was asked to rate the pupils on a five point scale taking each construct separately, and to point out any difficulties in the task.

Both types of data were collected again, on a similar time scale, in term 2.

Analysis

The number of attributes which teachers gave to each pupil was assessed (mean intra-coder reliability $r = 0.97$, mean inter-coder reliability $r = 0.93$), and the mean number of attributes per pupil (and ranges) were calculated for each teacher in each term's data.

To further understand the differences between first and second term means, an attribute category system was devised (see Appendix IV) to examine the types of attributions made by teachers in each term (mean intra-observer reliability = 94%, mean inter-observer reliability = 94%). The percentage change between terms for each category was calculated.

The common constructs used by the teachers in rating the pupils were examined. Means and standard deviations were calculated for each scale to examine which scales created most differentiation amongst the pupils, and comparisons were made between teachers and probationers in both first and second terms. A factor analysis was carried out to examine the relationships amongst the constructs used, and to investigate any possible differences in the factor structures of the ratings of experienced teachers and probationers, and any changes in the factor structures between the first and second terms.

The stability of teachers' ratings between terms was also investigated by correlating individual teachers' first and second term ratings where appropriate, using Spearman's correlation.

B. Teachers' Perceptions of Their Pupils: Results

1. Comparison of Experienced and Probationer Teachers with respect to the Number of Attributions in their Assessments of Pupils in terms 1 and 2

Table 8.1 shows the range and mean number of attributions (and rank order of means for teachers and probationers) given to each child in the class by all twelve teachers, taken from their assessments during the first two weeks of the session. Both means and range are generally lower for probationer teachers than for experienced teachers. The overall mean for probationers is 2.96 and for experienced teachers is 4.74. A t-test between means for probationers and experienced teachers indicates a significant difference, $p < 0.05$. Class size does not noticeably influence the mean number of attributions to any extent.

Table 8.2 shows the same statistics for the data gathered in term 2. Experienced teachers have similar means, ranges and rank orders to the first set of data, and the shifts that have occurred (which are generally small) have no consistent direction. Probationer teachers (with one exception) show comparatively large increases in the mean number of attributions per pupil*, the lower and upper limits of the range are increased (with the same exception),

* It is interesting to note that probationer 6 had taught abroad for six months teaching English to small groups of German adolescents; probationers 2 and 5 were the only college trained probationers (and consequently had had more teaching practice): all three have high rank orders amongst the probationers.

Probs.		No. of Pupils	Total No. of Attributions	Mean No. of Attributions per pupil	Rank	Range
1.	Girls	16	29	1.81		
	Boys	13	38	2.92	6	0-4
	Both	29	67	2.31		
2.	Girls	10	29	2.90		
	Boys	14	40	2.86	3	2-4
	Both	24	69	2.88		
3.	Girls	15	44	2.93		
	Boys	17	47	2.76	4	1-4
	Both	32	91	2.84		
4.	Girls	15	37	2.47		
	Boys	17	46	2.71	5	1-5
	Both	32	83	2.59		
5.	Girls	10	40	4.00		
	Boys	14	54	3.86	1	2-5
	Both	24	94	3.92		
6.	Girls	12	38	3.17		
	Boys	13	47	3.62	2	2-5
	Both	25	85	3.40		
Exp. Teachers						
7.	Girls	15	132	8.80		
	Boys	10	76	7.60	1	4-16
	Both	25	208	8.32		
8.	Girls	14	65	4.64		
	Boys	14	82	5.86	2	4-11
	Both	28	147	5.25		
9.	Girls	17	68	4.00		
	Boys	14	58	4.14	3	3-7
	Both	31	126	4.06		
10.	Girls	20	57	2.85		
	Boys	12	40	3.33	6	2-6
	Both	32	97	3.03		
11.	Girls	13	42	3.23		
	Boys	12	42	3.50	5	2-6
	Both	25	84	3.36		
12.	Girls	13	54	4.15		
	Boys	13	50	3.85	4	3-7
	Both	26	104	4.00		

Overall mean no. of attributions per pupil:
1) for probationers = 2.96
2) for exp. teachers = 4.74

Table 8.1

Total and Mean Number of Attributions from Teachers in Term 1.

Probs.		No. of Pupils	Total No. of Attributions	Mean No. of Attributions per pupil	Rank	Range
1.	Girls	15	30	2.00		
	Boys	12	31	2.58	6	1-4
	Both	27	61	2.26		
2.	Girls	8	38	4.75		
	Boys	13	64	4.92	3	3-7
	Both	21	102	4.85		
3.	Girls	14	76	5.43		
	Boys	17	91	5.35	1	4-7
	Both	31	167	5.39		
4.	Girls	14	64	4.57		
	Boys	17	70	4.12	5	3-6
	Both	31	134	4.32		
5.	Girls	10	59	5.90		
	Boys	13	63	4.85	2	3-8
	Both	23	122	5.30		
6.	Girls	12	58	4.83		
	Boys	13	58	4.46	4	3-9
	Both	25	116	4.64		
Exp. Teachers						
7.	Girls	13	76	5.85		
	Boys	10	70	7.00	1	5-13
	Both	23	146	6.35		
8.	Girls	13	54	4.15		
	Boys	13	72	5.54	2	2-8
	Both	26	126	4.85		
9.	Girls	17	57	3.35		
	Boys	14	50	3.57	6	2-5
	Both	31	107	3.45		
10.	Girls	19	79	4.16		
	Boys	13	61	4.69	3	2-7
	Both	32	140	4.38		
11.	Girls	13	46	3.54		
	Boys	13	49	3.77	5	2-6
	Both	26	95	3.65		
12.	Girls	13	49	3.77		
	Boys	14	59	4.21	4	3-6
	Both	27	108	4.00		

Overall mean no. of attributions per pupil:
1) for probationers = 4.44
2) for exp. teachers = 4.37

Table 8.2

Total and Mean Number of Attributions from Teachers in Term 2.

and rank order is similar. The difference between experienced and probationer teachers in the mean number of attributions per pupil in their assessments seems to have almost disappeared in the second term, overall means being virtually identical. This indicates that probationers, after one term's teaching, attribute more qualities to the children in their class, and, considering the increase in range, have come to attribute many qualities to at least a few children in the class; this attribution process seems to be carried out earlier in the school year by experienced teachers, although the approximate maintenance of rank order throughout may suggest differences in the teachers' abilities to attribute qualities to pupils. There is no consistent difference in the number of attributes referred to boys or girls.

Although other interpretations could be placed upon these findings, the data is consistent with hypothesis 1.

2. Comparison of Experienced and Probationer Teachers in terms of the Content and Form of their Attributions to their Pupils in Terms 1 and 2.

Probationers' and experienced teachers' assessments of children differed not only in terms of length but appeared to differ in the nature of what was said. Experienced teachers gave the impression that they understood their children very well and knew why their children behaved in the way they did: this was sometimes reflected in very specific attributes (e.g. "has difficulty with spelling") or in an apparently 'insightful' comment (e.g. "she'd like to be part of the group, but whatever she does annoys them").

An attempt was made to analyse these qualities of attributions with a view to gaining further understanding of the ways in which teachers' assessments of pupils may change over the term. However, again it has to be acknowledged that any such changes in the teachers' use of language could be accounted for by numerous theoretical frameworks.

The category system defined in Appendix IVa (examples of categorisations are given in Appendix IVb) was devised to account for both the types of attributes which teachers appeared to give their pupils (content) and the way in which they were made (form), and was intended to be reliable and manageable.

Table 8.3 shows the categorisation of teachers' and probationers' attributions in terms of content in term 1, and table 8.4 shows the same statistics for term 2. In the term 1 assessments, there are few differences in the mean distribution of attributions. Three of the experienced teachers seem to make slightly more attributions concerning social information (home background and reactions of other children towards individual pupils) and other information (e.g. "attractive", "good at football"). Probationers appear to make considerably more attributions concerning attitude to work (e.g. "lazy", "works hard"). There is a fairly general trend for about half of all attributions to fall into the categories of general ability and attitude to work. After these, attributions concerning personality and specific behaviours (generally, talking) are the most frequent.

	Probationers 1	2	3	4	5	6	mean % for probs.
1) General Ability	20.0	21.6	33.0	33.8	23.1	12.4	24.0
2) General Behaviour	3.1	1.4	2.3	3.8	3.3	2.5	2.7
3) Specific Ability	3.1	13.5	3.4	17.5	7.7	16.1	10.2
4) Specific Behaviour	26.2	12.2	11.4	10.0	14.3	11.1	14.2
5) Personality	18.5	8.2	3.4	7.5	30.8	30.9	16.5
6) Attitudes to work	26.2	32.4	34.1	15.0	15.4	22.2	24.2
7) Presentation of work	1.5	10.8	9.1	12.5			5.7
8) Social Information			1.1		5.5	3.7	1.7
9) Other	1.5		2.3			1.2	0.8

% of attributes

	Experienced Teachers 7	8	9	10	11	12	mean % for exp T's
1) General Ability	9.8	14.2	24.2	37.9	27.8	32.0	24.3
2) General Behaviour	1.0	2.7	5.0	8.1	5.6	2.9	4.2
3) Specific Ability	17.6	6.1	12.5	4.6	29.2	1.0	11.8
4) Specific Behaviour	13.5	15.5	12.5	12.6	2.8	16.5	12.2
5) Personality	22.3	29.1	12.5	25.3	13.9	11.7	19.1
6) Attitudes to work	16.6	9.5	16.7	4.6	15.3	13.6	12.7
7) Presentation of work	6.2	0.7	14.2	2.3	2.8	5.8	5.3
8) Social Information	5.7	11.5	0.8	2.3	1.4	11.7	5.6
9) Other	7.3	4.7	1.7	2.3	1.4	4.9	3.7

% of attributes

Table 8.3

Analysis of Content of Teachers' Attributions in Term 1.

	Probationers						
	1	2	3	4	5	6	mean % for probs.
1) General Ability	18.3	19.6	20.0	16.8	12.9	15.8	17.2
2) General Behaviour		5.4	1.3	3.2	5.2	2.6	3.0
3) Specific Ability		3.3	13.3	23.2	26.7	12.3	13.1
4) Specific Behaviour	21.7	19.6	12.7	24.0	13.8	8.8	16.7
5) Personality	18.3	9.8	25.3	14.4	13.8	25.4	17.8
6) Attitudes to work	28.3	28.3	18.7	11.2	12.9	25.4	20.8
7) Presentation of work		9.8	3.3	7.2	1.7	2.6	4.4
8) Social Information	6.7	1.1	1.3		11.2	4.4	4.1
9) Other	6.7	3.3	4.0		1.7	2.6	3.0
	% of attributes						

	Experienced Teachers						
	7	8	9	10	11	12	mean % for expT's
1) General Ability	10.9	18.1	30.5	14.6	23.2	25.5	20.1
2) General Behaviour	2.0	5.2	2.9	4.1	7.3	2.0	3.9
3) Specific Ability	19.1	25.0	10.5	9.8	22.0	11.8	16.3
4) Specific Behaviour	7.5	13.8	7.6	10.6	3.7	19.6	10.5
5) Personality	24.5	12.9	8.6	28.5	14.6	8.8	16.3
6) Attitudes to work	12.2	12.1	25.7	17.9	20.7	16.7	17.6
7) Presentation of work	4.8	5.2	9.5	10.6	3.7	7.8	6.9
8) Social Information	12.2	7.8	1.0	1.6	3.7	7.8	5.7
9) Other	6.8		3.8	2.4	1.2	2.0	2.7
	% of attributes						

Table 8.4

Analysis of Content of Teachers' Attributions in Term 2.

There may be some individual differences amongst teachers (and probationers) in the way in which they assess pupils and some of these individual differences reappear in the second term assessments (e.g. teachers 7 and 11 and probationer 4 make a comparatively large number of specific ability attributions in both terms) but this is not a consistent trend.

Probationers, in the second term, have increased the number of attributions in social and other categories and most have maintained a similar proportion of specific behaviour attributions while in two cases, (probationers 2 and 4), the proportion has greatly increased. Experienced teachers in term 2, in contrast, either maintain the same proportion or show a slight decrease in this category. For both probationers and teachers, there is a general tendency for an increase in the specific ability category in the term 2 assessments (probationers 3, 4 and 5, and teachers 7, 8, 10 and 12); and/or a decrease in the term 2 general ability category (probationers 1, 2, 3, 4 and 5, and teachers 10, 11 and 12), but there are wide individual variations within this trend and there are cases where changes are small and even negative.

In general, however, the proportions of different types of attributions seem to remain fairly stable between terms and, as table 8.5 indicates, the amount of change in probationers' attributions is comparable to that of experienced teachers, with the possible exception of personality where two probationers exhibit considerable change in opposite directions.

Probationers	1	2	3	4	5	6	Mean % change for probs. (direction of change ignored)
1) General Ability	− 1.7	− 2.0	− 13.0	− 17.0	− 10.2	+ 3.4	7.9
2) General Behaviour	− 3.1	+ 4.0	− 1.0	− 0.6	+ 1.9	+ 0.1	1.8
3) Specific Ability	− 3.1	− 10.2	+ 9.9	+ 5.7	+ 19.0	− 3.8	8.6
4) Specific Behaviour	− 4.5	+ 7.4	+ 1.3	+ 14.0	− 0.5	− 2.3	5.0
5) Personality	− 0.2	+ 1.6	+ 21.9	+ 6.9	− 17.0	− 5.5	8.9
6) Attitudes to work	+ 2.1	− 4.1	− 15.4	− 3.8	− 2.5	+ 3.2	5.2
7) Presentation of work	− 1.5	− 1.0	− 5.8	− 5.3	+ 1.7	+ 2.6	3.0
8) Social Information	+ 6.7	+ 1.1	+ 0.2		+ 5.7	+ 0.7	2.4
9) Other	+ 5.2	+ 3.3	+ 1.7		+ 1.7	+ 1.4	2.2

Exp. Teachers	7	8	9	10	11	12	Mean % change for exp T's.
1) General Ability	+ 1.1	+ 3.9	+ 6.3	− 23.3	− 4.6	− 6.5	7.6
2) General Behaviour	+ 1.0	+ 2.5	− 2.1	− 4.0	+ 1.7	− 0.9	2.0
3) Specific Ability	+ 1.5	+ 18.9	− 2.0	+ 5.2	− 7.2	+ 10.8	7.6
4) Specific Behaviour	− 6.0	− 1.7	− 4.9	− 2.0	+ 0.9	+ 3.1	3.1
5) Personality	+ 2.2	− 16.2	− 3.9	+ 3.2	+ 0.7	− 2.9	4.9
6) Attitudes to work	− 4.4	+ 2.6	+ 9.0	+ 13.3	+ 5.4	+ 3.1	6.3
7) Presentation of work	− 1.4	+ 4.5	− 4.7	+ 8.3	+ 0.9	+ 2.0	3.6
8) Social Information	+ 6.5	− 3.7	+ 0.2	− 0.7	+ 2.3	− 3.9	2.9
9) Other	− 0.5	− 4.7	+ 2.1	+ 0.1	− 0.2	− 2.9	1.8

Table 8.5

Percentage changes in content of attribution in teachers' assessments of pupils between terms 1 and 2.

Table 8.6 shows the percentage breakdown of first term attributions according to form. There seems to be a fairly general trend for most teachers and probationers to make attributions of a simple description form, with relatively few personal comparisons. However, experienced teachers appear to make more attributions concerning motive and to use rather more labels than probationer teachers. In Table 8.7, it can be seen that all but one of the experienced teachers have increased their use of personal comparison attributes in the second term, whereas very little change has occurred in the probationers' use of personal comparisons. All probationers have shown an increase in their use of motive attribution, while changes for experienced teachers occur in both directions and the mean for the latter remains fairly stable. Means for the use of labels also remain fairly stable although there is a reasonable degree of individual change in either direction for both experienced teachers and probationers.

Tables 8.8 and 8.9 show that the percentage of the total number of attributions in the cells of the category system concerned with general ability and attitude to work (which refer to the most frequently occurring attributes) is stable for the experienced teachers and is less stable for the probationers. The other cells of the category system have considerably smaller proportions of attributions and reliable comments concerning their stability are more difficult to make.

	Simple Description	Personal Comparison	Motive Attribution	Labels
Probationers 1	92.3	3.1	1.5	3.1
2	86.5	6.8	-	6.8
3	88.6	1.1	3.4	6.8
4	87.5	3.8	-	8.8
5	83.5	-	4.4	12.1
6	97.5	-	1.2	1.2
Mean % for probationers	89.3	2.5	1.8	6.5
Exp. Teachers 7	79.3	3.1	13.5	4.2
8	75.0	2.0	8.1	14.9
9	78.3	2.5	7.5	11.7
10	86.2	-	3.5	10.3
11	63.9	8.3	13.9	13.9
12	93.2	1.0	3.9	1.9
Mean % for exp. teachers	79.3	2.8	8.4	9.5

% of Attributes

Table 8.6

Analysis of Form of Teachers' Attributions in Term 1 Assessments

		Simple Description	Personal Comparison	Motive Attribution	Labels
Probationers	1	76.7	3.3	8.3	11.7
	2	81.5	4.4	14.1	-
	3	82.0	1.3	8.7	8.0
	4	80.0	4.8	6.4	8.8
	5	75.9	4.3	8.6	11.2
	6	83.3	-	12.3	4.4
Mean % for probationers		79.9	3.0	9.7	7.4
Exp. Teachers	7	79.6	0.7	12.2	7.5
	8	81.9	5.2	4.3	8.6
	9	82.9	2.9	9.5	4.8
	10	69.9	4.9	9.8	15.5
	11	67.1	17.1	8.5	7.3
	12	71.6	5.9	21.6	1.0
Mean % for exp. teachers		75.5	6.1	11.0	7.5

% of Attributes

Table 8.7

Analysis of Form of Teachers' Attributions in Term 2 Assessments.

	Simple Description		Personal Comparison		Motive Attribution		Labels	
	Term 1	Term 2	Term 1	Term 2	Term 1	Term 2	Term 1	Term 2
General Ability	21.7%	11.1%	0.8%	1.7%	–	0.2%	1.7%	1.2%
General Behaviour	2.1%	1.7%	–	0.2%	–	–	0.4%	1.2%
Specific Ability	10.0%	14.0%	0.2%	0.2%	–	0.6%	–	–
Specific Behaviour	12.9%	12.2%	–	0.2%	–	1.4%	0.6%	2.4%
Personality	13.6%	15.1%	–	–	0.2%	1.4%	3.1%	2.0%
Attitudes to work	21.3%	13.6%	0.6%	0.5%	1.7%	5.2%	0.4%	0.5%
Presentation of work	5.0%	3.7%	0.6%	0.5%	–	0.2%	–	–
Social Information	1.9%	3.2%	–	–	–	0.6%	–	–
Other	0.8%	2.7%	–	–	–	–	–	–

Total number of attributions (1st term) = 479

Total number of attributions (2nd term) = 657

Table 8.8

Percentage Distribution of Content and Form of Total Attributions from Probationers.

	Simple Description		Personal Comparison		Motive Attribution		Labels	
	Term 1	Term 2	Term 1	Term 2	Term 1	Term 2	Term 1	Term 2
General Ability	17.4%	15.9%	1.8%	1.8%	0.8%	0.3%	1.4%	1.3%
General Behaviour	2.6%	2.1%	—	0.6%	0.4%	0.6%	0.6%	0.4%
Specific Ability	10.7%	14.7%	0.3%	1.2%	0.7%	0.3%	—	0.2%
Specific Behaviour	10.1%	7.6%	0.1%	0.3%	1.7%	0.9%	1.1%	1.8%
Personality	13.0%	11.3%	—	0.2%	2.5%	3.7%	4.6%	2.1%
Attitudes to work	10.0%	10.1%	0.3%	1.0%	2.1%	4.9%	0.8%	1.0%
Presentation of work	4.8%	6.1%	0.1%	0.3%	0.1%	—	0.4%	0.6%
Social Information	5.3%	5.5%	—	—	0.6%	0.3%	0.1%	0.3%
Other	4.3%	3.0%	—	—	—	—	—	—

Total number of attributions (1st term)= 723

Total number of attributions (2nd term)= 675

Table 8.9

Percentage Distribution of Content and Form of Total Attributions from Experienced Teachers.

The above analysis suggests that for experienced teachers:

1) the number of attributions used in assessing pupils between term 1 and term 2 remains reasonably stable;

2) the types of attributions made remain reasonably stable between terms 1 and 2, although there is a general trend for fewer general ability attributions and for more specific ability attributions to be made in the second term (with some individual variations in the trend);

3) the form of the attributions undergoes a slight change in that more personal comparisons are made in the second term;

and that for probationer teachers:

1) the number of attributions used in assessing pupils increases from a mean of 2.96 per pupil to 4.44 per pupil between the first and second terms;

2) the types of attributions made remain reasonable stable between terms 1 and 2, although more 'attitude to work' attributions are made in the first term,and as in the case of experienced teachers, there is a trend over the term for less emphasis to be placed upon general ability and more upon specific abilities, although there are individual variations from and within this trend;

3) there is a slight change in the form of the attributions, such that more attributions of motivation occur in the second term.

Appendix V gives examples of the ways in which teachers' and probationers' reported assessments have changed between the two data collection sessions. The changes noted above are sometimes clearly evident in these examples. It is also noticeable that probationers more often make occasional use of what might be termed 'unprofessional' language in their assessments of the children (e.g. "thick", "smelly", "pest").

3. An Analysis of the Teachers' Ratings of Pupils in Terms 1 and 2.

a) A Comparison of the Nature of the Teachers' Ratings.

The five most common attributes mentioned by each teacher in both the first and second terms were used to construct rating scales on which teachers were asked to rate each of the pupils in the class on a five point scale, infrequently used attributes being ignored. The most common attributes used by each teacher in term 1 were generally the same as those used in term 2. Three probationers and one experienced teacher appeared to use commonly only four constructs in the first term, although five were used in the second. Table 8.10 outlines the constructs used on each occasion. As one would expect from the above analysis of attributions, there is a high degree of similarity between terms. (Occasionally, a slight change in vocabulary seems to refer to the same or similar construct e.g. teacher 8's 'high ability' and 'good worker' correlate rho = 0.8).

Since the construction of the rating scales requires some degree of inference from teachers' assessments, and since the individual attributes of a few pupils were necessarily lost in the development of the scales, teachers and probationers

Probationer/ Teacher	Term 1 Constructs	Term 2 Constructs
1.	1) good worker - poor worker	1) good worker - poor worker
	2) well behaved - poorly behaved	2) well behaved - poorly behaved
	3) quiet - talkative	3) quiet - talkative
	4) well motivated - poorly motivated	4) well motivated - poorly motivated
	5) good mixer - poor mixer	5) good mixer - poor mixer
2.	1) high ability - low ability	1) good worker - poor worker
	2) well motivated - poorly motivated	2) well motivated - poorly motivated
	3) quiet - talkative	3) quiet - talkative
	4) quick worker - slow worker	4) neat - untidy
		5) tries hard to please - does not try hard to please
3.	1) intelligent - unintelligent	1) intelligent - unintelligent
	2) well motivated - poorly motivated	2) well motivated - poorly motivated
	3) quiet - talkative	3) quiet - talkative
	4) well behaved - poorly behaved	4) well behaved - poorly behaved
	5) tidy worker - untidy worker	5) good worker - poor worker

Table 8.10

Teachers' Constructs Used in 1st and 2nd Term Ratings

cont.

Probationer/ Teacher	Term 1 Constructs	Term 2 Constructs
4.	1) high ability - low ability	1) high ability - low ability
	2) well motivated - poorly motivated	2) well motivated - poorly motivated
	3) quiet - talkative	3) quiet - talkative
	4) well behaved - poorly behaved	4) well behaved - poorly behaved
	5) neat worker - untidy worker	5) neat worker - untidy worker
5.	1) intelligent - unintelligent	1) good at number work - poor at number work
	2) well motivated - poorly motivated	2) good at language work - poor at language work
	3) quiet - talkative	3) well motivated - poorly motivated
	4) likeable - unlikeable	4) quiet - talkative
		5) likeable - unlikeable
6.	1) intelligent - unintelligent	1) intelligent - unintelligent
	2) well motivated - poorly motivated	2) well motivated - poorly motivated
	3) quiet - talkative	3) quiet - talkative
	4) high self esteem - low self esteem	4) high self esteem - low self esteem
		5) produces good work - produces poor work

Table 8.10 (cont'd)

cont.

Probationer/ Teacher	Term 1 Constructs	Term 2 Constructs
7.	1) high lang. ability - low lang. ability	1) high lang. ability - low lang. ability
	2) high maths ability - low maths ability	2) high maths ability - low maths ability
	3) quiet - talkative	3) quiet - talkative
	4) hard working - lazy	4) hard working - lazy
	5) neat worker - untidy worker	5) neat worker - untidy worker
8.	1) high ability - low ability	1) good worker - poor worker
	2) well behaved - poorly behaved	2) well behaved - poorly behaved
	3) quiet - talkative	3) quiet - talkative
	4) well motivated - poorly motivated	4) well motivated - poorly motivated
	5) good mixer - poor mixer	5) good mixer - poor mixer
9.	1) intelligent - unintelligent	1) intelligent - unintelligent
	2) quiet - talkative	2) quiet - talkative
	3) well motivated - poorly motivated	3) well motivated - poorly motivated
	4) neat worker - untidy worker	4) neat worker - untidy worker
	5) likeable - unlikeable	5) likeable - unlikeable

Table 8.10 (cont'd)

cont.

Probationer/ Teacher	Term 1 Constructs	Term 2 Constructs
10.	1) intelligent - unintelligent	1) good worker - poor worker
	2) quiet - talkative	2) quiet - talkative
	3) self assured - shy	3) self assured - shy
	4) good organiser - poor organiser	4) well motivated - poorly motivated
	5) well motivated - poorly motivated	5) pleasant - unpleasant
11.	1) high lang. ability - low lang. ability	1) high lang. ability - low lang. ability
	2) high arith. ability - low arith. ability	2) high arith. ability - low arith. ability
	3) mature - immature	3) mature - immature
	4) well motivated - poorly motivated	4) well motivated - poorly motivated
	5) serious in class - silly in class	5) responsible - irrespon-sible
12.	1) high ability - low ability	1) high ability - low ability
	2) well motivated - poorly motivated	2) well motivated - poorly motivated
	3) quiet - talkative	3) quiet - talkative
	4) good mixer - poor mixer	4) good mixer - poor mixer
		5) well behaved - poorly behaved

Table 8.10 (cont'd)

were asked to indicate instances where it seemed difficult or unnatural to rate a child on any of the constructs and to point out where constructs seemed inappropriate. Only two cases of difficulty were reported - one where a child was to be rated on the construct high ability/ low ability: the probationer thought the child to be good at arithmetic but poor at English; and the second where a child was to be rated on the construct quiet/talkative: the teacher thought the child was noisy outside but quiet within the classroom. Although such problems may raise minor methodological issues in the use of rating methods (noted in Chapter 7), in practice teachers appeared to have little difficulty in applying the scales.

All teachers and probationers used constructs referring to ability, motivation and talkativeness in both terms, and there was little change in the use of constructs between terms. A behaviour construct was used more by probationers (1, 3 and 4 in both terms - this excludes all 3 probationers with longer teaching experience) than teachers (8 and 12 in the second term), and only with teachers 7 and 11 were separate constructs used for maths and language abilities in the first term*. Teachers also seem to have used a greater variety of constructs: fifteen apparently different constructs appeared in the teachers' scales compared to eleven

* specific ability constructs used by some teachers tended to be applied to only some pupils and referred to various abilities (e.g. 'poor speller' 'good general knowledge') and consequently did not qualify for inclusion in the five most commonly used constructs.

in the probationers'. There is also a slight trend in the case of both teachers and probationers for the construct good worker/poor worker to be used more frequently in the second term and for it to replace the intelligence or ability construct (the construct occurs with probationer 1 in the first term and with probationers 1, 2 and 6 and teachers 8 and 10 in the second term). This could perhaps be interpreted in terms of a growing concern over the term with the work which the pupils produce.

The means and standard deviations* shown in table 8.11 suggest little difference in teachers' and probationers' use of the five point rating scales. There is a general trend for constructs concerning ability and talkativeness to have a relatively high standard deviation, suggesting teachers' greater differentiation amongst pupils on these dimensions: motivation also tends to have a reasonably high standard deviation whereas likeableness, self esteem and pleasantness generally have low standard deviations. There is a slight tendency for means and standard deviation to decrease marginally in the second term ratings, and this is most marked in the behaviour rating. Rank order of means and standard deviations remains fairly constant between the first and second term ratings for individual teachers, suggesting that the relative degree of discrimination associated with each construct remains fairly stable. Overall,

* means and standard deviations were considered in this case to be more illustrative of the way in which the probationers and teachers used the rating scales; although the median and range are more commonly used with ordinal scale data, they could easily conceal differences in the use of a five point scale.

Probationer	Construct	Term 1 Mean	Term 1 S.D.	Term 2 Mean	Term 2 S.D.	Construct in 2nd term (if changed)
1.	1 good worker	2.93	1.00	3.14	1.08	
	2 behaviour	3.03	1.12	2.61	0.74	
	3 quietness	3.38	1.18	2.86	1.11	
	4 motivation	3.10	1.29	3.00	0.98	
	5 good mixer	2.38	0.90	2.96	1.00	
2.	1 ability	2.88	0.99	2.83	1.43	
	2 motivation	2.58	1.14	2.75	1.29	
	3 quietness	3.17	1.13	3.33	1.52	
	4 quick worker	3.42	1.32	3.17	1.20	neatness in work
	5	-	-	2.33	1.17	trying hard to please
3.	1 intelligence	2.81	1.31	2.74	1.15	
	2 motivation	2.28	1.11	2.32	1.08	
	3 quietness	3.00	1.22	2.90	1.14	
	4 behaviour	2.53	1.08	2.29	0.78	
	5 tidiness in work	2.28	1.28	2.35	1.11	good worker
4.	1 ability	2.97	1.15	3.10	1.27	
	2 motivation	2.59	0.95	2.69	1.05	
	3 quietness	2.78	1.18	2.94	1.12	
	4 behaviour	2.44	0.98	2.52	0.81	
	5 neatness in work	2.59	1.16	2.74	1.18	
5.	1 intelligence	2.79	1.22	2.79	1.32	arith ability
	2 motivation	3.00	1.06	2.83	1.20	lang ability
	3 quietness	3.58	1.10	2.92	0.93	motivation
	4 likeableness	2.42	0.72	3.63	1.10	quietness
	5	-	-	2.54	0.51	likeableness

Table 8.11

Means and Standard Deviations of Teachers' Construct Ratings

Probationer/ Teacher	Construct	Term 1 Mean	Term 1 S.D.	Term 2 Mean	Term 2 S.D.	Construct in 2nd term (if changed)
6.	1 intelligence	3.08	0.86	3.04	1.02	
	2 motivation	3.36	1.19	3.00	0.91	
	3 quietness	3.60	1.22	3.28	1.10	
	4 self esteem	2.84	0.75	3.00	0.82	
	5	-	-	3.12	0.97	producing good work
7.	1 lang ability	3.28	1.34	3.43	1.31	
	2 maths ability	3.08	1.22	3.22	1.38	
	3 quietness	2.80	1.55	2.74	1.66	
	4 motivation	2.44	1.05	2.26	1.21	
	5 neatness in work	2.64	1.35	3.00	1.35	
8.	1 ability	2.78	1.28	3.00	0.83	
	2 behaviour	2.67	1.21	3.00	0.78	
	3 quietness	2.85	1.23	3.19	0.74	
	4 motivation	3.07	1.14	3.04	1.02	
	5 good mixer	3.04	1.19	2.85	1.06	
9.	1 intelligence	2.55	0.96	2.81	0.91	
	2 quietness	1.97	1.02	1.97	1.30	
	3 motivation	2.68	1.08	2.61	1.09	
	4 neatness in work	2.55	1.06	2.52	1.00	
	5 likeableness	1.45	0.62	1.10	0.30	
10	1 intelligence	2.74	1.44	2.61	1.23	
	2 quietness	3.13	1.41	3.19	1.45	
	3 self-assuredness	2.74	1.26	2.97	1.05	
	4 good organiser	2.71	1.57	2.80	1.35	motivation
	5 motivation	2.77	1.61	1.87	0.80	pleasantness

Table 8.11 (cont'd)

Teacher	Construct	Term 1 Mean	Term 1 S.D.	Term 2 Mean	Term 2 S.D.	Construct in 2nd term (if changed)
11	1 lang ability	2.48	1.26	2.92	1.22	
	2 arith ability	2.76	1.23	2.96	1.17	
	3 maturity	3.04	1.02	3.16	1.14	
	4 motivation	3.12	1.09	3.20	1.25	
	5 seriousness in class	2.96	0.89	3.32	1.28	
12	1 ability	2.69	1.29	2.60	1.11	
	2 motivation	2.62	1.24	2.64	1.22	
	3 quietness	3.19	1.06	2.92	0.99	
	4 good mixer	3.04	1.08	2.72	0.93	
	5	-	-	2.28	0.84	behaviour

Table 8.11 (cont'd)

there seems to be considerable uniformity in the means and standard deviations of probationers and experienced teachers' ratings, although teachers 7, 8 (first term only) and 10 seem to have an above average degree of variance in their ratings.

b) Factor Analysis of the Teachers' Ratings in terms 1 and 2

Intercorrelations of the ratings, taken from each teacher in each term yield basically two types of correlation matrix: one where all correlations are high and the other where one or two of the constructs correlate highly together but at a low level, and sometimes negatively, with the other constructs which also intercorrelate highly.

An iterative common factor analysis with a varimax rotation and the deletion of factors with eigenvalues less than 1.0, using Spearman's correlation matrix input, reduced the first term ratings to one factor in the case of three probationers and three teachers, and to two factors in the case of the others*. In the second term, the ratings were reduced to two factors for all but two probationers and one teacher.

The loadings from each factor analysis are shown in Table 8.12. There appear to be two general patterns occurring in the factor structures. Firstly, there are six

* an oblique rotation (with delta = 0.0) was also applied on a separate occasion, resulting in the same number of factors and virtually identical factor loadings. Nie et al (1976) suggest this gives a more "natural" solution when one might expect some degree of correlation amongst the resulting factors.

Term 1				Term 2	
Probationer 1	Factor 1	Factor 2	Constructs if changed	Factor 1	Factor 2
1) good worker	0.770	0.065		0.162	0.730
2) behaviour	0.944	0.174		0.600	0.183
3) quietness	0.429	-0.517		0.998	-0.270
4) motivation	0.079	0.843		0.123	0.794
5) good mixer	0.345	0.690		0.185	0.372
% of total variance =	35.87%	29.77%	% of total variance =	28.63%	28.16%
Probationer 2					
1) ability	-0.606			-0.923	
2) motivation	-0.957			-0.934	
3) quietness	-0.451			-0.481	
4) quick worker	-0.741		4) neatness in work	-0.823	
			5) trying hard to please	-0.901	
% of total variance =	50.89%		% of total variance =	68.90%	
Probationer 3					
1) intelligence	-0.674			0.652	0.220
2) motivation	-0.954			0.889	0.123
3) quietness	-0.775			0.143	0.667
4) behaviour	-0.844			0.189	0.901
5) tidiness in work	-0.822		5) good worker	0.998	0.196
% of total variance =	67.06%		% of total variance =	43.35%	27.17%

Table 8.12

Factor loadings resulting from the factor analysis of each teacher's ratings of their pupils and the percentage of total sample variance accounted for by each factor.

Term 1				Term 2	
Probationer 4	Factor 1	Factor 2	Constructs if changed	Factor 1	Factor 2
1) ability	-0.752			-0.866	
2) motivation	-0.905			-0.950	
3) quietness	-0.846			-0.858	
4) behaviour	-0.915			-0.888	
5) tidiness in work	-0.866			-0.778	
% of total variance =	73.75%		% of total variance	75.65%	
Probationer 5					
1) intelligence	0.424	0.021	1) arith. ability	0.905	-0.088
2) motivation	0.997	0.190	2) lang. ability	0.881	0.036
3) quietness	0.063	0.487	3) motiv-ation	0.721	0.195
4) likeableness	0.548	-0.424	4) quiet-ness	-0.256	0.218
			5) like-able-ness	0.187	0.998
% of total variance =	37.00%	11.34%	% of total variance	44.31%	21.81%

Table 8.12 (cont'd)

	Term 1			Term 2	
Probationer 6	Factor 1	Factor 2	Constructs if changed	Factor 1	Factor 2
1) intelligence	0.856	0.032		0.916	0.115
2) motivation	0.871	-0.030		0.850	-0.189
3) quietness	0.388	-0.762		0.458	-0.812
4) self-esteem	0.374	0.764		0.330	0.871
			5) producing good work	0.955	0.056
% of total variance =	44.54%	29.16%	% of total variance	55.84%	29.40%
Teacher 7					
1) lang. ability	0.840	0.242		0.833	0.192
2) maths. ability	0.950	0.221		0.998	0.290
3) quietness	-0.435	0.100		-0.413	0.291
4) motivation	0.214	0.719		0.163	0.837
5) neatness in work	-0.084	0.998		0.067	0.875
% of total variance =	37.00%	32.61%	% of total variance	37.83%	33.44%
Teacher 8					
1) ability	0.707	0.034		0.725	0.213
2) behaviour	0.186	0.998		0.419	0.995
3) quietness	-0.263	0.783		-0.078	0.430
4) motivation	0.998	-0.248		0.975	0.046
5) good mixer	0.636	0.007		0.655	-0.064
% of total variance =	40.08%	33.44%	% of total variance	41.74%	24.53%

Table 8.12 (cont'd)

Term 1			Term 2		
Teacher 9	Factor 1	Factor 2	Constructs if changed	Factor 1	Factor 2
1) intelligence	0.763	0.287		0.105	0.816
2) quietness	0.025	0.823		0.922	-0.156
3) motivation	0.993	0.108		0.150	0.959
4) neatness in work	0.535	0.685		0.743	0.348
5) likeableness	0.403	0.590		0.698	0.256
% of total variance =	40.53%	31.77%	% of total variance	38.46%	35.93%
Teacher 10					
1) intelligence	-0.975			0.685	0.716
2) quietness	-0.857			-0.055	0.742
3) self assured-ness	-0.745			0.751	-0.116
4) good organiser	-0.997		4) motiv-ation	0.801	0.567
5) motivation	-0.954		5) pleasant-ness	0.610	0.611
% of total variance =	82.88%		% of total variance	41.00%	35.43%
Teacher 11					
1) lang. ability	-0.820			-0.790	
2) arith. ability	-0.743			-0.691	
3) maturity	-0.884			-0.919	
4) motivation	-0.973			-0.971	
5) seriousness in class	-0.545			-0.834	
% of total variance =	64.99%		% of total variance	71.69%	

Table 8.12 (cont'd)

	Term 1			Term 2	
Teacher 12	Factor 1	Factor 2	Constructs if changed	Factor 1	Factor 2
1) ability	0.920			0.978	0.117
2) motivation	0.981			0.937	0.008
3) quietness	-0.468			0.037	0.723
4) good mixer	0.685			0.720	-0.063
			5) behav-iour	0.810	0.338
% of total variance	= 62.43%		% of total variance	60.21%	13.09%

Table 8.12 (cont'd)

cases in the first term and three in the second where one 'good pupil' factor appears, (Probationers 2, 3 and 4 and Teachers 10, 11 and 12 in the first term; Probationers 2 and 4, and Teacher 11 in the second term) loading highly on all the constructs used. Secondly, there are two cases in the first term and five in the second where both an academic* and a behaviour factor appear (Teachers 8, 9 in the first term and Probationers 1, 3 and Teachers 8, 9 and 12 in the second). The academic factor generally loads highly on constructs such as intelligence, ability and motivation, whereas the behaviour factor loads most highly on quietness and behaviour.

There are eight cases (four in the first term and four in the second) where teachers deviate from these patterns. Probationer 1's ratings reduce to two factors in the first term, the first loading heavily on "behaviour" and "good worker", the second on "motivation", "good mixer" and "quietness" (negatively) - these could possibly be interpreted in terms of "conformity" and "liveliness" dimensions, which may possibly have been useful assessments during the probationer's early classroom experiences. In the second term, probationer 1's ratings reduce to the more common academic and behaviour factors. Probationer 5's ratings also reduce to two factors in the first term: the first loads heavily on "motivation" with moderate loadings on

* the term 'academic' is used to cover ability, motivation, and work constructs which generally seem to intercorrelate highly.

"likeableness" and "intelligence", and the second loads moderately on "quietness" and moderately and negatively on "likeableness". In the second term, the first factor loads heavily on "arithmetic and language abilities" and "motivation" (becoming quite a 'pure' academic factor) and the second factor loads heavily on "likeableness", thus approximating to the academic/behaviour two-factor result but with an unusual second factor. Probationer 6* is the only probationer with an academic and personality/behavioural factor in both first and second terms, with a fairly stable pattern. The first factor loads heavily on "intelligence" and "motivation" (and on"producing good work" in the second term) and the second factor loads highly on "self-esteem" and negatively on "quietness", pupils high on self-esteem apparently being rated as noisy.

Teacher 7's ratings reduce to two academic factors in both terms, with very similar factor structures in each term. The first factor loads heavily on "maths and language abilities" and the second on "neatness in work"and "motivation": the first factor seems to be assessing 'ability', the second appears to be concerned with 'care' or 'interest' in work.

Teacher 10's ratings in the first term reduce to one 'good pupil' factor, but reduce to a rather idiosyncratic structure in the second, yielding two factors which are not strongly differentiated: the first factor loads highly on

* taught abroad for six months.

"intelligence", "self-assuredness", "motivation" and "pleasantness" and the second factor also loads highly on "intelligence", "motivation", "pleasantness" and on "quietness".*

If the factor structures are considered in terms of three major different patterns (those with a 'good pupil' factor, those with academic/behaviour factors, and those consisting of deviations), some general changes in factor structure can be easily identified between terms 1 and 2 (see Table 8.13).

	Probationers		Teachers		Total	
	Term 1	Term 2	Term 1	Term 2	Term 1	Term 2
Good Pupil	3	2	3	1	6	3
Acad./Behav.	0	2	2	3	2	5
Deviations	3	2	1	2	4	4

Table 8.13:

Patterns in Factor Strucdures of teachers' ratings in terms 1 and 2

There appears to be a general trend away from the 'good pupil' factor in the first term data to the academic/behaviour factors in the second for both teachers and probationers; one might well expect such a trend to occur as a greater knowledge of pupils is built up over the term. One might

* this teacher was the only teacher in the sample who did a lot of group work - the unusual constructs used in her assessments (e.g. "good organiser" "self assuredness") may have been useful to her in organising these groups.

also infer some signs of conformity on the part of probationers whose ratings in the first term reduced to deviant structures; this in fact only completely occurs in the case of probationer 1, but some signs of conformity in terms of 'purer' academic/behaviour factors are evident in both other 'deviants' (probationers 5 and 6).

Out of the nine cases where the number of factors has remained the same in both terms, the variance accounted for by the factors has increased in the second term in seven cases (average change for the nine cases = + 5.1%). There is thus an apparent tendency for pupils to be increasingly assessed on the major dimensions used by the teachers.

It is also interesting to note that the three older, more experienced teachers (7, 9, and 11) in the sample also appear to have features in common in their factor structures. Teacher 7's ratings reduce to two academic factors, one loading heavily on abilities and the other on neatness in work and motivation. Neatness in work also loads moderately in both teacher 9's first term factors and loads heavily on the behaviour factor in the second term; and teacher 11's ratings reduce to one academic factor in both terms, constructs such as quietness and behaviour being altogether absent from the 5 most commonly used constructs selected for her ratings of pupils. The factors emerging from the analysis of these experienced teachers' ratings suggest a more academically-oriented concern in their assessments of pupils.

Although there is variation in factor structures amongst both experienced and probationer teachers in both terms' data, there seems overall to be some evidence to suggest a fairly common usage of an academic/behaviour two factor mode of assessment of pupils by the experienced teachers, with some exceptions, and evidence to suggest a trend towards this mode of assessment by teachers and especially probationers during the course of the term.

c) Correlation of the Teachers' Ratings of Pupils in Terms 1 & 2

Table 8.14 shows the correlations between construct ratings in first and second terms where the same construct appears to have been used in both terms - this indicates to what extent pupils (excluding those who left during the term) were rated similarly on both occasions on each of the dimensions for which comparisons are available, assuming that teachers' assessments are reliable.

There may be individual differences in the consistency with which teachers rate their pupils on the two occasions. Probationer 4 and teacher 7, for example, seem to have high correlations on all constructs. There also appear to be some constructs, however, that are either more stable or more reliably rated - for example, correlations of intelligence and ability constructs are consistently high, whereas quietness is either less stable or less reliably rated.

With the exceptions of probationer 1, both experienced teachers and probationers show a similar range of correlations and it would be difficult to infer any general differences

Probationer and Construct	rho	Teacher and Construct	rho
Probationer 1		**Teacher 7**	
1) good worker	0.83	1) lang. ability	0.93
2) behaviour	0.07	2) maths ability	0.92
3) quietness	-0.66	3) quietness	0.86
4) motivation	0.21	4) hard working/lazy	0.82
5) good mixer	-0.02	5) neatness in work	0.77
	mean rho= 0.086		mean rho = 0.86
Probationer 2		**Teacher 8**	
1) ability/good worker	0.49	1) ability	0.80
2) motivation	0.61	2) behaviour	0.59
3) quietness	0.82	3) quietness	0.41
		4) motivation	0.74
		5) good mixer	0.76
	mean rho= 0.64		mean rho = 0.66
Probationer 3		**Teacher 9**	
1) intelligence	0.89	1) intelligence	0.85
2) motivation	0.74	2) quietness	0.69
3) quietness	0.60	3) motivation	0.82
4) behaviour	0.57	4) neatness in work	0.67
5) tidiness in work	0.55	5) likeableness	0.29
	mean rho= 0.67		mean rho = 0.66

Table 8.14

Spearman's Correlations of Construct Ratings between 1st and 2nd Terms for each Probationer/Teacher

Probationer and Construct	rho	Teacher and Construct	rho
Probationer 4		**Teacher 10**	
1) ability	0.80	1) intelligence/good worker	0.74
2) motivation	0.82	2) quietness	0.37
3) quietness	0.83	3) self-assuredness	0.62
4) behaviour	0.80	4) motivation	0.83
5) neatness in work	0.84		
mean rho=	0.82	mean rho =	0.64
Probationer 5		**Teacher 11**	
1) intelligence v number ability	0.92	1) lang. ability	0.81
2) intelligence v lang. ability	0.87	2) arith. ability	0.89
3) intelligence v average*	0.94	3) maturity	0.82
4) motivation	0.58	4) motivation	0.78
5) quietness	0.73	5) seriousness in class	0.52
6) likeableness	0.55		
mean rho=	0.77	mean rho =	0.76
Probationer 6		**Teacher 12**	
1) intelligence	0.71	1) ability	0.89
2) motivation	0.62	2) motivation	0.86
3) quietness	0.75	3) quietness	0.37
4) self esteem	0.62	4) good mixer	0.74
mean rho=	0.68	mean rho =	0.72

Table 8.14 (cont'd)

* mean of number ability and language ability ratings.

Probationer and Construct	rho	Teacher and Construct	rho
	Probationers		Experienced Teachers
Mean for intell/ability	rho = 0.78	rho =	0.85
Mean for motivation	rho = 0.60	rho =	0.81
Mean for quietness	rho = 0.51	rho =	0.54
Mean for total	rho = 0.59	rho =	0.72

Table 8.14 (cont'd)

between the two samples in terms of the stability of their assessments. However, it seems likely that probationer 1, whose constructs correlate at a low and occasionally negative level, has changed her perceptions of her pupils considerably over the course of the term on all constructs except "good worker".

4. Summary of Results relating to Teachers' Perceptions of Pupils

In the reported assessments of their pupils in the first term, experienced teachers attributed significantly more qualities to their pupils than did probationer teachers. This difference was not apparent in the second term, when the number of attributions made by probationers had increased to a level comparable with that of the experienced teachers, which had generally remained fairly constant.

There is a fair degree of similarity between experienced teachers and probationers in terms of the nature of the attributions made. Probationers appear to have made marginally more attributions concerning attitudes to work, especially in the first term, and made fewer attributions in a motive attribution or label form in that term, slightly increasing the number of motive attributions in the second term. Both teachers and probationers showed a general trend away from general ability to specific ability attributions between terms, but wide variations occurred within the trend.

In selecting the five most commonly used constructs from the teachers' attributions, it was found that a behaviour construct seemed to be more commonly used by probationers, whereas in the first term, separate ability constructs for language and arithmetic work were only found amongst teachers. The construct "good worker" tended to replace the general ability constructs in the second term, in several cases.

A factor analysis of teachers' ratings suggested that teachers' ratings could commonly be reduced to an academic or academic/behaviour factors and that there was some tendency to conform to an academic/behaviour factor structure over the course of the term; this conforming tendency was greater amongst probationer teachers. Despite this tendency, however, the ratings made by probationers of their pupils were as stable over the term as those of experienced teachers.

Some individual differences in teachers' perceptions of pupils were also identified: teacher 10 appeared to develop a fairly idiosyncratic mode of assessing pupils, probationer 1 appeared to quite radically change her assessment of the pupils over the course of the term, and the older teachers in the sample (teachers 7, 9 and 11) appeared to be more concerned with the academic assessment of pupils.

With regard to the original hypotheses concerning teachers' perceptions of pupils, the results of the analysis of the reported assessment data would support Hypothesis 1 (viz. Experienced teachers assess their pupils more quickly than probationer teachers (i.e. attribute more qualities to more children, early in the term)).

The correlations of first and second term ratings do not support Hypothesis 2 (viz. Experienced teachers' assessments of their pupils are more stable over time), although the factor analysis of teachers' ratings does suggest some change in factor structure over the course of the term, which may be indicative of probationers conforming to a mode of assessment used more commonly by experienced teachers.

CHAPTER 9 CLASSROOM INTERACTION: ITS RELATIONSHIP TO TEACHERS' PERCEPTIONS OF PUPILS.

A. Summary of Relevant Hypotheses, Research Design and Data Analysis

Hypotheses

3) There are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them.

4) These associations are stronger amongst experienced teachers than probationer teachers.

Research Design.

As noted in the previous chapter, teachers' perceptions of pupils were assessed on five point rating scales involving the most common constructs used by each teacher in a 'free-response' situation. These ratings were first taken during the sixth week of the first term.

During the second to seventh weeks of the first term, each of the twelve classes was visited on three half-hour occasions where teacher-individual pupil interactions were noted using the observation schedule outlined in Appendix IIa.

In the second term, both teachers' rating data and interaction analysis data were again collected on a similar time-scale.

Analysis

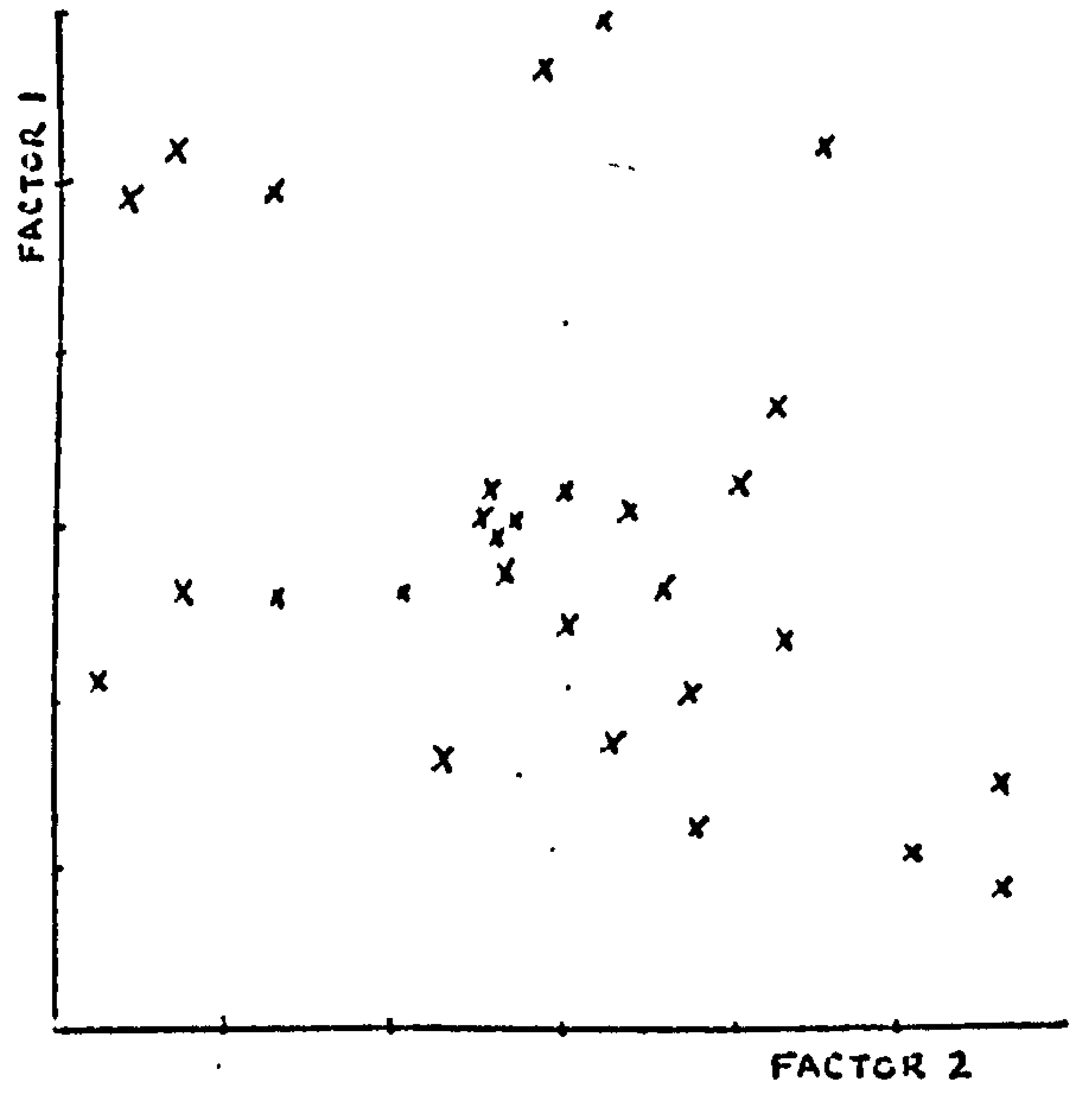
An examination was first of all made of the nature, quantity and relative proportions of the interactions recorded in each classroom and the degree to which these interactions were distributed amongst the pupils in the class: this served the function of providing a general description of the interaction occurring in the classroom which could aid the interpretation of further analyses; it also served to illustrate possible differences between experienced teachers' and probationers' classrooms.

a) Cluster Analysis of the Pupils.

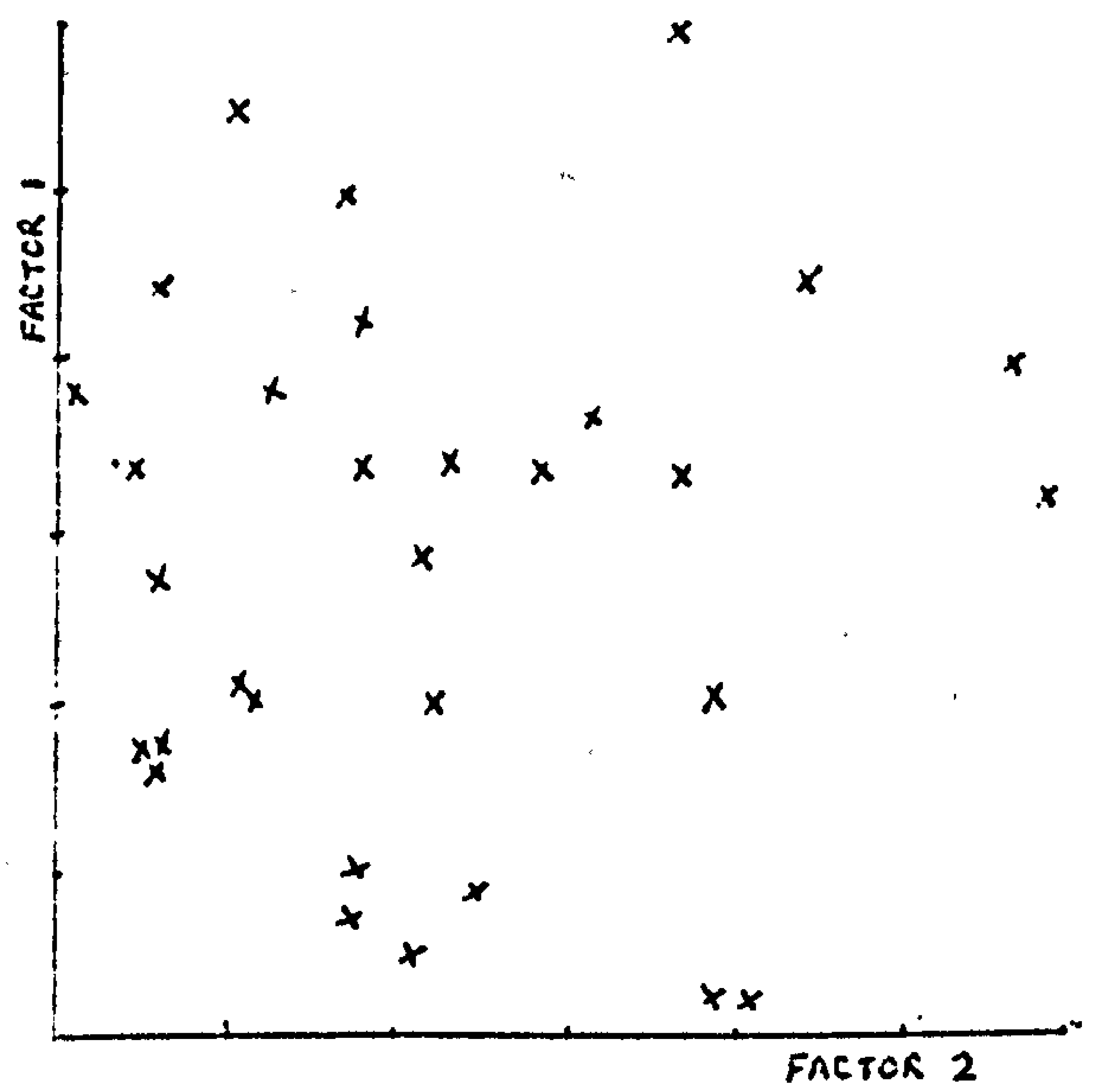
The teachers' ratings of their pupils were used in a cluster analysis to divide the pupils into groups which might possibly correspond to the typologies or 'trait packages' used by the teachers themselves. The term 'cluster analysis' covers a number of methods designed to group individuals or variables in such a way that within-group-variance (or distance) is smaller than between-group-variance (or distance). Different techniques present different advantages and disadvantages depending on the nature of the data.

However, before considering the appropriateness of different clustering techniques, scattergrams of the factor scores of each teacher's ratings were examined (see Table 9.1 for examples), in an attempt to identify the possible nature of the "natural" groupings of pupils, as this could influence the type of cluster analysis adopted. Fairly typical scattergrams showed a relatively large number of points close to the middle, with two, three or four outlying groups and occasionally one or two outlying individuals. Although groups were sometimes readily identifiable from factor score

(a) Probationer 1, term 1.



(b) Teacher 9, term 1.



(c) Teacher 12, term 2.

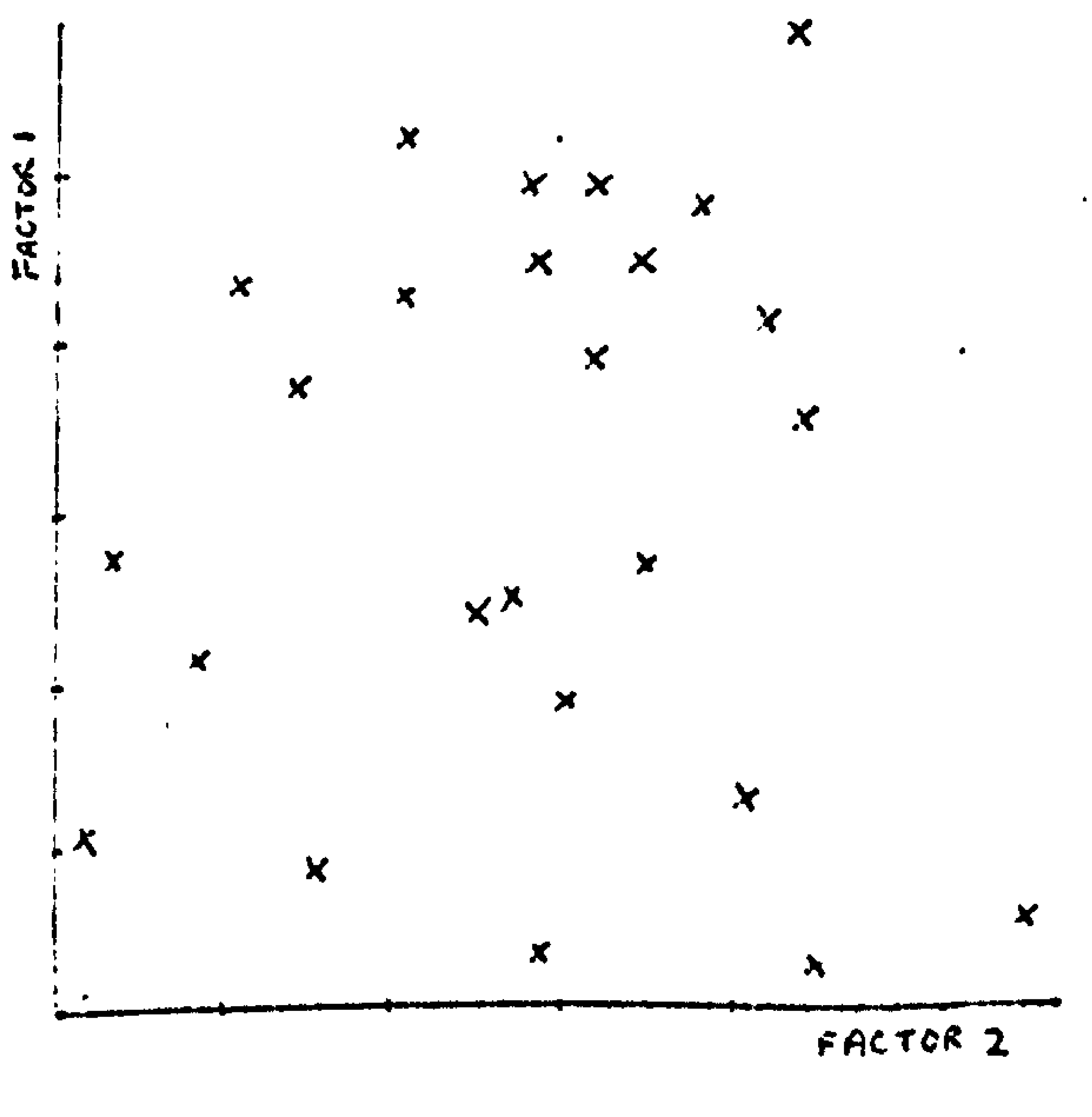


Table 9.1

Scattergrams of Factor Scores Derived from Teachers' Ratings scattergrams, boundaries were often difficult to define as some points bridged the clusters. Factor scores also accounted for only 60-70% approximately of the sample variance and this made prediction of clusters from this data somewhat uncertain.

Two cluster analysis techniques were eventually selected, on both logical and empirical grounds, for this analysis. MODE analysis* was the only technique found which satisfied the following criteria:

1) avoids "chaining"** across clusters, (found in all hierarchical techniques*** appropriate for ordinal scales)
2) seeks "natural" clusters, initiating the clusters using an algorithm appropriate for the data**** (partitioning techniques, for example, which involve the progressive division of the sample into clusters, generally require the user to predetermine the number of clusters and the cluster centres)
3) is not influenced by "outliers" (i.e. individual points which are not easily categorisable into clusters)
4) can be used with ordinal scale data
5) is available as a computer program package

MODE analysis also produced the most 'real-seeming' clusters when three data samples and a variety of techniques were piloted.

* Wishart (1972)

** "chaining" refers to the progressive joining together of clusters.

*** hierarchical techniques start with N clusters with one member in each cluster, the clusters are then monotonically joined in order of a measure of similarity.

**** an explanation of this follows.

As different cluster analysis techniques can produce varying results, a second method of analysis was selected as a check or 'warning device' for unreal or unstable clusters and also as a substitute where MODE analysis produced only one cluster*. Ward's hierarchical clustering method seemed to provide a reasonable alternative and although using means amongst members to estimate cluster centres (hence ideally being more appropriate for data of at least interval scale), it avoids some of the chaining of other hierarchical techniques. The method is, nevertheless, a weak process for assessing clustering reliability. It produces a pre-specified number of clusters, monotonically reducing this number to one, its hierarchical nature results in 'mis-groupings' when the number of clusters becomes small as a result of its inability to change earlier clusterings**. Consequently, the clusters produced by the two different methods could only be compared when the Ward's method listed a comparatively large number of clusters (the maximum

* to test the hypothesis that teachers/probationers interact differently with differently perceived groups or clusters, each class had to be divided up into more than one cluster. On the three occasions where MODE analysis produced one cluster, the Ward's analysis results were used instead.

** the method of Iterative Relocation, which is often used to counteract this effect, is inappropriate in this case due to the low range of the variables and a relatively small sample, and can produce widely differing results depending on the number of iterations.

specified was ten). The empirical findings were that the distinctions made between the six and ten cluster level generally included those occurring in the MODE analysis results.

Everitt (1974) suggests three ways of assessing the stability (or "reliability") of clusters: (1) randomly splitting the sample into two and cluster analysing each half separately, (2) omitting some of the variables in the analysis and examining the results for similarities, (3) cluster-analysing the sample on variables not included in the first analysis. The first method is inappropriate for small samples when using MODE analysis, since the whole of the sample space would become very low in density using half of the sample, and clusters could be formed encompassing distant points. Method 3 would also be inappropriate in this case, since other relevant variables which had been assessed were to be used in testing hypotheses concerning the clusters formed from teachers' rating data. Consequently, the second method was chosen to test reliability, although it was expected that when omitting even one variable from the analysis, this could in some instances produce different clusters when there are in fact only four or five variables altogether.

b) <u>An Explanation of the MODE analysis and Ward's Hierarchical Analysis Techniques, as applied to the Clustering of Pupils</u>

Since MODE analysis and Ward's hierarchical analysis are not widely used statistical techniques, a brief explanation of the processes involved is given below. A more detailed account is given in Everitt (1974).

Starting with a similarity matrix of squared Euclidean distances (sum of squares of distances on each variable between every pair of points) MODE analysis calculates the average (A(I)) of the two* smallest distances for each point. Those points with low averages are associated with areas of high density. The points are ordered according to their A(I) values, and the point with the least A(I) value becomes the first cluster nucleus. During each cycle of the process, the "coefficient threshold" (R) is increased to the next A(I) value and four actions are possible:-

1) the new point is separated from all other 'dense' (i.e. clustered) points by a distance greater than R, in which case a new cluster nucleus emerges;
2) the new point is within distance R of one cluster, therefore the point joins this cluster;
3) the new point is within distance R of more than one cluster, so the clusters combine;
4) at each cycle, the smallest distance, D, between dense points belonging to different clusters is found, and if R exceeds D for two clusters, these clusters are combined.

In the MODE program, clusters are printed before each

* this figure can be manipulated by use of the input parameter, K.

fusion, (which occurs in case 3 or 4 above) and it is suggested (in Wishart (1972) p. 33) that the clusters formed before the first fusion may correspond to the "lowest 'natural' level of classification which is possible". Points which have not been introduced before the first fusion are clustered with the nearest existing nucleus. The "enclosure ratio" (= Number of individuals classified/ Number in sample) indicates the proportion of individuals clustered at the nuclei before the fusion. Wishart (1972, p. 34) suggests that a high enclosure ratio is indicative of a stable classification.

In contrast, Ward's hierarchical technique starts with N clusters, where N is the number of individuals in the sample, and monotonically joins the clusters together in order of the fusion which leads to the minimum increase in the error sum of squares (i.e. the square of the distance from each individual to the mean of its parent cluster): this method avoids some of the "chaining" of most hierarchical methods and is more biased towards finding spherical clusters; it requires some subjective assessment, however, concerning the number of 'natural' clusters present.

In the following analysis, these techniques were used as presented in the CLUSTAN 1B program package on the IBM 76000 at the Manchester University Regional Computing Centre.

The option arose of inputing data to the programs in various forms: in the present case, factor scores or raw data could have been used, and the data could have been standardised. The use of factor scores was discounted on the grounds that it excluded 30 - 40% of sample variance. The raw data was not standardised since standardisation would lessen the influence of the better discriminating variables which teachers use (i.e. variables with high variance) whilst at the same time increasing the influence of those variables which do not 'naturally' make large discriminations amongst the pupils (i.e. variables with low variance).

Although there is an option of forty different similarity coefficients in the CLUSTAN 1B package, squared Euclidean distance was selected as an appropriate measure when using rating data with the cluster analysis techniques selected. This is probably the most commonly used measure in cluster analysis, being appropriate for most clustering techniques (see Wishart, 1972). However, the fact that distances are squared before being summed favours the development of clusters where members are close on all dimensions rather than possibly distant on one dimension (i.e. a pupil rated, for example, on five dimensions as 1, 1, 1, 1, 1 would more probably cluster with another pupil rated 1, 2, 2, 1, 1 rather than one rated 1, 3, 1, 1, 1 even although the unsquared distances are equal). In the case of this analysis, however, this bias is probably preferable since the maximum range of any variable is 1-5 and those variables in which a greater range is used (hence involving greater distances) are likely to be the better discriminating variables with which clusters may be differentiated.

The following values were used for the input parameters:

K	(Density parameter- determines the number of distances* used to calculate A(I))	1
Minc	(Minimum number of clusters that are of interest)	1
Minfus	(Minimum cluster size for output of groupings before fusion)	1
Perc	(Minimum enclosure ratio to terminate analysis)	0.8 **

c) <u>Reliability of MODE analysis</u>.

Table 9.2 shows the enclosure ratios prior to the first fusion in the MODE analysis - in most cases the ratio is quite high, especially in the second term data, suggesting fairly stable clusters.

In the reliability trials, one variable was randomly omitted from each set of rating data. In six cases out of the twenty four, generally where one of the variables with a high variance had been omitted from the MODE analysis, resulting in several dense points, the first fusion occurred early (with enclosure ratio < 0.2). Since only a small number of points had been clustered, and the resulting clusters could be unrepresentative, the clusterings before the second

* the number of distances used in the program is 2K

** Wishart suggests that the use of this value rather than 1.0 reduces the possibility of occasional outliers influencing the clusters formed, and also reduces computing time.

Probationer/ Teacher	1st Term enclosure ratio	2nd Term enclosure ratio
1	.76	1.00
2	.55	.71
3	.76	.71
4	.82	.78
5	.59	.42
6	.33	.93
7	.81	.70
8	.34	.67
9	.81	.81
10	.52	.55
11	.25	.45
12	.25	.89

Table 9.2:

Enclosure Ratios from Cluster Analysis (Mode Analysis) fusion were accepted instead. Table 9.3 shows the degree of agreement between the reliability analysis on full data, calculated by the formula:

$$\text{Percentage Agreement} = \frac{\text{N. of pupils clustered in the same clusters on both analyses}}{\text{N. of pupils in class}} \times 100$$

This yields an average agreement of 69.1% (first term data) and 70.3% (second term data).

The reliability analysis sometimes produced a different number of clusters, with a cluster being sub-divided on one analysis and not on the other: since this could again be attributed to the missing variable, an amended reliability estimate was made by combining appropriate complete clusters together to ensure that there were the same number of clusters in each analysis, and the percentage agreement recalculated as above. These results are also given in Table 9.3, and yield an average agreement of 86.5% (first term data) and 82.3% (second term data).

These figures suggest again that the clusters formed are reasonably stable. The clusters also frequently coincide with those which one might predict from the scattergrams of factor scores: for example, the clusters derived from mode analysis for probationer 1, and teachers 9 and 12 are similar to those identifiable in the scattergrams noted in table 9.1.

These results suggest that the clusters of pupils produced by MODE analysis from the teachers' ratings of pupils represent a stable classification which also gains some support from other clustering methods.

Teach. Prob.	1st Term Ag.	% Ag.	Amended Ag.	Amended % Ag.	No. of clusters on 1st & 2nd Anals.	2nd Term Ag.	% Ag.	Amended Ag.	Amended % Ag.	No. of clusters on 1st & 2nd Analysis
1	17/29	58.6	-	-	4,4	18/28	64.3	-	-	3,3 *
2	17/24	70.8	23/24	95.8	3,2	16/24	66.7	-	-	6,6 *
3	28/32	87.5	31/32	96.9	3,4	21/31	67.7	-	-	3,3
4	18/32	56.3	31/32	96.9	5,4	21/31	67.7	-	-	4,4
5	10/24	41.7	16/24	66.7	3,5	16/24	66.7	22/24	91.7	3,5 *
6	19/25	76.0	-	-	4,4	17/25	68.0	-	-	4,4 *
7	21/25	84.0	24/25	96.0	6,5	21/22	95.5	-	-	5,5
8	16/27	59.3	23/27	85.2	4,3	18/27	66.7	23/27	85.2	4,5
9	25/31	80.6	31/31	100.0	1,2*	13/31	41.9	31/31	100.0	1,3
10	18/31	58.1	30/31	96.8	4,3	23/31	74.2	30/31	96.8	2,4
11	19/25	76.0	22/25	88.0	3,4	18/25	72.0	23/25	92.0	3,4
12	21/26	80.8	-	-	5,5	23/25	92.0	-	-	3,3 *
Mean % Ag.		69.1		86.5			70.3		82.3	

* 1st array not accepted due to very low enclosure ratio; 2nd array substituted

Table 9.3

Reliability Estimates for Mode Analysis

d) Analysis of Interaction with Clusters

Taking teachers individually, the ratings of the members of each cluster and the interaction in which each cluster engaged were examined, F-tests were carried out on all behaviour categories, and a t-test was performed on the amount of instructional questioning (the most common behaviour category) received by different clusters in the class. An analysis of the teachers' interactions with clusters of pupils in their class also suggested a relationship between teacher-initiated contacts and pupil-initiated contacts, and product-moment correlation coefficients were calculated between these types of contact for each class.

B. Classroom Interaction: Its Relationship to Teachers' Perceptions of Pupils: Results.

1) The Classroom Interaction.

For each interaction category, the total number of interactions recorded in each classroom in each term, the expression of this as a percentage of the total amount of interaction recorded, the mean number of interactions per pupil and the variance amongst the class in the interactions engaged in, is noted in Appendix VI, from which Tables 9.4, 9.5, 9.6, and 9.7 are abstracted.

The amount and type of classroom interaction recorded in 1½ hours varies considerably amongst the whole sample, although some differences do emerge between the experienced teachers and probationers.

As shown in Table 9.4, the number of interactions occurring in the $1\frac{1}{2}$ hours of observation ranges from 48 to 208. Generally, the number of interactions occurring in probationers' classes in the first term is slightly less than in the experienced teachers' classrooms, the mean number of total interactions being 98.5 and 118 respectively, and the mean number of interactions per pupil being 3.6 and 4.3 respectively. In the second term, the mean number of total interactions are 124 (probationers) and 113 (experienced teachers) and 4.7 and 4.4 per pupil respectively. However, the number of interactions recorded does not appear to be a very stable feature of either experienced teachers or probationers, and these differences are not statistically significant when tested with a t-test. The subject taught, the time of day, the confidence of the teacher, and observer influence may be among the factors which account for this large variance in the amount of interaction taking place.

The composition of the interactions, however, is fairly stable. As can be seen in Table 9.5, one exception is probationer 4, where there is a very large increase in the number of instructional questions occurring in the second term observations, and a decrease in the amount of child-initiated interaction, which brings the recorded interactions for this probationer more into line with the conventional pattern.

A lower proportion of most probationers' interactions consists of instructional questions, compared to experienced

Term 1

Teacher	Total N. of recorded interactions.	Mean N. of interactions per pupil
1	109	3.75
2	142	5.92
3	71	2.18
4	99	3.09
5	48	2.17
6	122	4.88
7	102	4.08
8	100	3.70
9	65	2.10
10	173	5.58
11	126	5.04
12	142	5.46

Term 2

Teacher	Total N. of recorded interactions.	Mean N. of interactions per pupil
1	134	4.78
2	200	8.33
3	75	2.42
4	117	3.84
5	129	5.38
6	88	3.52
7	208	9.04
8	164	6.15
9	71	2.29
10	57	1.65
11	73	2.92
12	106	4.24

Table 9.4:

The total number of recorded interactions, and the mean number of interactions per pupil, in terms 1 and 2.

Teacher		QI	QM	DM	F	Disp	VIA	VIR	CQIR	CQMR	Inst
1	1st term	50.0	2.8	10.1	8.3	6.4	-	-	11.0	9.2	1.8
	2nd term	61.2	1.5	4.5	3.7	6.0	9.0	2.2	3.7	6.7	1.5
2	1st term	65.5	1.4	2.1	6.3	12.0	4.9	1.4	3.5	2.1	0.7
	2nd term	58.5	8.5	5.0	3.0	11.5	3.0	-	4.0	5.0	1.5
3	1st term	28.2	1.4	4.2	1.4	16.9	-	1.4	14.1	31.0	1.4
	2nd term	28.0	2.7	-	2.7	9.3	1.3	-	25.3	30.7	-
4	1st term	14.1	4.0	16.2	16.2	2.0	6.1	2.0	18.2	19.2	2.0
	2nd term	45.3	3.4	3.4	13.7	5.1	6.0	-	6.8	12.0	4.3
5	1st term	72.9	8.3	2.1	-	14.6	-	-	10.4	2.1	-
	2nd term	68.2	5.4	3.1	4.7	2.3	-	-	1.6	13.2	1.6
6	1st term	65.6	1.6	5.7	7.4	5.7	-	-	11.5	2.5	1.6
	2nd term	42.0	5.7	8.0	2.3	12.5	8.0	1.1	4.5	5.7	10.2
7	1st term	81.4	-	5.9	6.9	5.9	-	-	-	-	-
	2nd term	66.3	-	23.1	2.9	4.8	1.0	-	-	-	-
8	1st term	32.0	7.0	13.0	5.0	13.0	13.0	1.0	3.0	13.0	-
	2nd term	35.4	4.3	9.1	3.0	9.1	3.0	-	14.6	14.0	7.3
9	1st term	86.2	-	-	3.1	9.2	-	-	-	1.5	-
	2nd term	88.7	1.4	2.8	1.4	5.6	-	-	-	-	-
10	1st term	64.7	4.0	5.8	9.8	4.0	3.5	-	3.5	4.6	-
	2nd term	66.7	5.9	2.0	2.0	5.9	3.9	-	3.9	5.9	3.9
11	1st term	89.7	1.6	-	5.6	3.2	-	-	-	-	-
	2nd term	69.9	5.5	4.1	9.6	8.2	-	-	1.4	1.4	-
12	1st term	66.2	14.8	1.4	7.7	1.4	1.4	-	-	4.2	2.8
	2nd term	47.2	9.4	12.3	11.3	3.8	-	-	2.8	4.7	8.5

Table 9.5:

The number of recorded interactions in each category expressed as a percentage of all the recorded interactions in each classroom, in terms 1 and 2.

teachers, and the probationers also have much more child-initiated interaction, in the cases of CQIR and CQMR - see Table 9.6 Applying t-tests between the means of each interaction category in each term reveals only one statistically significant difference, in the case of CQIR in the first term (level < 0.01). These data may be interpreted in terms of probationers being more "reactive", (reacting to pupil-initiated contacts) and teachers more "proactive" (initiating contacts with pupils), to use Brophy and Good's terminology (Brophy and Good, 1974). It is interesting to note that teachers 7,9 and 11, who assessed their pupils with more academic constructs, engaged in little or no child-initiated interaction.

The occurrence of all the behaviour categories, with the exception of instructional questioning, is too infrequent for any significance to be attributed to the variance in their occurrence among pupils in a class. However, in the case of instructional questioning, the variance is marginally greater in the experienced teachers' classes. Table 9.7 shows the mean coefficient of variation* (coefficient $= \frac{\text{S.D.}}{\text{Mean}} \times 100\%$) for probationers to be 61.79% (excluding probationers 3 and 4**) in the first term, and 72.92% for experienced teachers. In the 2nd

* this statistic allows comparisons of variance to be made when samples have different means.

** the coefficient of variation is a meaningless statistic when the mean approaches zero - see Spiegel (1961) p. 73.

	QI	QM	DM	F	Disp	VIA	VIR	CQIR	CQMR	INST
Probs. 1st Term	49.4	3.3	6.7	6.6	9.6	1.8	0.8	11.5	11.0	1.3
Experi-enced Teachers 1st Term	70.0	4.6	4.4	6.4	6.1	3.0	0.2	1.1	3.9	0.5
Probs. 2nd Term	50.5	4.5	4.0	5.0	7.8	4.6	0.6	7.7	12.2	3.2
Experi-enced Teachers 2nd Term	62.4	4.4	8.9	5.0	6.2	1.3	0.0	3.8	4.3	3.6

Table 9.6

Mean Percentage Occurrence of all Interaction for Probationers and Experienced Teachers in Term 1 and Term 2

Probat-ioner/ Teacher	Term 1 Mean QI per pupil.	Term 1 Variance	Term 1 Coeffi-cient of Variation	Term 2 Mean QI per pupil	Term 2 Variance	Term 2 Coeffi-cient of Variation
1	1.89	0.95	51.57	3.04	4.16	67.09
2	3.88	4.14	52.44	4.88	8.81	60.82
3	0.63	1.27	178.88	0.68	0.83	133.98
4	0.43	0.51	166.08	1.71	5.15	132.71
5	1.80	1.47	67.36	3.83	7.19	70.01
6	3.20	5.88	75.78	1.48	1.59	85.20
7	3.50	3.13	50.55	6.00	12.73	59.47
8	1.14	1.54	108.86	2.23	2.82	75.30
9	2.20	4.03	91.25	2.03	1.56	61.53
10	3.50	5.64	67.85	1.06	1.49	115.16
11	4.71	7.84	59.45	2.12	3.53	88.62
12	3.62	4.65	59.57	2.00	1.67	64.61

	Term 1	Term 2
Mean Coefficient of Variation for Probationers	61.79*	83.17**
Mean Coefficient of Variation for Experienced Teachers.	72.92	87.70

* excluding probationers 3 and 4, due to mean close to zero

** excluding probationer 3, due to mean close to zero.

Table 9.7:

Means, Variances and Coefficients of Variation in the Instructional Questioning of Experienced Teachers and Probationers, in Terms 1 and 2.

term, the mean coefficient of variation for probationers (excluding probationer 3*) is 83.17% and for experienced teachers is 87.70%. This may suggest that in the first term experienced teachers distribute their questions a little more unevenly throughout the class; however since there is considerable variation amongst both experienced teachers and probationers in both terms, this suggestion must remain tentative.

2) <u>Cluster Analysis Results.</u>

a) <u>The Number and Size of Clusters.</u>

Table 9.8 indicates the number of clusters formed from MODE analysis** and their size (in terms of the number of pupils) for each teacher in each term. With only three exceptions, the analyses result in three, four or five clusters. There is a slight tendency for probationers in the first term to have fewer clusters (mean = 3.7 compared to the experienced teachers' mean = 4.5). There is also a general trend for one cluster to be considerably larger than the others: this occurs in the cases of both probationers and

* the coefficient of variation is a meaningless statistic when the mean approaches zero - see Spiegel (1961) p. 73.

** In the case of Teacher 9 (in terms 1 and 2) and Teacher 10 (term 2), MODE analysis produced only one cluster. In order to test the hypothesis that different groups in the class received different amounts and types of interaction, clusters were taken from the Ward's hierarchical analysis at the five cluster level, providing a comparable number of clusters to those generally provided by MODE analysis. However, in the case of Teacher 10, clusters at the three, four and five cluster levels exhibited a generally high variance in their ratings and did not appear to be very homogeneous clusters, hence clusters at level two were adopted.

	Term 1							Term 2						
	Number of Clusters	Clusters in order of size						Number of Clusters	Clusters in order of size					
		1st	2nd	3rd	4th	5th	6th		1st	2nd	3rd	4th	5th	6th
Probationer 1	4	21	3	3	2			3	23	3	2			
2	3	12	7	5				6	6	5	4	3	3	3
3	3	12	10	10				3	13	12	6			
4	5	13	8	6	3	2		4	13	9	4	4		
5	3	9	9	6				3	13	8	3			
6	4	10	6	5	4			4	16	3	3	3		
Mean * for Probationers	3.7	12.8	7.2	5.8	3.0	2.0	-	3.8	14.0	6.7	3.7	3.3	3.0	3.0
Teacher 7	6	6	5	4	4	4	2	5	7	6	4	3	3	
8	4	9	8	8	2			4	12	9	4	2		
9	5	10	8	7	4	2		5	10	7	7	4	3	
10	4	12	9	6	4			2	24	7				
11	3	13	7	5				3	14	7	4			
12	5	8	7	4	4	3		3	13	7	5			
Mean * for Teachers	4.5	9.7	7.3	5.7	3.6	3.0	2.0	3.7	13.3	7.2	4.8	3.0	3.0	-

* means calculated discounting empty cells.

Table 9.8

Number and Size of Clusters formed from Cluster Analysis of Each Teacher's Ratings of Pupils.

experienced teachers, although in the first term there is a slight trend for probationers to have a larger first cluster.

Fewer clusters, and larger first clusters, occurring in the case of probationers in the first term could be interpreted in terms of the probationers making fewer distinctions amongst the pupils and perceiving a larger 'average' group in the class. In the second term, however, with the exception of probationer 2, all teachers appear to have the same or fewer number of clusters and, with the same exception, the number of pupils occurring in the largest cluster has either remained the same or increased: this trend could perhaps tentatively be interpreted in terms of pupils, who were initially rated as extreme, appearing less extreme to teachers as the teachers' knowledge of them increases or as the teacher negotiates a 'working relationship' (Table 8.11 indicated that in the case of some constructs, especially behaviour ones, means and particularly variances tended to be lower in the second term, which may support this interpretation).

b) The Nature of the Clusters and the Interactions in which each Cluster was engaged.

Appendix VII tabulates the clusters for each teacher, indicating means and variances for the pupils in each cluster on all the interaction categories and rating scales*

* the means and variances for the ratings give a more appropriate indication of the differences between clusters in this case, than do median and range, which are more commonly used with ordinal scale data but can mask the skewness of distributions (see Gardner, 1975).

and on the total number of interactions engaged in, for first and second terms.

In the following tables, a summary is made of the teachers' ratings of the pupils in the clusters which emerged from the MODE analysis of each term's data, and of the interactions in which the pupils in these clusters engaged. Possible patterns of interaction with different clusters, and changes in clusters and levels and types of interaction between terms are noted. The male/female composition of each cluster is also noted as this factor may aid the interpretation of some interaction patterns.

Each summary is preceded by another table, abstracted from Appendix VII, to indicate the statistics upon which the summary is based. However, conclusions regarding individual teachers' interactions with different clusters are impossible due to the small sample of interaction data collected, and the function of the following analysis is to identify trends, within the cluster ratings and interaction data, which are common amongst teachers or amongst groups of teachers in the sample.

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1 (Good Worker)	Rating 2 (Well Behaved)	Rating 3 (Quiet)	Rating 4 (Well Motivated)	Rating 5 (Good Mixer)
1	cluster 1	21	1·76 (0·79)	0·05 (0·05)	0·29 (0·21)	0·29 (0·21)	0·33 (0·33)	—	—	0·38 (0·45)	0·43 (0·36)	0·05 (0·05)	3·57 (4·46)	2·90 (1·09)	3·00 (1·40)	3·57 (0·96)	2·95 (1·35)	2·29 (0·91)
	cluster 2	3	2·33 (1·33)	—	—	0·33 (0·33)	—	—	—	—	—	—	2·67 (2·33)	2·00 (0·00)	2·33 (0·33)	1·67 (0·33)	5·00 (0·00)	3·33 (0·33)
	cluster 3	3	1·67 (2·33)	0·33 (0·33)	1·00 (1·00)	0·33 (0·33)	—	—	—	0·67 (1·33)	0·33 (0·33)	—	4·33 (0·33)	3·67 (0·33)	4·00 (1·00)	4·67 (0·33)	1·67 (0·33)	2·00 (0·00)
	cluster 4	2	3·00 (0·00)	0·50 (0·50)	1·00 (1·00)	0·5 (0·5)	—	—	—	1·00 (0·00)	—	0·50 (0·50)	6·50 (0·50)	3·50 (0·50)	3·00 (0·00)	2·00 (0·00)	4·00 (0·00)	2·50 (0·50)
	TOTAL	29	1·90 (0·95)	0·10 (0·10)	0·38 (0·32)	0·31 (0·22)	0·24 (0·26)	—	—	0·41 (0·47)	0·34 (0·31)	0·07 (0·07)	3·75 (4·11)	2·93 (1·00)	3·03 (1·25)	3·38 (1·39)	3·10 (1·67)	2·38 (0·92)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
1	cluster 1	23	3·09 (4·17)	0·09 (0·08)	0·22 (0·27)	0·17 (0·15)	0·35 (0·51)	0·52 (0·53)	0·09 (0·09)	0·17 (0·15)	0·39 (0·52)	0·04 (0·04)	5·13 (13·39)	3·13 (0·94)	2·78 (0·36)	3·26 (0·57)	2·91 (0·81)	2·79 (0·91)
	cluster 2	2	1·00 (0·00)	—	—	—	—	—	—	—	—	—	1·00 (0·00)	1·50 (0·50)	1·00 (0·00)	1·00 (0·00)	2·00 (0·00)	3·00 (0·00)
	cluster 3	3	3·33 (6·33)	—	0·33 (0·33)	0·33 (0·33)	—	—	0·33 (0·33)	0·33 (0·33)	—	0·33 (0·33)	5·00 (19·00)	4·33 (0·33)	2·33 (0·33)	1·00 (0·00)	4·33 (0·33)	4·33 (0·33)
	TOTAL	28	2·93 (4·18)	0·07 (0·07)	0·21 (0·25)	0·18 (0·15)	0·24 (0·43)	0·43 (0·48)	0·11 (0·10)	0·18 (0·15)	0·32 (0·45)	0·07 (0·07)	4·79 (13·49)	3·14 (1·16)	2·61 (0·54)	2·86 (1·24)	3·00 (0·96)	2·96 (1·00)

Table 9.9A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 1)

Probationer 1

Cluster	Summary of Ratings	Summary of Interaction Patterns
1st term 1	large proportion of the class are in this cluster which includes ratings throughout the range on all dimensions (7/14)†	More managerial directives and more child-initiated interaction involve the less able or less motivated clusters 3 and 4; more instructional questioning involves cluster 4 and to some extent cluster 2.
2	above average* on good worker, behaviour and quietness; low on motivation and ability to mix (2/1)	
3	below average on good worker, behaviour and quietness, but above average in motivation and ability to mix (2/1)	
4	average on behaviour and ability to mix; above average on quietness and below average on motivation and good worker (2/0)	
2nd term 1	large cluster with wide range of ratings on all dimensions (11/12)	Cluster 2 is involved in little interaction; cluster 3 is involved in interaction similar to that of the majority of pupils in cluster 1.
2	above average on all dimensions except on ability to mix (0/2)	
3	below average on good worker, motivation and ability to mix; marginally above average on behaviour and quietness (2/1)	

Table 9.9B

Summary of Cluster Ratings and Interaction Patterns (Probationer 1)

<u>Cluster Membership</u>: 15 pupils are common to cluster 1 (both terms). All cluster 2 pupils (1st term) appear in cluster 1 (2nd term). 2 pupils are common to cluster 3 (both terms).
Both cluster 4 pupils (1st term) appear in cluster 1 (2nd term).
One large cluster in both terms.

<u>Comment</u>: There is some indication in both terms of pupils rated quiet but low on ability and motivation engaging in a large amount of interaction. In the 2nd term, a group of quiet, intelligent, hard-working well-behaved girls receive less interaction than others. However, these groups are small and the remainder of the class cluster together.

† (Male/female) composition of the class is noted in brackets.

* average is taken to be the class mean on each construct.

<u>Table 9.9B (cont'd)</u>

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1 (High Ability)	Rating 2 (Well Motivated)	Rating 3 (Quiet)	Rating 4 (Quick Worker)	Rating 5
2	cluster 1	12	4·08 (5·36)	0·25 (0·20)	0·08 (0·08)	0·17 (0·33)	0·58 (0·45)	0·05 (0·08)	0·08 (0·08)	0·08 (0·08)	0·17 (0·15)	0·08 (0·08)	5·67 (11·33)	2·17 (0·52)	1·92 (0·27)	3·25 (0·75)	2·58 (0·99)	—
	cluster 2	5	2·80 (1·20)	—	—	0·40 (0·80)	0·40 (0·80)	0·20 (0·20)	—	—	—	—	3·80 (6·70)	3·40 (0·30)	2·00 (0·00)	1·80 (0·70)	3·20 (0·70)	—
	cluster 3	7	4·14 (4·14)	—	0·29 (0·24)	0·71 (0·57)	1·14 (1·81)	0·71 (3·57)	0·14 (0·14)	0·57 (1·29)	0·14 (0·14)	—	7·86 (44·47)	3·71 (0·57)	4·14 (0·48)	4·00 (0·67)	5·00 (0·00)	—
	TOTAL	24	3·88 (4·14)	0·13 (0·11)	0·13 (0·11)	0·38 (0·51)	0·71 (0·91)	0·29 (1·09)	0·08 (0·08)	0·21 (0·43)	0·13 (0·12)	0·04 (0·04)	5·92 (19·56)	2·88 (0·98)	2·58 (1·30)	3·17 (1·25)	3·42 (1·73)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1 (Good Worker)	Rating 2	Rating 3	Rating 4 (Neat)	Rating 5 (Tries Hard To Please)
2	cluster 1	6	3·67 (3·07)	0·33 (0·67)	0·33 (0·27)	0·33 (0·27)	0·33 (0·27)	1·67 (0·17)	—	0·50 (0·30)	0·33 (0·67)	0·17 (0·17)	6·17 (9·37)	1·50 (0·30)	1·67 (0·67)	1·33 (0·27)	2·83 (0·97)	1·50 (0·30)
	cluster 2	3	3·67 (2·33)	—	0·33 (0·33)	0·33 (0·33)	0·67 (0·33)	—	—	—	0·67 (0·33)	—	5·67 (2·33)	1·67 (0·33)	1·67 (0·33)	3·00 (0·00)	1·67 (0·33)	1·00 (0·00)
	cluster 3	3	3·67 (0·33)	0·33 (0·33)	0·33 (0·33)	—	0·33 (0·33)	0·67 (1·33)	—	0·67 (1·33)	0·33 (0·33)	0·33 (0·33)	6·67 (0·33)	1·67 (0·33)	2·33 (0·33)	5·00 (0·00)	2·67 (0·33)	1·67 (0·33)
	cluster 4	3	6·00 (3·00)	—	0·33 (0·33)	—	—	0·33 (0·33)	—	—	—	0·33 (0·33)	7·00 (1·00)	3·33 (0·33)	2·67 (0·33)	3·00 (1·00)	2·33 (0·33)	2·33 (0·33)
	cluster 5	4	3·00 (10·00)	0·75 (0·92)	0·25 (0·25)	—	1·75 (2·25)	0·25 (0·25)	—	0·50 (0·33)	0·50 (0·33)	—	7·00 (26·67)	4·00 (0·67)	3·00 (0·00)	4·75 (0·25)	3·75 (0·25)	3·25 (0·25)
	cluster 6	5	8·60 (10·30)	2·20 (3·70)	0·50 (0·20)	0·60 (0·50)	2·20 (8·70)	0·20 (0·20)	—	0·20 (0·20)	0·60 (0·80)	—	15·40 (57·30)	4·60 (0·30)	4·80 (0·20)	4·00 (1·50)	4·80 (0·20)	3·50 (0·70)
	TOTAL	24	4·58 (8·81)	0·71 (1·61)	0·42 (0·25)	0·25 (0·28)	0·96 (2·65)	0·25 (0·28)	—	0·33 (0·33)	0·42 (0·43)	0·13 (0·11)	8·33 (29·71)	2·83 (2·06)	2·75 (1·67)	3·33 (2·32)	3·17 (1·45)	2·33 (1·36)

Table 9.10A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 2)

Probationer 2

Cluster	Summary of Ratings	Summary of Interaction Patterns
1st term 1	above average on ability and motivation; some members above average in speed of working; average on quietness (6/6)	More instructional questioning involves clusters 1 and 3; more disciplinary remarks and child-initiated interaction involves cluster 3.
2	below average on ability; average on speed of working; above average on motivation and quietness (2/3)	
3	below average on all dimensions, especially speed of working (5/2)	
2nd term 1	above average on all dimensions except neatness where there is considerable variance (1/5)	More instructional questioning involves clusters 4 and 6; more disciplinary remarks, managerial questioning and managerial directives also involve cluster 6.
2	above average on all dimensions except quietness which is averagely rated (2/1)	
3	above average on ability; slightly above average on motivation, trying hard to please, and neatness; and far below average on quietness (2/1)	
4	slightly below average on ability; above average on neatness; and average on all other dimensions (1/2)	
5	below average on ability, quietness and trying hard to please; slightly below average on the other dimensions (3/1)	

Table 9.10B

Summary of Cluster Ratings and Interaction Patterns (Probationer 2)

6	below average on all dimensions (4/1)	

Cluster Membership: Cluster 1 (1st term) is dispersed among clusters 1-5 (2nd term), 4 cluster 2 pupils (1st term) are in cluster 1 (2nd term), 6 cluster 3 pupils (1st term) are in clusters 5 and 6 (2nd term). Large increase in number of clusters in the second term.

Comment: The large number of clusters in the 2nd term may suggest a finer differentiation of the pupils than in the 1st term, but the interaction patterns do not show any great change. In both terms there are two clusters which receive more instructional questioning:
1) an above average ability/averagely quiet and a below averagely rated cluster (1st term);
2) an averagely and a below averagely rated cluster (2nd term).
In both terms, a below average group also receives more disciplinary interaction.

Table 9.10B (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1 (Intelligent)	Rating 2 (Well Motivated)	Rating 3 (Quiet)	Rating 4 (Well Behaved)	Rating 5 (Tidy Worker)
3	cluster 1	10	0·90 (1·21)	—	—	0·10 (0·10)	0·20 (0·18)	—	0·10 (0·10)	0·40 (0·93)	0·30 (0·23)	0·10 (0·10)	2·10 (2·99)	1·30 (0·41)	1·20 (0·16)	2·40 (0·32)	1·70 (0·16)	1·10 (0·09)
	cluster 2	10	0·40 (0·49)	0·10 (0·10)	0·10 (0·10)	—	0·30 (0·23)	—	—	0·10 (0·10)	0·30 (0·23)	—	1·30 (1·57)	3·30 (1·21)	2·00 (0·20)	2·40 (0·38)	2·00 (0·20)	2·00 (0·20)
	cluster 3	12	0·58 (2·08)	—	0·17 (0·15)	—	0·58 (0·81)	—	—	0·42 (0·45)	1·25 (2·20)	—	3·00 (6·55)	3·67 (0·22)	3·42 (0·56)	4·25 (0·35)	3·67 (0·56)	3·50 (1·25)
TOTAL		32	0·63 (1·27)	0·03 (0·03)	0·09 (0·09)	0·03 (0·03)	0·38 (0·44)	—	0·03 (0·03)	0·31 (0·48)	0·66 (1·14)	0·03 (0·03)	2·18 (4·16)	2·81 (1·72)	2·28 (1·23)	3·00 (1·49)	2·53 (1·17)	2·28 (1·64)

TERM 2.

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5 (Good Worker)
3.	cluster 1	6	1·33 (1·87)	—	—	—	0·17 (0·17)	—	—	—	0·67 (0·67)	—	2·17 (4·97)	1·00 (0·00)	1·00 (0·00)	2·33 (1·07)	1·83 (0·57)	1·00 (0·00)
	cluster 2	12	0·67 (0·61)	0·08 (0·08)	—	—	0·42 (0·81)	0·08 (0·08)	—	1·00 (2·73)	0·50 (0·45)	—	2·75 (4·20)	2·75 (0·39)	2·42 (1·17)	3·58 (1·36)	2·25 (0·39)	2·50 (1·36)
	cluster 3	13	0·38 (0·42)	0·08 (0·08)	—	0·15 (0·14)	0·08 (0·08)	—	—	0·54 (0·60)	1·00 (1·67)	—	2·23 (2·86)	3·54 (0·77)	2·85 (0·64)	2·54 (0·77)	2·54 (0·77)	2·85 (0·64)
TOTAL		31	0·68 (0·93)	0·06 (0·06)	—	0·06 (0·06)	0·23 (0·38)	0·03 (0·03)	—	0·61 (1·38)	0·74 (1·00)	—	2·42 (3·58)	2·74 (1·33)	2·32 (1·16)	2·90 (1·29)	2·29 (0·61)	2·35 (1·24)

Table 9.11A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 3)

Probationer 3

Cluster	Summary of Ratings	Summary of Interaction Patterns
1st term 1	above average on all dimensions, but fairly high variance on quietness (3/7)	More interaction with clusters 1 and 3; more child initiated interaction and more disciplinary comments involve cluster 3, but level of interaction is so low that patterns are not very clear.
2	fairly average on most dimensions, with high variance on intelligence (4/6)	
3	below average on all dimensions (10/2)	
2nd term 1	above average on intelligence, motivation and good worker; but tending towards average on quietness and behaviour (2/4)	More instructional questioning involves cluster 1, more child-initiated interaction involves clusters 2 and 3. Again level of interaction is low.
2	average on all dimensions, although a little below average on quietness (6/6)	
3	below average on all dimensions except quietness (9/4)	

Cluster Membership: 6 cluster 1 pupils (1st term) make up cluster 1 (2nd term). 5 cluster 2 pupils (1st term) are in cluster 2 (2nd term). 8 cluster 3 pupils (1st term) are in cluster 3 (2nd term). Hence cluster membership is quite stable.

Comment: Little discernible change during the term either in cluster-membership and their ratings, or in patterns of interaction. Clusters appear to be distributed along one overall 'good pupil' dimension in both first and second terms.

Table 9.11B

Summary of Cluster Ratings and Interaction Patterns (Probationer 3)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1 (High Ability)	Rating 2 (Well Motivated)	Rating 3 (Quiet)	Rating 4 (Well Behaved)	Rating 5 (Neat Worker)
4	cluster 1	6	0.33 (0.27)	—	0.17 (0.17)	0.83 (0.57)	—	—	—	0.83 (0.17)	0.50 (0.30)	—	2.67 (1.07)	1.33 (0.22)	1.33 (0.22)	1.33 (0.22)	1.00 (0.00)	1.00 (0.00)
	cluster 2	8	0.50 (0.57)	0.13 (0.13)	0.50 (1.14)	0.50 (0.29)	—	0.25 (0.50)	0.13 (0.13)	0.75 (3.07)	0.75 (0.79)	—	3.50 (16.00)	2.88 (0.61)	2.00 (0.25)	2.00 (0.50)	2.00 (0.25)	1.88 (0.36)
	cluster 3	13	0.15 (0.14)	0.23 (0.19)	0.38 (0.26)	0.31 (0.23)	0.15 (0.31)	0.15 (0.14)	—	0.23 (0.36)	0.23 (0.19)	0.08 (0.08)	1.92 (3.41)	3.54 (0.56)	3.15 (0.13)	3.38 (0.36)	2.85 (0.13)	3.38 (0.31)
	cluster 4	3	0.67 (0.33)	—	1.00 (1.00)	0.67 (0.33)	—	0.33 (0.33)	0.33 (0.33)	0.67 (0.33)	1.00 (0.00)	—	4.67 (6.33)	3.00 (0.00)	3.33 (0.22)	4.33 (0.22)	4.00 (0.00)	3.33 (0.22)
	cluster 5	2	2.00 (2.00)	—	1.00 (2.00)	1.00 (0.00)	—	0.50 (0.50)	—	0.50 (0.50)	1.00 (0.00)	0.50 (0.50)	6.50 (12.50)	5.00 (0.00)	4.00 (0.00)	4.00 (0.00)	3.50 (0.25)	4.00 (0.00)
	TOTAL	32	0.44 (0.51)	0.13 (0.11)	0.47 (0.58)	0.53 (0.32)	0.06 (0.13)	0.19 (0.22)	0.06 (0.06)	0.53 (0.97)	0.53 (0.34)	0.06 (0.06)	3.00 (7.55)	2.97 (1.32)	2.59 (0.90)	2.78 (1.39)	2.44 (0.96)	2.59 (1.35)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
4	cluster 1	4	0.25 (0.25)	—	0.25 (0.25)	0.50 (0.33)	—	—	—	—	0.25 (0.25)	—	1.25 (0.92)	1.00 (0.00)	1.00 (0.00)	1.25 (0.25)	1.25 (0.25)	1.50 (1.00)
	cluster 2	9	1.89 (5.11)	0.11 (0.11)	0.11 (0.11)	0.56 (0.53)	—	0.44 (1.78)	—	0.22 (0.19)	0.56 (1.03)	0.11 (0.11)	4.00 (16.25)	2.67 (0.25)	2.11 (0.11)	2.56 (0.53)	2.22 (0.19)	2.00 (0.50)
	cluster 3	13	1.92 (4.47)	0.23 (0.19)	0.15 (0.14)	0.46 (0.44)	0.31 (0.40)	0.15 (0.31)	—	0.31 (0.73)	0.38 (0.59)	0.08 (0.08)	4.00 (18.50)	3.62 (0.42)	3.31 (0.23)	3.54 (0.44)	3.00 (0.17)	3.31 (0.56)
	cluster 4	4	2.50 (13.67)	—	—	0.75 (0.25)	0.50 (1.00)	0.25 (0.25)	—	0.50 (0.33)	0.75 (0.92)	0.75 (0.25)	6.00 (14.00)	5.00 (0.00)	4.00 (0.00)	4.00 (0.67	3.25 (0.25)	4.25 (0.25)
	TOTAL	30	1.77 (5.22)	0.13 (0.12)	0.13 (0.12)	0.53 (0.40)	0.20 (0.30)	0.23 (0.67)	—	0.27 (0.41)	0.47 (0.67)	0.17 (0.14)	3.90 (15.26)	3.17 (1.52)	2.73 (1.03)	3.00 (1.17)	2.57 (0.60)	2.80 (1.34)

Table 9.12A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 4)

Probationer 4

Cluster	Summary of Ratings	Summary of Interaction Patterns
1st term 1	above average on all dimensions (2/4)	More instructional questioning involves cluster 5; more managerial directives to clusters 4 and 5.
2	average on ability; but slightly above average in motivation, quietness, behaviour and neatness (2/6)	
3	slightly below average on all dimensions (8/5)	
4	below average on quietness and behaviour, and slightly below average on all other dimensions (3/0)	
5	below average on all dimensions (2/0)	
2nd term 1	above average on all dimensions (1/3)	Little instructional questioning involves cluster 1, more to clusters 2 and 3, and most to cluster 4; all disciplinary comments to clusters 3 and 4; little child-initiated interaction from cluster 1, more from clusters 2 and 3, most from cluster 4.
2	slightly above average on all dimensions (4/5)	
3	slightly below average on all dimensions (8/5)	
4	below average on all dimensions (3/1)	

Table 9.12B

Summary of Cluster Ratings and Interaction Patterns (Probationer 4)

<u>Cluster Membership</u>: 4 cluster 1 pupils (1st term) are in cluster 1 (2nd term). 6 cluster 2 pupils (1st term) are in cluster 2 (2nd term). 8 cluster 3 pupils (1st term) are in cluster 3 (2nd term). 2 pupils from clusters 4 and 5 (1st term) are in cluster 4 (2nd term). Clusters fairly stable.

<u>Comment:</u> In the 2nd term, a cluster of quiet intelligent (mostly) girls receive little interaction. Below average groups receive more disciplinary remarks in the 2nd term and in both terms engage in more child-initiated interaction; there is an apparent correlation between the amount of teacher-initiated and pupil initiated interaction. Clusters seem to be distributed along one overall 'good pupil' dimension in both terms.

<u>Table 9.12B (cont'd)</u>

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1 (Intelligent)	Rating 2 (Well Motivated)	Rating 3 (Quiet)	Rating 4 (Likeable)	Rating 5
5	cluster 1	6	2.00 (0.80)	—	—	—	0.17 (0.17)	—	—	0.17 (0.17)	—	—	2.33 (2.27)	2.17 (0.97)	1.67 (0.27)	3.17 (0.57)	1.83 (0.17)	—
	cluster 2	9	1.00 (1.25)	0.11 (0.11)	—	—	—	—	—	0.44 (0.28)	0.11 (0.11)	—	1.17 (1.75)	2.11 (0.61)	3.00 (0.00)	3.39 ([illegible])	2.44 (0.53)	—
	cluster 3	9	1.44 (2.03)	0.33 (0.50)	0.11 (0.11)	—	0.67 (1.25)	—	—	—	—	—	2.56 (4.28)	3.89 (0.86)	3.89 (0.86)	3.56 (2.53)	2.78 (0.44)	—
	TOTAL	24	1.42 (1.47)	0.17 (0.23)	0.04 (0.04)	—	0.29 (0.56)	—	—	0.21 (0.17)	0.04 (0.04)	—	2.17 (2.75)	2.79 (1.48)	3.00 (1.13)	3.58 (1.21)	2.42 (0.51)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1 (Good at number work)	Rating 2 (Good at language work)	Rating 3 (Well motivated)	Rating 4 (Quiet)	Rating 5 (Likeable)
5	cluster 1	3	2.67 (14.33)	0.67 (0.33)	—	0.33 (0.33)	—	—	—	0.33 (0.33)	0.67 (0.33)	—	4.67 (25.33)	2.00 (0.00)	2.67 (0.33)	2.33 (0.33)	2.67 (0.33)	2.33 (0.33)
	cluster 2	8	4.50 (10.29)	0.13 (0.13)	0.13 (0.13)	0.25 (0.21)	0.13 (0.13)	—	—	0.13 (0.13)	—	—	5.25 (11.07)	1.63 (0.55)	1.63 (0.27)	2.13 (0.13)	3.88 (0.98)	2.38 (0.27)
	cluster 3	13	3.38 (4.59)	0.31 (0.40)	0.23 (0.36)	0.23 (0.19)	0.15 (0.14)	—	—	—	1.15 (2.14)	0.15 (0.14)	5.62 (9.26)	3.69 (1.06)	3.62 (0.92)	3.54 (0.60)	3.69 (1.40)	2.69 (0.23)
	TOTAL	24	3.67 (7.19)	0.29 (0.30)	0.17 (0.23)	0.25 (0.20)	0.13 (0.11)	—	—	0.03 (0.08)	0.71 (1.43)	0.08 (0.03)	5.37 (10.50)	2.79 (1.74)	2.83 (1.45)	2.92 (0.86)	3.63 (1.20)	2.54 (0.26)

Table 9.13A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 5)

Probationer 5

Cluster	Summary of Ratings	Summary of Interaction Patterns
1st term 1	above average on all dimensions (3/3)	More instructional questioning involves cluster 1; most disciplinary remarks involve cluster 3; most of the small amount of child-initiated interaction involves cluster 2. Level of interaction is low.
2	above average on intelligence; but average on motivation, quietness and likeableness (4/5)	
3	below average on all dimensions except for quietness which is averagely rated (7/2)	
2nd term 1	above average on quietness; slightly above average on number work and motivation; and average on language work and likeableness (3/0)	Cluster 1 receives less instructional questioning and cluster 2 the most. Most child-initiated interaction involves clusters 1 and 3. Level of interaction is again low.
2	above average on number work, language work and motivation; average on quietness and likeableness (4/4)	
3	below average on number work, language work and motivation; average on quietness and likeableness (7/6)	

Table 9.13B

Summary of Cluster Ratings and Interaction Patterns (Probationer 5)

<u>Cluster Membership</u>:	2 cluster 1 pupils (1st term) in cluster 1 (2nd term). 6 pupils common to cluster 2 (both terms). 9 pupils common to cluster 3 (both terms). Clusters quite stable.
<u>Comment</u>:	In term 1, clusters seem to be distributed along one overall 'good pupil' dimension, more instructional questioning occurring with the above average pupils, and more disciplinary remarks being addressed to the below average pupils. In the 2nd term, a fairly average but quiet cluster seems to emerge with less instructional questioning, and an above average in ability/ motivation group emerge engaging in more instructional questioning.

<u>Table 9.13B (cont'd)</u>

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1 (Intelligent)	Rating 2 (Well Motivated)	Rating 3 (Quiet)	Rating 4 (High Self-Esteem)	Rating 5
6	cluster 1	4	2·75 (0·25)	—	0·25 (0·25)	0·50 (0·33)	—	—	—	—	—	—	3·50 (0·33)	1·75 (0·25)	2·00 (1·33)	2·75 (0·25)	2·75 (0·25)	—
	cluster 2	5	3·00 (6·50)	—	0·40 (0·30)	0·40 (0·30)	0·20 (0·20)	—	—	0·40 (0·30)	0·20 (0·20)	0·20 (0·20)	4·80 (12·70)	2·80 (0·20)	2·60 (0·30)	4·60 (0·30)	2·00 (0·00)	—
	cluster 3	10	3·00 (6·44)	0·20 (0·18)	0·20 (0·18)	0·30 (0·23)	0·30 (0·23)	—	—	0·80 (1·51)	0·20 (0·18)	—	5·00 (13·11)	3·30 (0·23)	3·50 (0·72)	2·70 (0·90)	3·40 (0·27)	—
	cluster 4	6	4·33 (9·47)	0·33 (0·67)	0·50 (0·30)	0·33 (0·23)	0·50 (0·70)	—	—	0·67 (0·67)	—	0·17 (0·17)	6·83 (27·37)	3·83 (0·57)	4·67 (0·27)	4·83 (0·17)	2·67 (0·67)	—
	TOTAL	25	3·28 (5·85)	0·16 (0·22)	0·32 (0·23)	0·33 (0·27)	0·28 (0·29)	—	—	0·56 (0·84)	0·12 (0·11)	0·08 (0·08)	5·16 (13·91)	3·08 (0·74)	3·36 (1·41)	3·60 (1·50)	2·84 (0·56)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5 (Produces good work)
6	cluster 1	16	1·50 (2·27)	0·19 (0·16)	—	0·13 (0·12)	0·44 (0·53)	0·25 (0·60)	0·06 (0·06)	0·13 (0·12)	0·19 (0·30)	0·25 (0·20)	3·13 (10·12)	3·39 (0·52)	3·19 (0·70)	3·25 (1·00)	3·25 (0·73)	3·38 (0·38)
	cluster 2	3	1·00 (1·00)	—	0·33 (0·33)	—	0·33 (0·33)	1·00 (1·00)	—	0·33 (0·33)	—	0·33 (0·33)	3·33 (5·33)	1·67 (0·33)	2·00 (0·00)	3·00 (0·00)	2·00 (0·00)	2·00 (0·00)
	cluster 3	3	1·67 (0·33)	0·67 (0·33)	1·00 (0·00)	—	0·67 (1·33)	—	—	0·33 (0·33)	—	1·00 (0·00)	5·33 (1·33)	1·67 (0·33)	2·00 (0·00)	2·00 (0·00)	3·00 (0·00)	1·67 (0·33)
	cluster 4	3	1·67 (0·33)	—	1·00 (1·00)	—	0·33 (0·33)	—	—	—	0·67 (1·33)	0·33 (0·33)	4·00 (3·00)	4·00 (0·00)	4·00 (0·00)	5·00 (0·00)	2·67 (0·33)	4·33 (0·33)
	TOTAL	25	1·48 (1·59)	0·20 (0·17)	0·25 (0·24)	0·08 (0·08)	0·44 (0·51)	0·28 (0·54)	0·04 (0·04)	0·16 (0·14)	0·20 (0·33)	0·36 (0·24)	3·52 (7·68)	3·04 (1·04)	3·00 (0·83)	3·28 (1·21)	3·00 (0·67)	3·12 (0·94)

Table 9.14A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Probationer 6)

Probationer 6

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1 1	above average on intell-igence; average or above on motivation, quietness and self-esteem (3/1)	Interaction with cluster 1 is almost entirely of instructional question form; most instructional questioning involves cluster 4.
2	talkative, but slightly above average on other dimensions (2/3)	
3	average on all dimensions with some members above average on quietness and motivation (4/6)	
4	below average on all dimensions except self-esteem which is averagely rated (4/2)	
Term 2 1	average on all dimensions with fairly high variance on quietness (7/9)	Patterns are difficult to distinguish due to the low level of interaction, but marginally less instruct-ional questioning involves cluster 2.
2	above average on all dimensions except quietness which is average (2/1)	
3	above average on all dimensions except self-esteem which is average (1/2)	
4	below average on all dimensions except self-esteem which is average or above (3/0)	

Table 9.14B

Summary of Cluster Ratings and Interaction Patterns (Probationer 6)

<u>Cluster Membership</u>:	2 pupils common to cluster 1 (both terms). 4 cluster 2 pupils (1st term) are in cluster 1 (2nd term). Cluster 3 pupils (term 1) are dispersed throughout all clusters in term 2. 3 pupils are common to cluster 4 (both terms) Consequently, cluster membership is not very stable.
<u>Comment</u>:	Some slight evidence for a group perceived as high in ability/motivation/self-esteem, but average on quietness, who receive less interaction than others, in the second term, but a low level of interaction makes interpretation highly speculative.

<u>Table 9.14B (cont'd)</u>

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1 (High language ability)	Rating 2 (High maths ability)	Rating 3 (Quiet)	Rating 4 (Hard-working)	Rating 5 (Neat worker)
7	cluster 1	2	4.00 (2.00)	—	—	—	—	—	—	—	—	—	4.00 (2.00)	1.00 (0.00)	1.00 (0.00)	5.00 (0.00)	1.00 (0.00)	1.00 (0.00)
	cluster 2	4	3.00 (0.67)	—	—	—	—	—	—	—	—	—	3.00 (0.67)	2.00 (0.50)	2.00 (0.50)	4.00 (0.50)	1.50 (0.25)	2.00 (0.50)
	cluster 3	6	3.33 (4.27)	—	0.17 (0.17)	0.33 (0.27)	—	—	—	—	—	—	3.83 (5.71)	3.17 (0.81)	3.00 (0.00)	1.67 (0.22)	2.00 (0.33)	1.53 (0.14)
	cluster 4	5	3.40 (2.80)	—	—	0.60 (0.80)	—	—	—	—	—	—	4.00 (5.00)	3.60 (0.64)	3.00 (0.40)	1.60 (0.24)	3.00 (1.20)	4.00 (0.40)
	cluster 5	4	4.25 (6.25)	—	1.25 (6.25)	0.25 (0.25)	0.50 (0.33)	—	—	—	—	—	6.25 (17.58)	5.00 (0.00)	5.00 (0.00)	1.75 (0.69)	2.00 (0.00)	1.75 (0.19)
	cluster 6	4	2.00 (2.67)	—	—	0.25 (0.25)	1.00 (0.67)	—	—	—	—	—	3.25 (2.25)	3.75 (0.69)	3.50 (0.75)	4.75 (0.19)	3.25 (1.19)	4.50 (0.25)
	TOTAL	25	3.28 (3.13)	—	0.24 (1.02)	0.28 (0.29)	0.24 (0.27)	—	—	—	—	—	4.04 (5.79)	3.28 (1.80)	3.08 (1.49)	2.80 (2.40)	2.44 (1.10)	2.64 (1.82)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
7	cluster 1	3	7.00 (9.00)	—	2.33 (2.33)	—	0.33 (0.33)	0.67 (1.33)	—	—	—	—	10.33 (16.33)	1.67 (0.33)	1.00 (0.00)	4.33 (0.33)	1.00 (0.00)	1.67 (1.33)
	cluster 2	6	6.00 (1.20)	—	1.50 (0.70)	0.17 (0.17)	0.17 (0.17)	—	—	—	—	—	7.83 (2.17)	2.50 (0.70)	2.50 (1.10)	1.67 (0.27)	1.67 (0.27)	2.33 (0.27)
	cluster 3	4	6.00 (28.67)	—	2.25 (2.25)	0.25 (0.25)	0.25 (0.25)	—	—	—	—	0.25 (0.25)	9.00 (47.33)	4.50 (0.33)	4.25 (0.92)	1.50 (0.33)	2.50 (1.00)	4.25 (0.25)
	cluster 4	3	4.00 (12.00)	—	0.67 (0.33)	—	0.33 (0.33)	—	—	—	—	0.33 (0.33)	5.33 (22.33)	5.00 (0.00)	4.67 (0.33)	1.00 (0.00)	1.67 (0.33)	1.67 (0.33)
	cluster 5	7	6.43 (21.62)	—	3.00 (4.33)	0.57 (0.62)	0.86 (0.81)	—	—	—	—	0.29 (0.24)	11.14 (31.45)	3.71 (0.90)	3.57 (0.62)	4.43 (1.29)	3.43 (1.62)	4.00 (1.33)
	TOTAL	23	6.00 (12.73)	—	2.09 (2.54)	0.26 (0.29)	0.43 (0.44)	0.09 (0.17)	—	—	—	0.17 (0.15)	9.04 (24.59)	3.43 (1.71)	3.22 (1.91)	2.74 (2.74)	2.26 (1.47)	3.00 (1.82)

Table 9.15A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 7)

Teacher 7

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1 1	very highly rated on language ability, maths ability, hard worker and neat worker; but very poorly on quietness (2/0)	More instructional questioning involves clusters 1 and 5; clusters 1 and 2 receive interaction of only instructional questioning type. Disciplinary remarks are only addressed to clusters 5 and 6.
2	above average on language and maths ability and hard worker; slightly above average on neat worker; below average on quietness (2/2)	
3	above average on quietness; slightly above average on neat worker; average on other dimensions (1/5)	
4	quiet, untidy but fairly average on other dimensions (3/2)	
5	well below average on ability; above average on quietness and neat worker; average on hard worker (0/4)	
6	below average on quietness and neat worker; average or slightly below on other dimensions (2/2)	
Term 2 1	above average on all dimensions except quietness which is below average (3/0)	Marginally more instructional questioning involves clusters 1 and 5; slightly more managerial direction involves clusters 1, 3 and 5. Cluster 5 is involved in marginally more disciplinary contacts.
2	slightly above average on all dimensions (3/3)	

Table 9.15B

Summary of Cluster Ratings and Interaction Patterns (Teacher 7)

3	below average on abilities and neat worker; above average on quietness; and average on hard worker (1/3)	
4	below average on abilities; average on hard working; above average on quietness and neat worker (0/3)	
5	average on ability; below average on all other dimensions (3/4)	

Cluster Membership: All cluster 1 pupils (1st term) are in cluster 1 (2nd term). 3 pupils common to cluster 2 (both terms). All cluster 6 pupils (1st term) are in cluster 5 (2nd term). Some change of cluster membership in other clusters. Consequently there is a reasonable degree of stability, but more especially with the most favourably and least favourably perceived clusters.

Comment: Two clusters in both terms (one perceived as able but averagely quiet, the other perceived less favourably) receive slightly more instructional questioning. Disciplinary remarks are generally addressed to poorly perceived clusters.

Table 9.15B (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	(High Ability) Rating 1	(Well Behaved) Rating 2	(Quiet) Rating 3	(Well Motivated) Rating 4	(Goal Mixer) Rating 5
8	cluster 1	2	—	—	0.50 (0.50)	—	—	—	—	—	—	—	0.50 (0.50)	1.00 (0.00)	1.00 (0.00)	2.00 (0.00)	2.00 (0.00)	2.50 (0.25)
	cluster 2	8	1.63 (2.27)	0.13 (0.13)	0.50 (0.29)	0.13 (0.13)	0.63 (1.41)	0.75 (0.79)	—	—	0.25 (0.21)	—	4.00 (5.71)	2.00 (0.25)	2.88 (0.61)	3.15 (1.11)	1.88 (0.11)	1.88 (0.61)
	cluster 3	9	0.89 (1.11)	0.44 (0.53)	0.56 (0.53)	0.33 (0.25)	0.44 (0.28)	0.11 (0.11)	0.11 (0.11)	0.22 (0.19)	0.56 (0.53)	—	3.67 (6.00)	2.89 (1.23)	1.89 (0.32)	1.78 (0.40)	3.78 (1.06)	3.56 (0.91)
	cluster 4	8	1.38 (1.41)	0.25 (0.21)	0.38 (0.55)	0.13 (0.13)	0.50 (0.29)	0.75 (0.79)	—	0.13 (0.13)	0.75 (1.93)	—	4.25 (17.07)	3.88 (1.11)	3.75 (1.19)	3.38 (0.73)	3.75 (0.19)	3.75 (0.69)
TOTAL		27	1.19 (1.54)	0.26 (0.28)	0.48 (0.41)	0.19 (0.16)	0.48 (0.57)	0.48 (0.57)	0.04 (0.04)	0.11 (0.10)	0.48 (0.80)	—	3.70 (8.91)	2.75 (1.64)	2.67 (1.46)	2.85 (1.51)	3.07 (1.30)	3.04 (1.42)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	(Good worker) Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
8	cluster 1	4	1.25 (3.58)	0.25 (0.25)	0.25 (0.25)	—	0.25 (0.25)	—	—	0.75 (0.92)	0.25 (0.25)	—	3.00 (8.67)	2.00 (0.00)	2.00 (0.00)	2.75 (0.25)	1.75 (0.25)	1.25 (0.25)
	cluster 2	12	2.67 (2.61)	0.33 (0.42)	0.75 (0.39)	0.25 (0.39)	0.59 (0.63)	0.17 (0.15)	—	0.92 (0.81)	1.00 (0.55)	0.83 (1.06)	7.50 (10.27)	3.42 (0.63)	3.33 (0.61)	3.17 (0.33)	3.83 (0.33)	3.58 (0.45)
	cluster 3	9	2.33 (2.25)	0.11 (0.11)	0.56 (0.53)	0.22 (0.19)	0.78 (0.69)	0.44 (1.03)	—	1.00 (0.50)	1.11 (1.36)	0.11 (0.11)	6.67 (16.25)	2.67 (0.25)	3.11 (0.36)	3.66 (0.50)	2.33 (0.25)	2.33 (0.25)
	cluster 4	2	—	0.50 (0.50)	—	—	—	—	—	0.50 (0.50)	0.50 (0.50)	0.50 (0.50)	2.00 (2.00)	4.00 (0.00)	2.50 (0.50)	2.00 (0.00)	4.00 (0.00)	4.00 (0.00)
TOTAL		27	2.15 (2.82)	0.26 (0.28)	0.56 (0.41)	0.19 (0.23)	0.56 (0.56)	0.22 (0.41)	—	0.89 (0.64)	0.89 (0.79)	0.44 (0.64)	6.15 (14.21)	3.00 (0.69)	3.00 (0.62)	3.19 (0.54)	3.04 (1.04)	2.85 (1.13)

Table 9.16A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 8)

Teacher 8

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1 1	above average on all dimensions, although only slightly on good mixer (0/2)	Most instructional questioning involves clusters 2 and 4; very little interaction with cluster 1 (both members are girls).
2	above average on ability, motivation and good mixer; average on behaviour; and below average on quietness (high variance on latter) (2/6)	
3	average ability; slightly above average on behaviour and quietness; slightly below average on motivation and good mixer; high variance on ability, good mixer and motivation (7/2)	
4	below average on ability and behaviour, (high variance on both); slightly below average on all other dimensions (5/3)	
Term 2 1	above average on all dimensions (1/3)	Most instructional questioning involves clusters 2 and 3; little teacher-initiated interaction with cluster 4, and a below average level of instructional questioning involves cluster 1.
2	average on quietness; slightly below average on all other dimensions (10/2)	
3	average on behaviour; some members talkative; slightly above average on other dimensions (2/7)	

Table 9.16B

Summary of Cluster Ratings and Interaction Patterns (Teacher 8)

4	below average on ability, motivation and good mixer; above average on behaviour and quietness (1/1)	

Cluster Membership: 2 cluster 1 pupils (1st term) in cluster 2 (2nd term). 3 cluster 2 pupils (1st term) are in cluster 3 (2nd term). 5 cluster 3 pupils (1st term) are in cluster 2 (2nd term). Cluster 4 pupils (1st term) are dispersed throughout clusters 2, 3 and 4 (2nd term). Therefore cluster membership is not very stable.

Comment: A group of quiet, intelligent, (mostly) girls receive little interaction in both terms. Two groups receive most instructional questioning in both terms. In the second term, cluster 4 emerges as a quiet, low ability group involved in little teacher-initiated interaction.

Table 9.16B (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn.	(Intelligent) Rating 1	(Quiet) Rating 2	(Well-Motivated) Rating 3	(Neat worker) Rating 4	(Likeable) Rating 5
9	cluster 1	10	1·20 (1·51)	—	—	—	0·30 (0·23)	—	—	—	0·10 (0·10)	—	1·00 (2·27)	1·70 (0·23)	1·40 (0·27)	1·70 (0·23)	1·50 (0·28)	1·10 (0·10)
	cluster 2	2	5·50 (0·50)	—	—	—	—	—	—	—	—	—	5·50 (0·50)	1·00 (0·00)	3·00 (0·00)	1·00 (0·00)	3·00 (0·00)	1·00 (0·00)
	cluster 3	7	0·71 (0·90)	—	—		0·14 (0·14)	—	—	—	—	—	0·86 (1·14)	2·86 (0·48)	1·00 (0·00)	3·57 (0·29)	2·57 (0·62)	1·43 (0·29)
	cluster 4	8	1·75 (4·21)	—	—	0·13 (0·13)	—	—	—	—	—	—	1·88 (4·41)	3·25 (0·21)	2·38 (0·27)	2·88 (0·13)	2·88 (0·41)	1·50 (0·29)
	cluster 5	4	3·50 (7·00)	—	—	0·25 (0·25)	0·50 (0·33)	—	—	—	—	—	4·25 (8·25)	3·50 (0·33)	3·75 (0·25)	4·00 (0·67)	4·25 (0·25)	2·50 (0·33)
TOTAL		31	1·81 (4·03)	—	—	0·06 (0·06)	0·19 (0·16)	—	—	—	0·03 (0·03)	—	2·10 (4·62)	2·55 (0·92)	1·97 (1·03)	2·68 (1·16)	2·55 (1·12)	1·45 (0·39)

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N of Interactn.	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
9	cluster 1	7	2·00 (2·67)	—	—	—	0·29 (0·57)	—	—	—	—	—	2·29 (5·24)	2·29 (0·57)	1·29 (0·24)	1·71 (0·24)	1·29 (0·24)	1·00 (0·00)
	cluster 2	7	2·29 (1·90)	—	0·29 (0·57)	—	0·14 (0·14)	—	—	—	—	—	2·71 (2·57)	1·86 (0·14)	2·71 (1·57)	1·57 (0·29)	2·71 (0·24)	1·00 (0·00)
	cluster 3	10	1·80 (1·51)	—	—	—	—	—	—	—	—	—	1·80 (1·51)	3·10 (0·32)	1·30 (0·46)	3·00 (0·00)	2·40 (0·27)	1·00 (0·00)
	cluster 4	3	2·33 (2·33)	—	—	—	0·33 (0·33)	—	—	—	—	—	2·67 (4·33)	4·00 (0·00)	1·00 (0·00)	4·33 (0·33)	3·00 (0·00)	1·00 (0·00)
	cluster 5	4	2·00 (0·00)	0·25 (0·25)	—	0·25 (0·25)	—	—	—	—	—	—	2·50 (0·33)	3·75 (0·25)	4·25 (0·25)	3·75 (0·92)	4·25 (0·25)	1·75 (0·25)
TOTAL		31	2·03 (1·57)	0·03 (0·03)	0·06 (0·13)	0·03 (0·03)	0·13 (0·18)	—	—	—	—	—	2·29 (2·46)	2·81 (0·83)	1·97 (1·70)	2·61 (1·18)	2·52 (0·99)	1·10 (0·09)

Table 9.17A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 9)

Teacher 9

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1 1	above average on all dimensions (5/5)	Much instructional questioning involves clusters 2 and 5; little interactior with cluster 3.
2	above average on intelligence, motivation and likeableness; talkative; and slightly below average on neat worker (0/2)	
3	quiet; average on intelligence, neat worker and likeableness; below average on motivation (4/3)	
4	slightly below average on all dimensions except likeableness which is rated averagely (1/7)	
5	below average on all dimensions (4/0)	
Term 2 1	above average on all dimensions (3/4)	Patterns difficult to distinguish; distribution of interaction quite even, though marginally less interaction with cluster 3.
2	above average on intelligence and motivation; average on neat worker; talkative (3/4)	
3	average on all dimensions though slightly above average on quietness (3/7)	

Table 9.17B

Summary of Cluster Ratings and Interaction Patterns (Teacher 9)

4	below average on intelligence and motivation; slightly below average on neat worker; quiet (1/2)	
5	below average on all dimensions, including likeableness which has little variance throughout the class (4/0)	

Cluster Membership: 6 cluster 1 pupils (1st term) are in cluster 1 (2nd term). Both cluster 2 pupils (1st term) are in cluster 2 (2nd term). 6 cluster 3 pupils (1st term) are in cluster 3 (2nd term). 2 cluster 4 pupils (1st term) are in cluster 4 (2nd term). 3 cluster 5 pupils (1st term) are in cluster 5 (2nd term). Consequently, cluster membership is quite stable over the terms.

Note: Mode analysis produced 1 cluster in both sets of data; the clusters above were taken from Ward's hierarchical analysis at the 5 cluster level.

Comment: The uneven distribution of instructional questioning where one above average and one below average group receive most interaction, seems to occur only in the first term, although the level of interaction is low in both terms.

Table 9.17B (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact.ⁿ	Rating 1 (Intelligent)	Rating 2 (Quiet)	Rating 3 (Self-Assured)	Rating 4 (Good Organiser)	Rating 5 (Well-Motivated)
10	cluster 1	4	4·25 (7·58)	—	—	0·25 (0·25)	—	0·25 (0·25)	—	0·25 (0·25)	—	—	5·00 (6·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)
	cluster 2	6	3·50 (7·50)	0·17 (0·17)	0·17 (0·17)	0·17 (0·17)	—	0·17 (0·17)	—	0·33 (0·27)	—	—	4·50 (13·10)	1·33 (0·27)	2·17 (0·17)	2·00 (0·40)	1·00 (0·00)	1·00 (0·00)
	cluster 3	9	2·67 (5·25)	0·11 (0·11)	0·44 (0·28)	0·56 (0·53)	0·11 (0·11)	0·11 (0·11)	—	0·11 (0·11)	0·78 (1·94)	—	4·89 (21·86)	2·44 (0·28)	2·89 (0·86)	2·67 (0·75)	2·33 (0·25)	2·44 (0·28)
	cluster 4	12	4·25 (4·75)	0·33 (0·61)	0·42 (0·81)	0·83 (0·33)	0·50 (1·00)	0·25 (0·20)	—	0·17 (0·15)	0·08 (0·08)	—	6·83 (9·79)	4·25 (0·57)	4·50 (0·45)	3·75 (1·11)	4·42 (0·63)	4·50 (0·64)
	TOTAL	31	3·65 (5·64)	0·19 (0·24)	0·32 (0·43)	0·55 (0·39)	0·23 (0·45)	0·19 (0·16)	—	0·19 (0·16)	0·26 (0·66)	—	5·58 (13·25)	2·74 (2·06)	3·13 (1·98)	2·74 (1·60)	2·71 (2·50)	2·77 (2·58)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact.ⁿ	Rating 1 (Good worker)	Rating 2 (Quiet)	Rating 3 (Self-Assured)	Rating 4 (Well-Motivated)	Rating 5 (Pleasant)
10	cluster 1	24	1·00 (1·39)	0·13 (0·11)	—	0·04 (0·04)	0·13 (0·20)	0·08 (0·08)	—	0·04 (0·04)	0·13 (0·11)	0·04 (0·04)	1·58 (3·64)	3·08 (0·95)	3·58 (1·91)	3·29 (0·82)	3·29 (1·26)	2·13 (0·55)
	cluster 2	7	1·43 (1·95)	—	0·14 (0·14)	—	—	—	—	0·14 (0·14)	—	0·14 (0·14)	1·86 (2·48)	1·00 (0·00)	1·86 (0·48)	1·86 (0·48)	1·14 (0·14)	1·00 (0·00)
	TOTAL	31	1·10 (1·49)	0·10 (0·09)	0·03 (0·03)	0·03 (0·03)	0·10 (0·16)	0·06 (0·06)	—	0·06 (0·06)	0·10 (0·09)	0·06 (0·06)	1·65 (3·30)	2·61 (1·51)	3·19 (2·09)	2·97 (1·10)	2·81 (1·83)	1·87 (0·65)

Table 9.18A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 10)

Teacher 10

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1		
1	well above average on all dimensions (2/2)	Slightly more instructional questioning involves clusters 1 and 4, and cluster 3 is less involved. Virtually all of the few disciplinary remarks are addressed to cluster 4 which is also involved in marginally more feedback. Cluster 3 engages in more child-initiated interaction than other clusters but the level of interaction is again low.
2	above average on all dimensions (1/5)	
3	marginally above average on all dimensions (2/7)	
4	well below average on all dimensions (7/5)	
Term 2		
1	marginally below average on all dimensions, but variance on each dimension is relatively high (11/13)	Marginally more instructional questioning involves cluster 2 but differences are difficult to identify due to the low level of interaction and evenness of distribution of interaction throughout the clusters.
2	above average on all dimensions (1/6)	

Cluster Membership: Cluster 2 (2nd term) consists of 3 from cluster 1 (1st term), 3 from cluster 2 and 1 from cluster 3. One very large cluster in the 2nd term.

Note: Mode analysis resulted in only one cluster in the 2nd term; the two clusters noted above were taken as the only 'sensible' clusterings* produced by Ward's hierarchical analysis.

* clusterings with a large number of clusters appeared to have little to distinguish one cluster from another, a high variance occurring within the clusters on most of the rating scales.

Table 9.18B

Summary of Cluster Ratings and Interaction Patterns (Teacher 10)

Comment: The uneven distribution of instructional questioning seems to occur only in the 1st term, where 2 groups (one above averagely rated, the other below) receive marginally more interaction; the below-averagely rated cluster also receives most disciplinary remarks in the 1st term. In the 1st term, clusters appear to be distributed along one overall 'good pupil' dimension.

Table 9.18B (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact.ⁿ	Rating 1 (High language ability)	Rating 2 (High arithmetic ability)	Rating 3 (Mature)	Rating 4 (Well Motivated)	Rating 5 (Serious in class)
11	cluster 1	5	4.00 (9.50)	—	—	0.20 (0.20)	—	—	—	—	—	—	4.20 (11.70)	1.40 (0.30)	2.00 (0.50)	1.60 (0.30)	1.80 (0.70)	2.20 (0.20)
	cluster 2	7	5.57 (6.95)	0.29 (0.57)	—	0.71 (2.24)	0.29 (0.24)	—	—	—	—	—	6.86 (20.81)	1.57 (0.29)	1.71 (0.24)	3.00 [illegible]	2.86 (0.14)	2.86 (0.48)
	cluster 3	13	4.08 (9.08)	0.08 (0.08)	—	0.08 (0.08)	0.15 (0.14)	—	—	—	—	—	4.38 (8.92)	3.38 (1.09)	3.62 (1.09)	3.62 (0.76)	3.77 (0.86)	3.31 (0.90)
TOTAL		25	4.48 (7.84)	0.12 (0.19)	—	0.28 (0.71)	0.16 (0.14)	—	—	—	—	—	5.04 (12.96)	2.48 (1.59)	2.76 (1.52)	3.04 (1.64)	3.12 (1.19)	2.96 (0.79)

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact.ⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5 (responsible)
11	cluster 1	7	1.71 (2.90)	—	—	—	—	—	—	0.14 (0.14)	—	—	1.56 (3.48)	2.00 (1.00)	2.29 (0.90)	1.86 (0.48)	1.57 (0.29)	1.71 (0.24)
	cluster 2	14	2.21 (4.64)	0.21 (0.34)	0.21 (0.34)	0.21 (0.34)	0.14 (0.13)	—	—	—	—	—	3.00 (8.92)	2.93 (0.84)	2.86 (0.90)	3.36 (0.40)	3.50 (0.27)	3.64 (0.55)
	cluster 3	4	2.00 (2.00)	0.25 (0.25)	—	1.00 (2.00)	1.00 (0.67)	—	—	—	0.25 (0.25)	—	4.50 (9.00)	4.50 (1.00)	4.50 (1.00)	4.75 (0.25)	5.00 (0.00)	5.00 (0.00)
TOTAL		25	2.04 (3.54)	0.16 (0.22)	0.12 (0.19)	0.21 (0.54)	0.24 (0.27)	—	—	0.04 (0.04)	0.04 (0.04)	—	2.92 (7.58)	2.92 (1.49)	2.96 (1.37)	3.16 (1.31)	3.20 (1.58)	3.32 (1.64)

Table 9.19A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 11)

Teacher 11

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1		
1	above average on all dimensions (1/4)	More instructional questioning involves cluster 2, which also receives more feedback though its occurrence is infrequent.
2	above average in language and arithmetic ability; but average on other dimensions (6/1)	
3	below average on all dimensions (5/8)	
Term 2		
1	above average on all dimensions (1/6)	Marginally more instructional questioning involves cluster 2, but differences are very small. More feedback and disciplinary remarks are addressed to cluster 3. Cluster 1 is engaged in less interaction. Interaction level is quite low.
2	average on all dimensions (7/7)	
3	below average on all dimensions (4/0)	

Cluster Membership: 3 cluster 1 pupils (1st term) are in cluster 1 (2nd term). 6 cluster 2 pupils (1st term) are in cluster 2 (2nd term). 4 cluster 3 pupils (1st term) make up the whole of cluster 3 (2nd term). Cluster membership is fairly stable.

Comment: There is evidence in both terms of a group of (mostly) girls, above average on all constructs, who engage in a less than average amount of interaction; and in the second term of a group of boys, below average on all constructs who receive an above average amount of feedback and disciplinary comments.
In both terms, the clusters appear to be distributed along one overall 'good pupil' dimension.

Table 9.19B

Summary of Cluster Ratings and Interaction Patterns (Teacher 11)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	(High Ability) Rating 1	(Well Motivated) Rating 2	(Quiet) Rating 3	(Good Mixer) Rating 4	Rating 5
12	cluster 1	4	4·75 (7·58)	0·25 (0·25)	0·50 (0·33)	0·75 (0·92)	—	—	—	—	0·50 (1·00)	—	6·75 (14·25)	1·00 (0·00)	1·00 (0·00)	4·25 (0·25)	1·00 (0·00)	—
	cluster 2	7	3·43 (1·62)	1·29 (1·57)	—	0·29 (0·24)	—	—	—	—	0·14 (0·14)		5·29 (2·57)	1·71 (0·24)	1·71 (0·24)	3·29 (0·90)	3·29 (0·24)	—
	cluster 3	4	3·25 (3·58)	0·50 (1·00)	—	0·50 (1·00)	0·25 (0·25)	0·14 (0·14)	—	—	0·25 (0·25)	0·25 (0·25)	5·00 (2·00)	4·00 (1·33)	4·00 (1·33)	1·50 (0·33)	4·25 (0·25)	—
	cluster 4	8	3·75 (7·93)	0·63 (1·13)	—	0·50 (0·57)	—	—	—	—	0·25 (0·21)	0·25 (0·50)	5·50 (20·29)	3·50 (0·57)	3·38 (0·55)	3·38 (0·55)	2·88 (0·13)	—
	cluster 5	3	2·67 (4·33)	1·33 (1·33)	—	—	0·33 (0·33)	0·13 (0·13)	—	—	—	—	4·33 (10·33)	3·33 (0·33)	3·00 (0·00)	3·33 (0·33)	4·00 (0·00)	—
	TOTAL	26	3·62 (4·65)	0·81 (1·12)	0·08 (0·07)	0·42 (0·49)	0·08 (0·07)	0·08 (0·07)	—	—	0·23 (0·26)	0·12 (0·19)	5·46 (9·53)	2·69 (1·66)	2·62 (1·53)	3·19 (1·12)	3·04 (1·16)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	(Well Behaved) Rating 5
12	cluster 1	5	1·40 (0·30)	0·40 (0·80)	0·40 (0·30)	0·20 (0·20)	0·20 (0·20)	—	—	—	0·60 (0·80)	0·20 (0·20)	3·40 (6·30)	1·00 (0·00)	1·00 (0·00)	2·00 (0·80)	1·40 (0·30)	1·20 (0·20)
	cluster 2	7	2·43 (0·62)	0·57 (1·29)	0·57 (0·62)	0·57 (0·62)	0·14 (0·14)	—	—	0·14 (0·14)	0·14 (0·14)	0·29 (0·24)	4·86 (4·48)	2·14 (0·14)	2·00 (0·00)	2·71 (0·90)	2·57 (0·29)	2·00 (0·33)
	cluster 3	13	2·00 (2·67)	0·31 (0·40)	0·54 (0·94)	0·54 (0·94)	0·15 (0·14)	—	—	0·15 (0·31)	0·08 (0·08)	0·46 (1·27)	4·23 (10·19)	3·46 (0·44)	3·62 (0·59)	3·00 (0·67)	3·31 (0·40)	2·85 (0·31)
	TOTAL	25	2·00 (1·67)	0·40 (0·67)	0·52 (0·69)	0·49 (0·68)	0·16 (0·14)	—	—	0·12 (0·19)	0·20 (0·25)	0·36 (0·74)	4·24 (7·52)	2·60 (1·25)	2·64 (1·49)	2·92 (0·99)	2·72 (0·88)	2·28 (0·71)

Table 9.20A: The clusters, cluster sizes, cluster means and variance amongst pupils in each cluster, for each behaviour category and rating scale (Teacher 12)

Teacher 12

Cluster	Summary of Ratings	Summary of Interaction Patterns
Term 1		
1	well above average on ability, motivation and good mixer; very talkative (2/2)	More instructional questioning involves cluster 1; cluster 5 is less involved. Clusters 2 and 5 receive marginally more managerial questioning but occurrence is infrequent.
2	above average on ability and motivation; average on quietness and good mixer (2/5)	
3	below average on ability, motivation (variance quite high), and good mixer; well above average on quietness (0/4)	
4	below average on ability and motivation; average on both quietness and good mixer (7/1)	
5	below average on all dimensions, though only marginally on motivation and quietness (2/1)	
Term 2		
1	well above average on ability, motivation, good mixer and behaviour; above average on quietness (3/2)	Cluster 1 is involved in slightly less instructional questioning; other interaction seems fairly evenly distributed.
2	marginally above average on all dimensions (4/3)	
3	average on quietness, but below average on all other dimensions (5/8)	

Table 9.20B

Summary of Cluster Ratings and Interaction Patterns (Teacher 12)

Cluster Membership: 1 cluster 1 pupil (1st term) is in cluster 1 (2nd term). 4 cluster 2 pupils (1st term) are in cluster 1 (2nd term). 3 pupils are common to cluster 3 (both terms). Cluster 4 pupils (1st term) are distributed throughout clusters 2 and 3 (2nd term).
All cluster 5 pupils (1st term) are in cluster 3 (2nd term). Reduction from 5 to 3 clusters between terms. Cluster membership at the 'extremes' is quite stable.

Comment: A group of pupils, perceived as able, well motivated, good mixers and talkative, receive more instructional questioning in the 1st term, but this trend does not appear in the 2nd term, and no other marked patterns of interaction occur.

Table 9.20B (cont'd)

c) Test of Statistical Significance.

In spite of the small amount of data involved, it seemed potentially informative to ascertain the degree to which different clusters engaged in different amounts of interaction in terms of a level of statistical significance. However, several factors make such a test difficult. The numbers of pupils in each cluster often differ (sometimes to a large extent), and clusters frequently have quite different variances in behaviour scores: these features contravene the assumptions of the F-test and t-test, and consequently these would appear to be inappropriate statistics for this data.

However, Gardner (1975) points out that both the F-test and t-test can in some circumstances be 'robust' in the face of these contraventions, although unequal sample sizes and unequal variances together do severely affect probability levels. Nevertheless, in the absence of any more appropriate statistic, the F-test was carried out with the clusters in each analysis on every behavioural variable, and t-tests were carried out between clusters on the amount of instructional questioning (the only behaviour with a relatively frequent occurrence). The t-tests were carried out even in cases where the F-test proved non-significant, since the circumstances under which the two tests appear to be robust are different (see Gardner, 1975, p. 48).

F-tests proved significant ($p < 0.5$) in ten cases (for full details see Appendix VIII). Table 9.21 indicates the

Term	Teacher	Interaction Category
Term 1	Probationer 1	Management Directives
	Probationer 3	Child-initiated Managerial Questioning
	Probationer 4*	Instructional Questioning
	Teacher 7*	Disciplinary Comments
	Teacher 9*	Instructional Questioning
	Teacher 12*	Management Directives
Term 2	Probationer 2	Instructional Questioning
	Probationer 4*	Individual Instruction
	Probationer 6*	Management Directives
	Teacher 11*	Disciplinary Comments

Table 9.21

Occasions where F score (Each Interaction Category Broken Down by Clusters) attained significance ($p < 0.05$, except where asterisked).

* $p < 0.01$

teachers and behaviour variables involved where F achieved significance. However, in all but two of these cases (Teacher 9 (first term) and Probationer 2 (second term)), both on the instructional questioning variable, the behaviour variable concerned is a very infrequently occurring one, the mean occurrence usually being well below 0.5 per pupil, and the significant F value has generally been achieved through this infrequently occurring behaviour being concentrated in one or two clusters. Considering the small quantity of interaction data collected, it would be unwise to attach much importance to these F values, as a larger sample of these infrequently occurring interactions may have evened out their distribution.

In the case of t-tests between clusters with respect to the instructional questioning variable, the significant differences are noted in Table 9.22.

	Teacher/Probationer	Clusters	Level of Significance ($p <$)
Term 1	Probationer 4	3 & 5	0.01
	Teacher 9	1 & 2	0.01
		2 & 3	0.01
		3 & 5	0.05
Term 2	Probationer 2	1 & 6	0.01
		2 & 6	0.01
		3 & 6	0.01
	Teacher 12	1 & 2	0.05

Table 9.22

Occasions where t-test attained significance between clusters on the instructional questioning variable.

d) Summary of Clusters and Associated Interactions.

Although the above data provides very few statistically significant results, and although there are clearly many differences amongst the teachers in terms of the individual clusters derived from their ratings and the interaction patterns associated with the clusters, there are nevertheless several common trends in the types of clusters which emerge from the cluster analysis of the teachers' ratings, and in their associated interactions.

In view of the factor analysis of teachers' ratings generally resulting in a 'good pupil' factor or in an academic and behaviour factor (see Chapter 8), it is not surprising that clusters often appear to be positioned at different points along the one 'good pupil' dimension, or within the two academic/behaviour dimensions. Some commonly occurring clusters also seem to be associated with very similar interaction patterns. In particular, the following trends occur:-

1) There is a general trend amongst almost all the teachers for girls to be better represented in the higher ability clusters and for boys to be better represented in the lower ability clusters. In some cases, a predominantly female group is rated highly on most, if not all, dimensions and sometimes particularly highly on ability and quietness dimensions; it receives a lower number of instructional questions and often is involved in very little other interaction. This pattern occurs in the first term with teachers 8 and 11 and in the second term with probationers 1 and 4 and teachers 8 and 11. A similar pattern occurs to some extent with

probationer 6 (first term) and teacher 12 (second term) though the clusters are not predominantly female.

2) Two groups, one rated above average on ability (also generally above average on motivation and behaviour) but average or below on quietness, and the other rated below average on ability and on most other dimensions, receive a large proportion of instructional questioning. This pattern occurs in the first term with probationer 2 and slightly with probationer 3, with teachers 7, 8, and 9; and teacher 10's results show a similar pattern but the above average group is rated as quiet; in the second term, a similar pattern occurs with probationers 2* and 5, and with teachers 7 and 8.

3) In addition to those low-ability clusters which accompany a higher ability cluster where both clusters are engaged in a large amount of instructional questioning, there are also cases where clusters rated well below average on ability and motivation and usually below average on all other dimensions, and comprising mostly of boys are engaged alone in a large proportion of instructional questioning. This pattern occurs with probationers 1, 4 and 6, in the first term, and probationers 4, and to some extent 1, in the second term. In several cases, similar clusters typically rated poorly on all dimensions and comprising more boys than girls receive

* Probationer 2 (2nd term) has two groups, one rated fairly averagely on most dimensions, the other below average on all dimensions - this may or may not be a reflection of this same pattern.

most disciplinary interactions, and also frequently receive a large proportion of feedback and managerial questions. This pattern occurs in the first term with probationers 2, 3, 5 and slightly with probationer 6, and teacher 10; and in the second term with probationers 2 and 4 and teacher 11.

4) In the case of some probationers, especially in the first term, (e.g. probationers 2 and 3) there appears to be a slight trend for one cluster (usually rated well below average on most dimensions) to engage in an above average amount of child-initiated interaction. There also seems in some cases to be a reasonable correlation between the amount of child-initiated interaction in which a pupil engages and the amount of teacher-initiated interaction in which he/she is engaged. Table 9.23 indicates the product moment correlations for each class between the combined number of teacher-initiated interactions and the combined number of pupil-initiated interactions for each pupil. Although more probationers in the first term have significant correlations (consonant with the notion that probationers are more reactive than experienced teachers), if we exclude probationer 5 and teacher 9 in the first term, and teacher 11 in the second, all of whom are associated with very low levels of child-initiated interaction, then in most cases where a reasonable level of child-initiated interaction occurs, there is a significant correlation with teacher-initiated interaction for both probationers and teachers. No causal connection can be deduced from this; whether much pupil-

	Term 1	Term 2
Probationer 1	0.33	0.65
	$p<0.05$	$p<0.01$
Probationer 2	0.43	-0.19
	$p<0.05$	n.s.
Probationer 3	0.30	0.01
	$p<0.05$	n.s.
Probationer 4	0.50	0.51
	$p<0.01$	$p<0.01$
Probationer 5	-0.09	0.10
	n.s.	n.s.
Probationer 6	0.51	0.41
	$p<0.01$	$p<0.05$
Teacher 7	-	0.29
		n.s.
Teacher 8	0.37	0.34
	$p<0.05$	$p<0.05$
Teacher 9	-0.01	-
	n.s.	
Teacher 10	0.39	0.45
	$p<0.05$	$p<0.05$
Teacher 11	-	-0.04
		n.s.
Teacher 12	0.43	0.46
	$p<0.05$	$p<0.05$
Mean corr. for Probationers	=0.33	0.25
Mean corr. for Teachers (Exp)	=0.29	0.30

Table 9.23

Product-Moment Correlation Coefficients for Teacher-Initiated with Pupil-Initiated Behaviours in Terms 1 and 2 initiation of interaction encourages more teacher-directed interaction or vice versa, or both, or whether this finding is produced by other factors is open to speculation. However, since the teacher is in a position of authority in the classroom and normally exerts some degree of control over classroom interaction, it would seem that where the teacher allows the pupils to initiate interaction the teacher reciprocates interaction with the initiators.

5) The degree of stability of the membership of the clusters between terms varies amongst the teachers, but overall it appears to be quite stable.

Generalisations concerning interactions with particular types of cluster are difficult to make. In some cases the low level of recorded interaction may have made patterns imperceptible; in others, patterns may be obscured by the individual differences amongst teachers in the ways in which they have rated pupils in the clusters. Even with some of the patterns that are discernible, the high variance in the number of interactions engaged in by pupils suggests the possibility that the interaction patterns are only typical of a few pupils within the cluster, due perhaps to the teacher having more firmly 'stereotyped' these pupils, or to a chance prominence resulting from the relatively small sample of classroom interaction taken here.

In spite of the considerable variation amongst teachers in terms of their clusters and associated interaction patterns, some patterns of interaction have been identified in a relatively large proportion of the sample in both first and second terms. Table 9.24 summarises the cases where teachers can be found to have clusters corresponding to the quiet intelligent girls cluster, the able but talkative, and below average ability clusters, and the low-ability, poorly motivated boy cluster, and the table indicates in which cases the associated interaction patterns also occur. The patterns for some teachers are complicated by other issues: for example, in some instances, more than one cluster satisfies the conditions for the common cluster type, in others the same cluster may satisfy the criteria for both the below average ability cluster and the low ability boy cluster; in two cases, of the two clusters which best fit the rating criteria only one is included in the two clusters which best fit the associated interaction pattern. Table 9.24 lists all the clusters which fit the specified criteria and the number of these clusters which exhibit the expected interaction pattern.

For the reasons already noted, firm generalisations concerning the differences in interaction patterns between probationers and experienced teachers cannot be made, but it would ceem that the previously-described clusters commonly occur, and in 65% of cases for probationers and 82% of cases for experienced teachers the typical interaction patterns are associated with the clusters (i.e. relatively little interaction with quiet intelligent girls, relatively large amounts of instructional questioning to able, talkative, and

	CLUSTER TYPE N. of Teachers with a high-ability quiet girl cluster.	ASSOCIATED INTERACTION N. of Teachers where high-ability quiet girl cluster receives little interaction.	CLUSTER TYPE N. of Teachers where there are two groups one rated above average ability and average, or below on quietness, the other rated below average ability.	ASSOCIATED INTERACTION N.of Teachers where both these clusters engage in a large amount of Instructional questioning.	CLUSTER TYPE N. of Teachers with low-ability, poorly-motivated, predominantly boy cluster, also rated poorly on other dimensions.	ASSOCIATED INTERACTION N. of Teachers where low ability boy cluster receives most disciplinary remarks and/or a high proportion of instructional questioning
Probationers (Term 1)	P4(1) N=1	N=0	P2(1,3) P3(1,3) P5(2,3) P6(1,4) N=4	P2(1,3) P3(1,3) N=2	P1(4)P6(4) P2(3) P3(3) P4(4,5) P5(3) N=6	P1(4) P6(4) P2(3) P3(3) P4(4,5) P5(3) N=6
Probationers (Term 2)	P1(2) P2(1) P4(1) N=3	P1(2) P4(1) N=2	P2(2,6) P3(1,3) P5(2,3) P6(2,4) N=4	P2(4,6)* P5(2,3) N=2	P1(3) P2(6) P3(3) P4(3,4) P6(4) N=5	P1(3) P2(6) P4(3,4) N=3
Experienced Teachers (Term 1)	T8(1) T10(2) T11(1) N=3	T8(1) T11(1) N=2	T7(1,5) T8(2,4) T9(2,5) T12(2,4) N=4	T7(1,5) T8(2,4) T9(2,5) N=3	T8(4) T9(5) T10(4) T12(4,5)N=4	T8(4) T9(5) T10(4) N=3
Experienced Teachers (Term 2)	T8(1) T11(1) N=2	T8(1) T11(1) N=2	T7(1,4) T8(2,3) T9(2,5) N=3	T7(1,5)* T8(2,3) N=2	T8(2) T9(5) T11(3) N=3	T8(2) T11(3) N=2

Table 9.24

Summary of the Number of Teachers with Particular Cluster Types and the Number of These Teachers whose Classroom Interactions Exhibit the Associated Patterns (Teachers with the noted clusters are listed, with relevant cluster(s) in brackets; N = the number of teachers in each category)

* slightly different clusters best fit the cluster types, than the clusters which best fit the associated interaction pattern.

below average ability groups, and most disciplinary remarks, and/or a large amount of instructional questioning, addressed to the low ability poorly motivated boy clusters*). Probationers, in both terms, more frequently have a low ability boy cluster, generally rated poorly on other constructs, and more often direct disciplinary remarks and/or instructional questioning towards its members; probationers also less frequently have a high ability girl cluster: however, these differences are slight and it is clear that all three cluster - interaction patterns are fairly common amongst both experienced teachers and probationers.

It is interesting to note that some cluster interaction patterns which one might expect, in fact quite rarely occurred (e.g. a quiet, intelligent cluster, possibly seen as 'teacher favourites', engaged in much teacher interaction (found with probationer 5, term 1), and a low ability, quiet, quite hard-working group, possibly seen as 'deserving of attention', engaged in a large amount of instructional questioning (found with teacher 7, term 1)).

* The proportion of experienced teachers (and probationers in the 2nd term) addressing a relatively large number of disciplinary comments to the cluster of low ability boys is low and may possibly be due to teachers making a conscious effort not to reprimand the same boys repeatedly, or to observer influence on classroom interaction, teachers perhaps being less willing to reprimand in the observer's presence.

3) Summary of Total Results relating to Classroom Interactions and their Relation to Teachers' Perceptions of Pupils.

In analysing the nature of the recorded classroom interactions, it was found that experienced teachers more frequently engaged in instructional questioning, whereas in probationers' classrooms more child-initiated interaction was recorded, reaching the level of statistical significance in the case of child-initiated instructional questioning. It was suggested that Brophy and Good's "proactive/reactive" distinction might be an appropriate way of conceptualising the difference between experienced teachers' and probationers' classroom interactions; the former very much initiating and controlling the interaction, the latter responding to approaches from the children. From the researchers' recollections of the classrooms observed, it seems that this difference is possibly not due simply to experienced teachers preventing child initiation: sometimes, the experienced teachers anticipated problems and difficulties before the children themselves encountered them, hence removing the need for as much child-initiated interaction.

It was also found that when pupil-initiated interaction occurred, it generally correlated significantly with teacher-initiated interaction, suggesting that teachers more often interacted with pupils who themselves initiated contacts.

In the cluster analysis of teachers' ratings it was found that generally three, four or five clusters resulted. The probationers in the first term tended to have fewer clusters and tended to have more pupils in their largest cluster: this is consistent with the hypothesis that probationers at the beginning of their teaching career make fewer discriminations amongst their pupils than do experienced teachers.

With the exception of one probationer, there also tended to be the same or a smaller number of clusters in the term 2 analysis, and the same or larger number in the largest second-term cluster for both experienced teachers and probationers: this was tentatively interpreted in terms of the more extremely perceived pupils appearing less extreme after the teachers' knowledge of them had increased, coinciding with a general decrease in mean and especially variance in the second term rating scales.

In investigating patterns of interaction with particular clusters, it was clear that the ratings of the clusters and their associated interaction patterns were virtually unique to each teacher. However, three regularly occurring patterns were found. A cluster of quiet, intelligent girls engaged in little interaction; two groups, one able and talkative, the other less-able, received relatively large proportions of instructional questioning; and a cluster of low-ability poorly-motivated boys, generally rated poorly on other constructs as well, received a large proportion of disciplinary remarks and/or instructional questioning. These patterns occurred with both probationers and experienced teachers, and there is no evidence to suggest that for experienced teachers the patterns are any more frequent or any more marked in terms of the differences in interaction in which different clusters were engaged. In fact, the occurrence of a low-ability boy cluster receiving a large amount of instructional questioning was more frequent amongst the probationers, although the occurrence of the quiet intelligent girl cluster engaging in little interaction was marginally less frequent amongst them.

Tests of statistical significance were not ideally appropriate for the data, but it was thought worth investigation to assess whether different clusters were in fact engaging in significantly different behaviour. F - and t - tests were carried out but indicated relatively few significant differences. However, it is unknown to what extent the lack of significance could be due to the inappropriateness of the statistical tests, or to the fact that the amount of interaction recorded is relatively low and hence differences in interaction level may not be very pronounced.

In terms of the initial hypotheses, it seems there is some evidence, although it cannot be demonstrated to be at the level of statistical significance, to support hypothesis 3 (viz. there are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them), but hypothesis 4 (viz. these associations are stronger amongst experienced teachers than probationer teachers) receives virtually no support.

CHAPTER 10 - TEACHERS' REASONS FOR THEIR CLASSROOM BEHAVIOUR, AND THE RELATIONSHIP OF THESE REASONS TO TEACHERS' PERCEPTIONS OF PUPILS AND TO PATTERNS OF CLASSROOM INTERACTION

A. Summary of Relevant Hypotheses, Research Design and Data Analysis

Hypotheses

5) Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour.

6) The reasons, given by experienced teachers, which account for their classroom interactions, are different from those, given by probationer teachers, which account for their classroom interactions.

Research Design

During the second half of the second term, a tape recording was made of a lesson, given by each teacher, in a previously agreed subject area. Another tape recording was made, approximately one week later, of a lesson in the same subject area, and this was replayed to the teacher shortly after the lesson to stimulate a 'running commentary'. The teachers were given the instruction: "I would like you to listen to the tape recording of your lesson and try to think of what was going on in your own mind while you were teaching. If you are aware of your reasons for doing what you did, I would like you to tell me. You can stop the tape recorder at any time when you want to explain something." The teachers' comments were noted. Classroom interaction data was collected as noted in Chapter 9.

Analysis

The number and nature of the reasons which teachers gave for their behaviour were first analysed and the proportion of reasons which suggested pupil-differentiations was calculated. The nature of the pupil differentiations and the teacher behaviours with which they were associated in the teachers' reasons were also investigated for each teacher. The reasons which teachers gave were then categorised, when possible, according to the function which they indicated was served by the teacher's behaviour: six categories were developed to account for the majority of functions suggested by teachers. It was then predicted that teachers, whose behaviours fulfilled certain functions which involved the differentiation amongst pupils using particular constructs, would display certain patterns in their classroom interaction, and would perhaps also tend to adopt certain constructs in their assessments of pupils. The occurrence of such patterns was investigated in the interaction and construct data which had been collected in the second term, and a Fisher exact probability test was employed to assess the extent to which the giving of different reasons was associated with different interaction patterns and constructs.

Validity of Teachers' Stimulated Commentaries.

It was originally intended that the reasons given by teachers during stimulated commentaries could be checked against a similar lesson, tape-recorded one-to-two weeks previously to assess whether the teachers did in fact behave regularly in the way they explained during the commentaries. For example, if a teacher claimed, as in one of the pilot studies, that she asked the "quick, eager people" at the beginning of the lesson to get the lesson going, this 'strategy' could be checked, assuming similar lessons follow similar formats, by examining whether the same group of children were asked questions at the beginning of the first tape-recorded lesson. However, the nature of the teachers' reasons, and the relatively small sample of interaction occurring during the lessons, made it virtually impossible to check all but a very small number of reasons which generally concerned the structure of the lesson (e.g. getting ideas at the beginning of a creative writing lesson, reading an interpretation passage twice, or involving many pupils in oral arithmetic examples after a new process has been explained). Appendix IX outlines the format of the first tape-recorded lessons, and, although a meaningful statistical measure of similarity would be virtually impossible to achieve, it can be clearly seen that the lessons generally followed a similar form to those during which the teachers gave commentaries (see Appendix X).

Reliability of Coding Teachers' Reasons.

In coding reasons as involving pupil-differentiations or not, and in coding the behaviours occurring at the time of the reasons as question, direction or reaction, and in coding the functions which the teachers' behaviours appeared to serve (as pedagogic, pacing, checking understanding, balance, attention or involvement), few differentiations were involved, and with the exception of the coding of the functions of teachers' behaviours, relatively little inference was required. Inter and intra-coder reliability was above 95% in all cases: all twelve commentaries were coded by the researcher on two occasions, one month apart, and on one occasion by another coder.

B. Teachers' Reasons for their Behaviour, and the Relationship of these Reasons to Teachers' Perceptions of Pupils and to Patterns of Classroom Interaction: Results.

1) An Analysis of the Nature of Teachers' Reasons for their Behaviour.

The reasons given by the teachers during the stimulated commentaries are noted in Appendix X which also includes a brief summary of the activity occurring at the time of (or immediately preceding) each comment, and a brief outline of the classroom activity. It was found in the pilot studies (see Chapter 5) that teachers' reasons for their behaviour frequently related to individual differences amongst the pupils; since this assumption underlies hypotheses 5 and 6, the extent to which this was true of the data collected in the twelve commentaries was first of all assessed.

The number of reasons given by each teacher, and the number and percentage of those reasons which suggested that the teacher behaved in a particular way because of her awareness of particular individual differences amongst pupils (i.e. selectively directed her interaction with pupils, depending on her perception of them, e.g. "Frankie's a good reader so I chose him to start") is noted in Table 10.1. The reasons classified as pupil-differentiating are noted in Appendix X.

Some of the statements made by teachers were worded as if they were comments rather than reasons (e.g. "That's good for him" or "He didn't express it well either") but since the teachers were instructed to give reasons, where possible, for their behaviour, it was assumed that all comments made by the teachers probably constituted some form of justification for an action the teacher took during the lesson (this action could vary from launching into a short period of individual instruction, to the asking a question of a particular pupil, or the saying of "good"), although sometimes such justification had to be partly, and possibly wrongly, inferred. Some questions were addressed to pupils because the teacher hadn't recently contacted them, (e.g. "Asked Lorraine because I hadn't asked her before"); and probationer 4 was influenced in his questioning of pupils by their seating

Teacher	Total N. of Reasons	N. of Child-Differentiating Reasons	$\frac{\text{col } 2}{\text{col } 1} \times 100\%$	
Prob. 1	8	3		37.5%
Prob. 2	24	11		45.8%
Prob. 3	11	8		72.7%
Prob. 4	11	11		100.0%
Prob. 5	5	0		0.0%
Prob. 6	14	7		50.0%
Teach. 7	14	9		64.3%
Teach. 8	4	1		25.0%
Teach. 9	4	1		25.0%
Teach. 10	9	4		44.4%
Teach. 11	4	3		75.0%
Teach. 12	15	12		80.0%
Mean N. for Probationers	12.2	6.7	Mean percentage for Probationers	51.0%
Mean N. for Experienced Teachers	8.3	5.0	Mean percentage for Experienced Teachers	52.3%

Table 10.1

The Total Number of Reasons given by Teachers During the Stimulated Commentaries and the Number and Proportion of Those which Differentiated amongst Pupils.

position (e.g. "Taking someone at the front to balance"): although these distinctions amongst the pupils are different from those concerned with ability or whether the child was day-dreaming, they are still differentiating amongst pupils and seem likely to influence the distribution of classroom interactions, consequently they are included here as pupil-differentiating and treated later as a special case concerning pupils' 'participation level'.

As can be seen from Table 10.1, the experienced teachers have given fewer reasons than the probationers for their behaviour, three experienced teachers giving only four reasons each during tape recorded lessons lasting about twenty minutes. This trend would be expected, however, if experienced teachers' behaviour was more automatised and hence less consciously performed. The number of reasons given by individual teachers ranges from 4 to 24, the proportion of these which are pupil-differentiating also varies amongst teachers from 0% to 100%, although on average, for both experienced teachers and probationers, the mean proportion of pupil-differentiating reasons is just over 50%.

Since it is the behaviours justified by pupil-differentiating reasons which are most likely to account for the differences in the distribution of interaction found amongst the pupils, the nature of the teachers' behaviours (e.g. question, direction) and the nature of the pupil differentiations (e.g. ability, quietness) were further examined to identify possible patterns in the teachers' behaviour associated with particular pupil attributes. The distinctions made amongst the pupils could be classified into the broad categories of high ability, low ability, inattention (including being noisy at inappropriate moments) and the child's participation level (how often the child engaged in interaction with the teacher). These categories appeared to account for a high proportion of the pupil attributes mentioned in the teachers' reasons for their behaviour; they also involved the constructs of ability and quietness which corresponded to the areas where differences were found between clusters that tended toward different characteristic interaction patterns (see chapter 9).

The ability categories were used to include references to both specific and general abilities (e.g. "those with good ideas", "a good reader" and "the top people" were all taken to refer to high ability; "a poor one", "very slow" and "those who have difficulty with spelling" were taken to refer to low ability): this broad use of the term ability was essential in order to form any generalisations at all from such a small sample. Some degree of inference was sometimes required to enable a differentiation to be categorised; the context of the teacher's comment could sometimes aid categorisation. For example, "That's good for Donald" was understood to indicate the teacher's awareness of Donald's low ability since the question asked of Donald was one of the simplest ones of the whole lesson (viz. to convert 5% to a fraction, compared with other questions requiring pupils to convert 35%, $2\frac{1}{2}$%, $7\frac{1}{2}$% etc. to fractions where no pupils appeared to be having difficulty answering them). Difficulties sometimes arose concerning comments relating to the child's participation level, when it appeared that the teacher was attributing blame for the lack of participation upon the pupil (e.g. "I asked her because she hadn't got her hand up and most of the others had"): these differed from comments such as "Taking someone at the front to balance", and where it seemed reasonably clear that a child was engaged in interaction because the teacher appeared to think he or she was not making the effort to participate, such comments were categorised as distinguishing inattention, which they seemed more closely to resemble, rather than participation.

The teachers' behaviours which accompanied the pupil-differentiating reasons in the commentaries could be classified into the areas of questioning (the questions asked always related to instruction; and the category was used to include the teacher asking a pupil to answer after addressing a question to the class and waiting for hands to be raised), direction (such as directions to read, or directions to look back in the book) and reaction (this generally referred to the teacher saying "good" after an answer from a pupil). These categories corresponded to the interaction schedule categories Q_I D_M and F respectively. Only two disciplinary remarks occurred (Probationer 2 and Teacher 12) and due to their small number these were categorised here with Direction; periods of explaining and questioning (Teacher 11) were categorised, again due to their infrequent occurrence, as questioning: this enabled a simple classification of behaviour to be carried out with very little inference, which could then be cross-tabulated with the pupil distinctions that the teachers reported during their commentaries.

Appendix XI presents tables indicating the distinctions made and behaviours engaged in by each teacher. A summary of these statistics for probationers and experienced teachers is presented in Table 10.2 where it can be seen that similar trends appear for both samples. Pupil-differentiating reasons were given most frequently for questioning behaviour; the experienced teachers, however, also gave a larger number of pupil-differentiating reasons for directive behaviour (as one might expect if they were more 'proactive'); very few differentiations were involved in reactive behaviour (again one might expect this due to the simple nature of the reactions).

Low ability was the most frequent pupil differentiation for both experienced teachers (46.7%) and probationers (32.5%). High ability was also a frequent differentiation (23.3% for the experienced teachers, 25.0% for the probationers). Probationers made more inattention differentiations (17.5% compared to the experienced teachers' 3.3%) which coincides with their apparently greater concern with classroom behaviour in their assessments of pupils (see chapter 8); and with both sets of teachers just under one-sixth of all differentiations

Probationers

	High Ability	Low Ability	In-attention	Child's Partici-pation level	Other	Row Totals
Direction	1(2.5%)		1(2.5%)			2(5.0%)
Question	9(22.5%)	11(27.5%)	6(15.0%)	6(15.0%)	4(10.0%)	36(90.0%
Reaction		2(5.0%)				2(5.0%)
Column Totals	10(25.0%)	13(32.5%)	7(17.5%)	6(15.0%)	4(10.0%)	40

Experienced Teachers

	High Ability	Low Ability	In-attention	Child's Partici-pation level	Other	Row Totals
Direction	3(10.0%)	3(10.0%)	1(3.3%)			7(23.3%)
Question	4(13.3%)	10(33.3%)		4(13.3%)	4(13.3%)	22(73.3%
Reaction		1(3.3%)				1(3.3%)
Column Totals	7(23.3%)	14(46.7%)	1(3.3%)	4(13.3%)	4(13.3%)	30

Table 10.2

A Crosstabulation of the number and type of distinctions amongst pupils made by teachers during stimulated commentaries v. the teacher behaviour engagedin at the time the distinction was made.

concerned the children's participation levels. A small proportion of 'other' distinctions (e.g. pupil absence) were also made by both experienced teachers and probationers.

In this sample, instructional questions appear to be associated with pupil differentiations more often than any other teacher behaviour and constitute the only behaviour category in which both experienced teachers and probationers associated a high proportion of pupil differentiations. Instructional questioning was also the most commonly recorded category in the interaction data collected from these classrooms (see Chapter 9) and tended to suggest differences in the interactions engaged in by different clusters. Consequently, it was anticipated that examining the reasons which teachers gave for their pupil-differentiating instructional questioning might provide explanations for patterns of classroom interaction, and that these reasons might possibly differ between experienced teachers and probationers. As noted earlier, however, the teachers' 'reasons' given during the running commentaries did not always reflect any very apparent reasons for their behaviour (e.g. "Tony is one of the poorer ones again" or "I generally chose the children with good ideas"): such comments do not provide a very explicit explanation of the teachers' behaviour since they do not state the function or purpose it serves the teacher. Occasionally, however, the function or purpose of behaving in a particular way was stated, and on some occasions it could be reasonably inferred from earlier comments.*

Probationer 1, for example, explained at the beginning of her commentary on a creative writing lesson that she was trying to get ideas for the whole class and later said that she generally chose children with good ideas: this suggests that asking particular children was a significant part of the lesson and served what might be termed a pedagogic function. Probationer 1 also asked two questions whose function appears to be to curb inattention (e.g. "He was making a noise so I got him to answer").

Probationer 2, in an interpretation lesson also appears to ask questions to curb inattention (e.g. "I asked Martin first of all because he wasn't thinking much"). The questions which Probationer 2 addressed to lower ability children seem to enable the teacher to check that they have understood (e.g. "If the poorer ones have their hands up, I prefer to ask them to see if they understand"). On two occasions, Probationer 2 showed that she was conscious of the speed of the lesson ("I started to read because I thought they were getting restless and taking too much time" and "They call out a lot but I don't tell them off because it slows things down"); in two cases where high ability pupils were asked questions, the lesson was going slowly (on one occasion, the boy asked previously didn't know the answer and a boy who was "first

* Appendix X indicates the functions, where these are apparent, of the behaviours associated with pupil differentiations.

with his hand up and gives clear answers" was then chosen; on the second occasion the teacher knew that the girl she asked was the only one who had looked for the answer), but the possible fact that these pupils were asked to speed up the lesson, although a likely inference, was not explicitly stated. In one case where a girl who "doesn't often answer" was asked a question, the function seems again to be to check understanding or memory ("I wanted to know if she'd remembered").

Probationer 3 clearly stated her reasons for asking high-ability children at the beginning of the lesson: "I was asking the people who knew the answers, then on to people who didn't know once there was a steady stream". On two occasions, she also asked a top-group pupil because "I thought I was ignoring the top people". Another pupil who rarely volunteered and a girl who hadn't been asked a question were also given questions apparently to balance out the classroom interaction, (e.g. "Asked Lorraine because I hadn't asked her before"). A girl who had been absent was also questioned to check her understanding ("to see if she was following it yet"), as was another girl whom the teacher thought had not understood.

Probationer 4 also appears to address questions to able pupils to start the lesson and was aware of this on several occasions (e.g. "To get the lesson started - he's good at arithmetic" and "Gary is good - gets the lesson going"); later in the lesson, Gary was again brought in to answer a question which another pupil had struggled with and answered wrongly. Inattentive pupils were also asked questions to curb their inattention (e.g. "Asked Graham to wake him up. He's a day dreamer"). On two occasions, pupils sitting in different parts of the group appear to have been asked questions to balance out the questioning, i.e. to even out the participation level, (e.g. "Taking someone at the front to balance"). Low-ability children were also frequently asked questions but the function of this was never made clear.

Probationer 5 does not appear, from her commentary, to have taken part in any questioning which required pupil differentiation.

Probationer 6, in a history project lesson, asked questions to curb inattention and to develop interest in those who didn't normally express any (e.g. "I'm asking people who don't normally answer and aren't normally interested" and later, "I'm asking mostly people who aren't interested - they're either not paying attention or they need reinforcement"). Several questions were also asked for quite individual reasons (e.g. "I asked Janice about the scars because she's very fashion conscious").

Teacher 7 asked several questions of low-ability children; in one case to give a low-ability boy "the chance to get it right"; in other cases seemingly to clear up anticipated misunderstandings, to check understanding or to lead into a period of instruction (e.g. "I knew she didn't understand what 'it' was and I wanted her to work it out for herself").

Teachers 8 and 9 did not engage in questioning which involved pupil differentiations, although in both cases they made a direction involving pupil differentiation concerning low and high ability distinctions respectively.* Teacher 9 explained some of her questioning in terms of a point which she wished to elicit from the children, but no pupil differentiations were made, and when asking several questions of the pupils the teacher commented, "I was bringing as many children into it as possible."

Teacher 10 similarly explained that in asking a series of mental arithmetic questions she was "involving as many as possible to see how many of them know". The individual questions asked by the teacher tended to be accompanied by comments on the pupils, rather than reasons (e.g. "That's good for Donald"), but such comments, combined with the observation that the easier questions appear to have been asked of the lower-ability children would suggest that the teacher may have been matching the difficulty of the questions to the ability of the child chosen to answer. However, the teacher never explicitly stated this, and other than aiming for class involvement, the only reason given

* Teacher 7, incidentally, who made most of the recorded directions involving pupil differentiation, also appeared to make ability distinctions in some of her directions (e.g. "I wouldn't choose a child who is poor at reading").

for her questioning was to check whether they understood.

Teacher 11, spent a large proportion of her time with a low-ability group, and explained her questioning and instruction in terms of "These are poor ones, they need to be helped quite a bit". No further reason for pupil-differentiating questions was offered.

Teacher 12, like probationers 3 and 4, asked certain able pupils at the beginning of the lesson "to get things going, to get a good start". He also asked questions to involve others (e.g. "got to ask him something to get him involved", "wanted to bring him in, he hasn't said anything"), and was conscious of attempting to balance his interaction between the boys and girls, although he also explained that he went back to the boys when his questions weren't answered correctly, because "the boys seem to pick up more small detail".

Several of the functions which the teachers' questions appear to serve are common amongst the sample. In fact, the large majority of the reasons given by teachers can be classified as serving one of the following functions: Pedagogic (concerned with the form of the lesson e.g. "I generally chose the children with good ideas"), Attention (concerned with maintaining attention e.g. "He was making a noise so I got him to answer"), Pacing (concerned with starting the lesson flowing and keeping it flowing, e.g. "I was asking the people who knew the answers, then on to people who didn't know, once there was a steady stream"), Balance (concerned with an even distribution of interaction e.g. "Wanted to bring him in, he hasn't said anything"), and Checking Understanding (concerned with whether the pupil(s) have understood e.g. "I knew she wasn't very sure about it so I asked her"). One other function which was mentioned by two teachers in their commentaries but which seemed to differ from the other functions, in that it did not relate to any pupil distinctions, was classified as Involvement (concerned with involving as many pupils as possible): this function was included in the analysis since its use implied a particular pattern of classroom interaction which could be checked. These areas seemed to account for the functions explicitly mentioned by teachers. Some teachers, however, also seemed to ask questions which served a matching function - for example, asking low ability pupils an easy question "to give them the chance to get it right" (Teacher 7), or of being aware of the difficulty of the question and the estimated ability of the pupil (e.g. "Didn't expect Ronnie to get that but I wanted to see if he knew" - Teacher 10). Teacher 7 also allowed a pupil a longer time to answer because the question was thought to be difficult for her. However, indications of matching didn't often appear in teachers' comments, and although it probably occurred, matching was never explicitly stated as a function or purpose of a question. It also seemed doubtful whether this awareness would result in any particular patterns in the quantitative distribution of classroom interaction although it would clearly influence the nature of the interaction directed to different children (e.g. the difficulty of the question): consequently a matching function was not considered in the analysis.

It would seem from the summary in Table 10.3, where the teachers' reported functions and pupil distinctions have been tabulated, that certain pupil distinctions tend to accompany particular functions of questions. For example, maintaining attention was frequently given as a reason for asking questions of inattentive pupils (Probationers 1, 2, 4, and 6). Pacing a lesson was given as a reason for asking high-ability pupils (Probationers 2, 3, and 4 and Teacher 12); balancing out the classroom interaction was also given by three of the same teachers as a reason for asking pupils who had low participation levels (Probationers 3 and 4 and Teacher 12). Checking Understanding was always given as a reason for asking low ability pupils except for one occasion when it was associated with a pupil having a low participation level (mentioned by four probationers and two teachers). Pedagogic reasons were given for questioning high ability pupils by Probationer 1 and for questioning low ability pupils by Teachers 7 and 11. The function of involving as many pupils as possible was mentioned by Teachers 9 and 10.

Instructional questions which serve the function of maintaining attention only appear in probationers' commentaries. Similarly, questions which serve pacing and balance functions occur with three probationers and the one teacher with only one year's teaching experience and both functions always occur together, except in the case of Probationer 2 where no

TEACHER	PUPIL DIFFERENTIATION	FUNCTION
Probationer 1	High Ability	Pedagogic
	Inattention	Attention
Probationer 2	Inattention	Attention
	Low Ability	Checking Understanding
	Low Participation Level	Checking Understanding
	High Ability	Pacing
Probationer 3	High Ability	Pacing
	Low Participation Level	Balance
	Low Ability	Checking Understanding
Probationer 4	High Ability	Pacing
	Inattention	Attention
	Low Participation Level	Balance
	Low Ability	Checking Understanding
Probationer 5	-	-
Probationer 6	Inattention	Attention
	Low Ability	Checking Understanding
Teacher 7	Low Ability	Pedagogic
	Low Ability	Checking Understanding
Teacher 8	-	-
Teacher 9	-	Involvement
Teacher 10	-	Involvement
	Low Ability	Checking Understanding
Teacher 11	Low Ability	Pedagogic
Teacher 12	High Ability/boys	Pacing
	Low Participation Level	Balance
	Pupils' Sex	Balance

Table 10.3.

The Pupil-Differentiating Questions Asked by Teachers: the Pupil Differentiations made and the Apparent Function of the Question where Identifiable.

balance reasons were given. Checking understanding functions appear in the case of four probationers and two experienced teachers. All of the probationers who reported pacing reasons also reported checking understanding reasons, leaving Teacher 12 the only case where pacing occurred without checking understanding. The two experienced teachers whose questions appear to have a checking understanding function (Teacher 7 and 10) were also the two teachers who seemed to be making some effort to match the difficulty of the question to the ability of the pupils - one could speculatively suggest that matching is a more elaborate version of the checking understanding function. Involvement functions were mentioned only by experienced teachers, and pedagogic functions were mentioned by two experienced teachers and one probationer, where in the case of the probationer the function consisted of getting ideas from certain imaginative children, and in the case of both teachers, instructing low-ability pupils.

Some teacher directions also appeared to serve a similar range of functions: pedagogic (Teachers 7 and 8) and attention (Teacher 12), but these were omitted from the analysis due to the low level of recording of directive behaviour in the collection of classroom data and consequently the impossibility of checking predictions concerning classroom interactions of this form.

There do appear to be some general patterns of teachers' questioning, associated with particular pupil differentiations, which serve similar functions for several teachers. However, it is unknown whether, for individual teachers, these behaviours and the functions which they appear to serve are regularly occurring, routine parts of their classroom activity, since one relatively short running commentary is hardly sufficient evidence on which to base such a decision (the methodological issues involved here are raised in Chapter 3).

Nevertheless, in order to test the original hypotheses 5 and 6, it is assumed that, since the recorded lessons were similar to 'normal' classroom lessons, where teachers have given particular reasons for their behaviour it is more probable that these behaviours will have occurred more frequently in their classes for the same reasons. Consequently, it was predicted that teachers giving pacing and checking understanding reasons for questioning would be better represented in the sample of teachers, identified in Chapter 9, who have one high-ability (also described in Chapter 9, as at least averagely talkative) and one low-ability cluster of pupils engaging in a large amount of instructional questioning; teachers giving attention reasons for questioning would more often have a cluster of poorly-motivated pupils engaging in a large amount of instructional questioning; and teachers giving balance and involvement reasons would have more evenly distributed interaction. It was anticipated that some of the commonly-occurring patterns of interaction noted in Table 9.24 might be explained in terms of teachers' reasons for their behaviour. The pedagogic reasons given by teachers for their questioning, however, seem to be peculiar to certain subject matter (e.g. asking children with good ideas during a creative writing lesson), and although Appendix IX does suggest that teachers may teach lessons in the same subject area in similar ways, predictions could not be made about patterns to be found in the interaction data collected across subjects.

One might also expect to find certain constructs to be associated with particular reasons given by teachers for their behaviour, since some constructs would be more useful than others in identifying specific pupil groups, e.g. motivation and quietness constructs would probably be more important to a teacher concerned with maintaining pupil attention, ability constructs might be more useful to a teacher concerned with pacing a lesson and checking pupils' understanding. Consequently, the constructs used by teachers were also examined in an attempt to identify such patterns.

In the following analysis, results are abstracted from the cluster analysis of teachers' ratings of pupils in the second term, and their associated interaction patterns (Tables 9.9 - 9.20 and summary table 9.24), and from the rating constructs used by teachers in the second term (Table 8.10) in order to test the predictions noted above. Second term data is used here due to the collection of this data at a similar time to that of the stimulated commentaries.

Of the four teachers who gave attention reasons for instructional questioning (probationers 1, 2, 4 and 6), all have a low ability, poorly motivated boy group, and in three cases this group received a high proportion of instructional questioning, and in two cases disciplinary remarks (ref: Tables 9.24, 9.9, 9.10, 9.12, 9.14); all four used quietness and motivation constructs in the second term (ref: Table 8.10), although these constructs were also employed by seven of the other eight teachers in the sample.

Of the three teachers who gave pacing and checking understanding reasons for instructional questioning (Probationers 2, 3, 4), two have two groups, one rated above average ability, average quietness and the other rated below average ability, but only in the case of Probationer 2 did a large amount of instructional questioning occur with both clusters (ref: Table 9.24); all three teachers used general constructs to assess ability (e.g. high ability - low ability, intelligent - unintelligent). The expected interaction patterns in the case of Probationers 3 and 4 (especially in the case of Probationer 3 where appropriate clusters have emerged) may have been obscured by the fact that the same two teachers also gave balance reasons in their commentaries whereas Probationer 2 did not, and consequently one might expect questioning to be more evenly balanced throughout the class in the case of these two teachers. This is in fact true of Probationer 3 where instructional questioning has a low variance in its distribution throughout the class, whereas the variance is high for Probationer 2, but also for Probationer 4 (ref: Tables 9.10, 9.11, 9.12).

Again quietness and motivation constructs, possibly instrumental in identifying those with a low participation level, were used by both of these teachers giving balance reasons. Teacher 12, who gave pacing and balance reasons for his behaviour but no checking understanding reasons, also has a low variance in the distribution of his instructional questioning (ref: Table 9.20); this would again suggest that the balance function may counteract the effects of the pacing function. Teacher 12 also used quietness and motivation constructs.

Both teachers giving involvement reasons for questioning were the only two teachers where MODE analysis resulted in only one cluster in the second term; this could be interpreted in terms of these teachers having less need to differentiate amongst pupils. Instructional questioning was fairly evenly distributed throughout the class in both of these cases, there being relatively low variance amongst the pupils (ref: Tables 9.17, 9.18); both teachers were also amongst the three who used a likeableness (or pleasantness) construct (ref: Table 8.10) although the significance of this is difficult to interpret, and both teachers used general ability constructs in the assessment of ability.

In those cases where checking understanding reasons were given and were not accompanied by pacing or balance reasons (Probationer 6, and Teachers 7 and 10), Probationer 6 and Teacher 7 have low-ability clusters but in neither case did they engage in an abnormally large amount of instructional questioning (ref: Tables 9.14, 9.15, 9.18, 9.24). In each of these three cases, the checking understanding reason was also accompanied by another reason, different in each of the three cases: no noticeable distinguishing patterns either in the constructs used or in the classroom interaction patterns can be found common to all three cases.

These trends are summarised in Table 10.4 which indicates the number and proportion of teachers giving each of the reasons during the stimulated commentaries, the number of these who exhibit the expected interaction pattern including the proportion they are of all those exhibiting this interaction pattern, and the number of teachers giving each reason who use the expected constructs, also expressed as a proportion of all those using the constructs. Each reason is examined separately, and cumulative or interaction effects resulting from the different possible combinations of reasons are ignored. As can be seen from the table, in all cases, the teachers who have given particular reasons for instructional questioning addressed to particular pupils, are better represented amongst those exhibiting the associated interaction and construct patterns. For example, teachers giving attention reasons constitute 33% of the total sample, yet make up 60% of those with a low motivation group engaged in much instructional questioning, and 36% of those with quietness and motivation constructs. The two teachers giving involvement reasons constitute 17% of the sample, yet account for one of the two cases (50%) where the variance in instructional questioning amongst the pupils in the class is less than the mean number of instructional questions per pupil for the same class*, and 22% of the cases where general ability

* a cut-off point selected to divide the sample into those with average/high and low levels of relative dispersion

Pacing	N. of teachers giving pacing reasons 4 (33%)	N. of these teachers with high ability-high QI group/total N. of teachers with high ability-high QI group 2/5 (40%)	N. of these teachers who use gen. ability constructs/total N. of teachers using gen. ability constructs 4/9 (44%)
Checking Underst-anding	N. of teachers giving checking understanding reasons 6 (50%)	N. of these teachers with low ability and high QI group/total N. of teachers with low ability and high QI group 3/5 (60%)	N. of these teachers with quietness and motivation constructs/total N. of teachers with quietness and motivation constructs 6/11 (55%)
Attention	N. of teachers giving attention reasons 4 (33%)	N. of these teachers with low ability and low motivation-high QI group/total N. of teachers with low ability, low motivation-high QI group. 3/5 (60%)	N. of these teachers with quietness and motivation constructs/total N. of teachers with quietness and motivation constructs 4/11 (36%)
Balance	N. of teachers giving balance reasons 3 (25%)	N. of these teachers where variance in QI in class < mean QI per pupil /total N. of teachers where variance in QI in class < mean QI per pupil 1/2 (50%)	N. of these teachers with quietness and motivation cons-ructs/total N. of teachers with quietness and motivation constructs 3/11 (27%)
Involvement	N. of teachers giving involvement reasons 2 (17%)	N. of these teachers where variance in QI in class < mean QI per pupil /total N. of teachers where variance in QI in class < mean QI per pupil 1/2 (50%)	N. of these teachers with gen. ability constructs /total N. of teachers with gen. ability constructs. 2/9 (22%)

Table 10.4

Number (and proportion) of Teachers giving Pacing, Checking Understanding, Attention, Balance and Involvement Reasons during their Running Commentaries and the extent to which the same Teachers exhibit the Expected Interaction and Construct Patterns, Expressed as a Proportion of all those exhibiting the noted Interaction and Construct Patterns (percentages noted in brackets).

constructs are used by teachers.

In spite of the crudeness of the measures used, and of the analysis (e.g. assessing the functions of a teacher's questioning on the basis of one running commentary, using a relatively small sample of classroom interaction, and ignoring interaction effects amongst functions such as balance effects cancelling out pacing effects, which all load against the finding of any associations) it is clear that the teachers expressing particular reasons are consistently better represented amongst those exhibiting the expected interaction and construct patterns. In some cases the trends are slight, and none reach the level of statistical significance at the 0.05 significance level*, but they are all in the expected direction.

When a teacher's behaviour may serve several functions to her during the course of a lesson, some of these not being identified by stimulated commentary techniques, and when some of these functions result in classroom interactions which obscure the interaction effects of other functions, attempts to associate particular functions with particular interaction patterns are clearly problematic. However, if pacing, checking understanding, balance and attention (the most commonly occurring reasons given by teachers in their

* a Fisher exact probability test, which is appropriate for investigating the extent to which two groups differ in their association with a discrete variable consisting of two mutually exclusive categories, was carried out on each interaction and construct trend - see Appendix XII for an explanation of the procedure adopted and the exact probabilities of the trends.

stimulated commentaries) are relatively important functions in determining the distribution of teachers' interactions with their pupils, one might expect a particular overall pattern of interaction to occur in classrooms. The pacing function, for example, would result in questions being addressed to able, but possibly not quiet, pupils to start the lesson and maintain its 'flow', questions might then be addressed to less able pupils to check their understanding; the balance function would result in most pupils engaging in a certain minimum level of interaction; and the attention function would result in a possibly poorly-motivated and low-ability group engaging in a high level of interaction. Using the two commonly occurring constructs 'ability' and 'behaviour', five groups could be devised, corresponding roughly to those emerging from the cluster analyses of some teachers' ratings, to illustrate the consequent distribution of interactions throughout the class diagrammatically (see figure 10.1).

Although the extent to which a teacher's interactions serve these various functions is unknown, unless a teacher gives considerable emphasis to the balance function, or employs some other function which results in an even distribution of interaction, such as involvement, it seems likely that groups of pupils will tend to receive disproportionate amounts of interaction. The commonly occurring trends in interaction, found in Chapter 9 (see Table 9.24) support the patterns of interaction which one might expect if teachers' instructional questioning served the functions, noted in figure 10.1 fairly equally, and involved the common pupil distinctions. For instance, it was found in the analysis of clusters and their involvement in classroom interaction, that a group of quiet intelligent pupils (often girls) received little interaction (this may correspond to cluster 1 in fig. 10.1); two groups, one above average ability but averagely quiet, and the other below average ability, engaged in a relatively large amount of instructional questioning (these may correspond to clusters 2 and 4 or 2 and 5 of fig. 10.1); and a below average ability poorly motivated cluster of pupils (mostly boys) received a large proportion of disciplinary remarks and/or instructional questioning (corresponding to cluster 4 in fig. 10.1). Other groups, generally perceived averagely on most dimensions, (possibly corresponding to cluster 3 in fig. 10.1) tended to engage in moderate levels of interaction.

Figure 10.1 is obviously an imprecise account of the distribution of teachers' classroom interaction, but the functions noted in the figure may broadly account for some of the patterns of interaction commonly found in the classrooms studied here. Interestingly, these patterns of classroom interaction are similar to those identified by Silberman (1969) and Garner and Bing (1973) which in both cases indicated two groups of pupils engaging in relatively large amounts of teacher-initiated work contacts. In the case of the Garner and Bing study, one of the groups engaging in much of this interaction

Cluster	1	2	3	4	5
Ability Rating	High	High	Average	Low	Low
Behaviour Rating	High	Average/Low	Average	Average/Low	High
Pacing		P			
Checking Understanding				$\frac{CU}{2}$	$\frac{CU}{2}$
Balance	$\frac{B}{2}$		$\frac{B}{2}$		
Attention				A	
Total	$\frac{B}{2}$	P	$\frac{B}{2}$	$\frac{CU}{2}$ + A	$\frac{CU}{2}$

P = interactions serving pacing function

CU = interactions serving checking understanding function

B = interactions serving balance function

A = interactions serving attention function

Figure 10.1

The Distribution and Function of Teachers' Instructional Questions was rated by teachers as average on ability, poor on behaviour and high on likeableness, and the other was rated poorly on all rating scales, and received a larger than average number of disciplinary contacts, thus corresponding approximately to clusters 2 and 4 in fig. 10.1. Silberman's "indifferent" group and Garner and Bing's averagely rated clusters engaged in less interaction, corresponding to cluster 3 in fig. 10.1. Consequently, the commonly occurring functions noted in the stimulated commentaries could account for some of the group interaction patterns also found in other studies.

As acknowledged earlier, the assessment of the regularly occurring functions of a teacher's behaviour is problematic, and it is interesting to note that in the results summarised in Table 10.4, although particular functions and interaction and construct patterns show some level of coincidence, tendencies toward the construct or interaction patterns frequently occur with teachers who did not indicate the use of pacing, checking understanding, balance or attention functions in their stimulated commentaries. These findings could be due to such factors as the limitations of accessing the functions of teachers' behaviour from one commentary, to the reluctance of some teachers to talk about their teaching, or to the lack of awareness that some teachers may have concerning the reasons for what may be routinely-performed behaviours, even although these behaviours may be regulating the distribution of their everyday classroom interaction.

2) Summary of Results Concerning Teachers' Reasons for their Behaviour.

In investigating the reasons which teachers gave for their behaviour, during a running commentary on one of their lessons, it was found that, on average, experienced teachers gave fewer reasons than did probationers, but in both cases, approximately half of the stated reasons involved the making of differentiations amongst pupils, although this proportion varied considerably amongst the sample. It was also found that by far the largest proportion of reasons involving pupil differentiations were concerned with justifying teachers' instructional questioning, and it seemed that this questioning could serve various functions for the teacher. A categorisation of the instructional questions for which teachers gave reasons was made according to the function they appeared to serve (viz. Pedagogic, Pacing, Balance, Attention and Involvement) and it was found that functions tended to be associated with particular pupil distinctions. It was found that some teachers whose questioning behaviour during the commentary lesson appeared to satisfy a particular function also tended to have particular patterns in their other classroom interaction data and used particular constructs in their pupil assessments, both of which could be explained in terms of the function. The coincidence of function and interaction and construct patterns was a consistent though statistically non-significant trend. A consideration of the data suggested that it would be unrealistic to attempt to account for patterns in teachers' classroom interaction in terms of single factors.

With respect to hypothesis 5 (viz. "Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour"), some support is received from the above analysis in the case of some of the distribution patterns and in the case of a few teachers but not at the level of statistical significance; and when considering the sample as a whole, it is possible to account for the commonly occurring classroom interaction patterns (both in this and other studies) in terms of the commonly occurring reasons for teachers' behaviour. With respect to hypothesis 6 (viz. "The reasons given by experienced teachers which account for their classroom interactions are different from those, given by probationer teachers, which account for their classroom interactions"), probationers gave attention reasons and also marginally more pacing, checking understanding and balance reasons whereas experienced teachers gave involvement reasons and marginally more pedagogic reasons: these may, to some extent, explain a few of the differences in the interaction patterns found in probationers' and experienced teachers' classrooms and in the constructs used by these two groups to assess their pupils. For example, in both the first and second terms, clusters of poorly-rated boys more frequently emerged in the cluster analysis of probationers and these were also frequently associated with most disciplinary remarks and/or a high proportion of instructional questioning (see Table 9.24);

probationers also tended to use more behavioural constructs (see Table 8.10), which one might expect to be more appropriate in the case of questions serving the function of curbing inattention. In addition, both of the experienced teachers whose questioning at times appeared to serve a pedagogic function, used separate arithmetic and language ability constructs in their assessments of pupils in each term (see Table 8.10), and were among the three older, more-experienced teachers who appeared to be more concerned with the academic assessment of their pupils, suggesting a more 'learning-centred approach' to their teaching. The probationers' greater concern with pacing and checking understanding functions may also possibly be linked to the probationers' marginally greater use of general ability rather than specific ability constructs, since these functions of questioning would require the identification of high ability, possibly vocal, pupils and low-ability pupils. The use of questioning for a balance function, again more prevalent amongst probationers, may be a consequence of adopting pacing and checking understanding functions which alone would create large imbalances in the distribution of classroom interaction; in the running commentary data balance reasons always accompany pacing reasons and in all but one case accompany checking understanding reasons.

Consequently, it may be concluded that both hypotheses 5 and 6 receive some support from the present analysis.

CHAPTER 11 - THE RELATIONSHIP BETWEEN TEACHERS' ASSESSMENTS OF THEIR PUPILS AND THE PUPILS' ASSESSMENTS OF THEMSELVES AND THEIR FRIENDSHIP CHOICES.

A. Summary of Relevant Hypotheses, Research Design and Data Analysis.

Hypotheses

The originally proposed hypothesis suggested a correlation between the ways in which teachers perceived pupils and the ways pupils perceived themselves and formed group structures:

7) There is a relationship between a teacher's assessments of his/her pupils and the pupils' perceptions of themselves and their friendship choices.

This hypothesis derives from pilot study 4, where it was found that pupils appeared to make friendship choices consisting of pupils perceived similarly by the teacher. Several researchers (e.g. Silberman, 1969; Barker Lunn, 1970; Nash, 1973) have also suggested that teachers communicate their assessments to their pupils, influence pupils' self-concepts and hence the group structure of the class, which is assumed to be formed largely by homophillic selection, some studies suggesting that ability, amongst other factors, is an important attribute in pupils' perceptions of others.

However, in view of the generally reactive nature of probationers' interactions and the generally proactive nature of the experienced teachers', one might expect different processes to be occurring in the two different samples. If experienced teachers assess their pupils earlier in the term and act differentially towards them, they may be more likely to communicate their assessments to the children and possibly influence the children's self-perceptions. If probationer teachers, on the other hand, are more reactive and engage in more child-initiated contacts, and tend to form assessments of pupils less quickly, their assessments of pupils may be more influenced, at least initially, by pupils' self-perceptions. One might also expect friendship groups to be more stable over the term in the case of reactive probationers (assuming the probationers have less influence than experienced teachers over pupil self-perceptions and group selection processes and assuming that, without influence from the teacher, pupil groups will remain stable).

Finally, if there is a relationship between teachers' assessments of pupils and pupils' friendship choices and if friendship choices are made on the basis of homophillic selection, one would expect a significant level of congruence between pupils' friendship choices and the clusters derived from the teachers' ratings of pupils; one might additionally expect this relationship to be stronger in the case of the probationers in term 1 (where the reactive probationers may be 'learning' the pupils' self-perceptions) and stronger in the case of the experienced teachers in the second term (where the proactive experienced teachers have communicated their assessments to the pupils).

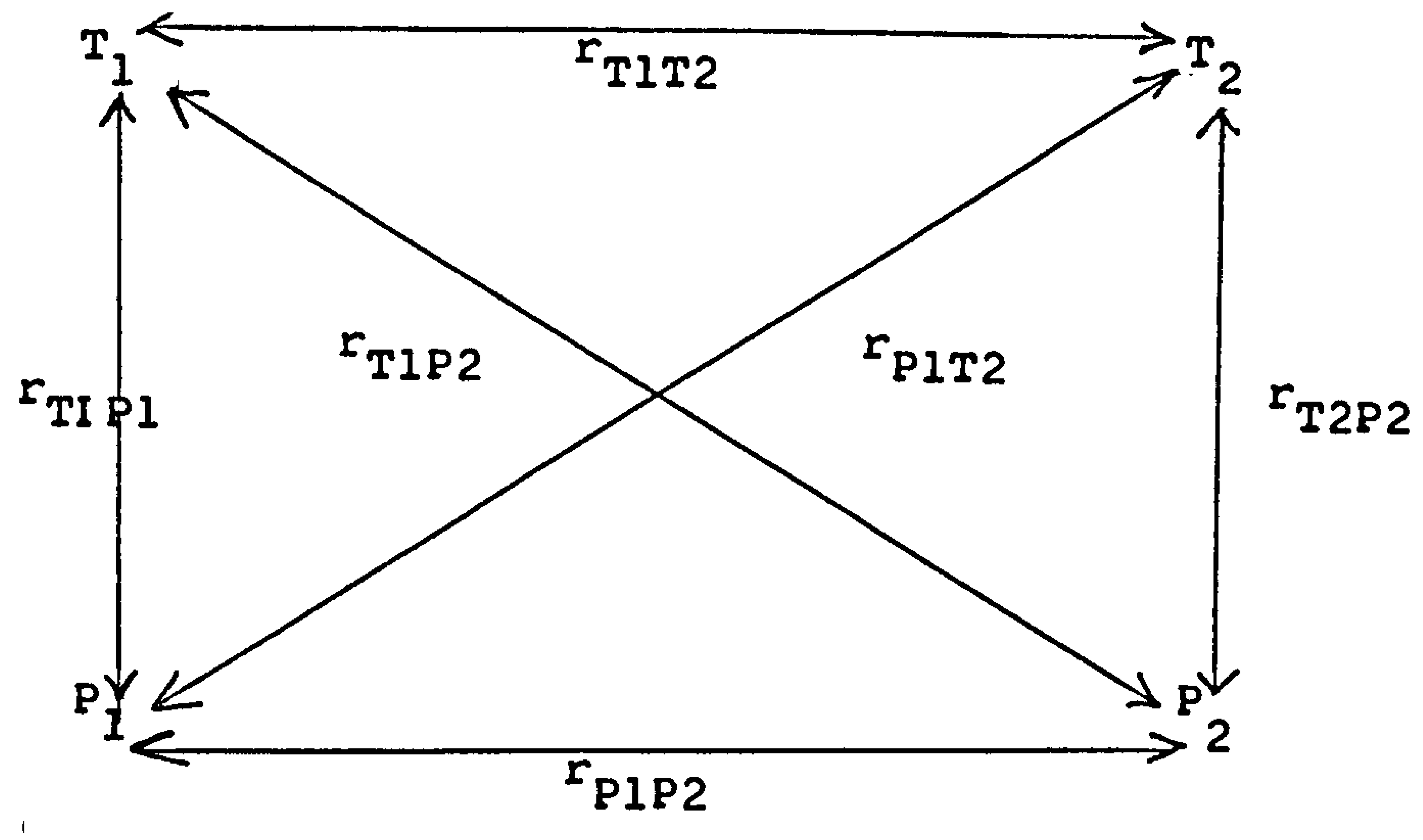
The initial hypothesis clearly oversimplifies the relationships which one might expect to find within the data.

To clarify the issue, fig. 11.1 indicates the correlations, within the rating data, which could be of interest. Where the same sample and variables have been employed on a number of test occasions, as in this case, a cross-lagged panel analysis (see Crano, 1974) can be carried out to investigate the more dominant direction of influence between the variables. For example, in fig. 11.1, if for a class $r_{T1P2} > r_{P1T2}$ one could conclude that the teacher's assessments have greater influence upon the pupils' self-assessments than the pupils' self-assessments have upon the teacher's assessments.

Considering the relationships noted in fig. 11.1 and the reactive/proactive distinction between probationers and experienced teachers, several more specific hypotheses can be suggested:

a) The correlation between teachers' assessments of pupils and pupils' self-assessments in the first term (i.e. r_{T1P1}) will be greater in the case of probationer teachers (assuming that in being more reactive, probationers are more initially influenced by pupil self-perceptions).

b) In the second term data, an equal or higher correlation will exist between experienced teachers' assessments of their pupils and pupils' self-assessments (i.e. r_{T2P2}) than between the probationer teachers' assessments and their pupils' (due to experienced teachers effectively communicating their perceptions to the pupils).



T = teachers' assessments of pupils.

P = pupils' self-assessments.

r = correlation

1 = 1st term

2 = 2nd term

Figure 11.1

Diagrammatic representation of the relationships amongst teachers' assessments of pupils and pupils' self-assessments in the first and second terms.

c) In the case of probationers, the correlation between the teachers' first term assessments and the pupils' second term self-assessments will be lower than the correlation between the pupils' first term self-assessments and the teachers' second term assessments (i.e. $r_{T1P2} < r_{T2P1}$), whereas in the case of experienced teachers the opposite will hold true, $r_{T1P2} > r_{T2P1}$ (due to pupils having a greater influence on teachers' assessments in the case of probationer teachers, but teachers having a greater influence on pupils' self assessments in the case of experienced teachers). For the same reasons, one would also anticipate that pupils' self assessments in terms 1 and 2 would correlate more highly than their teachers' in the case of probationers' classes (i.e. $r_{P1P2} > r_{T1T2}$), but would correlate less highly than their teachers' in the case of experienced teachers' classes ($r_{P1P2} < r_{T1T2}$), pupils' perceptions being more stable in probationers' classes.* One would also expect experienced teachers' assessments to be more stable over the term, relative to probationers'.

d) The stability of pupils' friendship choices between terms will be greater in the case of probationer teachers (due to probationers being less influential in the changing of pupil self-perceptions and therefore less influential in group homophillic selection processes*).

* it is assumed that without influence from the teacher, self-perceptions and friendship groups remain fairly stable.

e) There will be a degree of similarity between pupil-determined groups and the clusters derived from the cluster analysis of teachers' ratings, and this degree of similarity may be greater in the probationers' classes in the first term but greater in the experienced teachers' classes in the second (due to (i) the hypothesised closer relationship between probationers' and pupils' assessments in the first term, and an as close, or closer, relationship between experienced teachers' and pupils' perceptions in the second term; and (ii) pupils' group choices being influenced by their homophillic perceptions).

Research Design

Six weeks after the beginning of the first and second data collection periods, the pupils in each class were asked to rate themselves using labelled five-point scales, on the dimensions of intelligence (explained in terms of "how clever you think you are"), behaviour in class (explained in terms of "how well behaved in class you think you are") and motivation (explained in terms of "how interested in schoolwork you are"). On each occasion, the pupils were also asked to name those pupils in the class whom they would like to sit and work with, and to name the person in the class whom they thought was most like themselves(explained in terms of "the person you think is most like you, the person in the class who is the same type of person as yourself").

Data Analysis.

For each class, Spearman's correlations were calculated for all the relationships noted in figure 11.1.

One measure was required to indicate the stability of sociometric data between the two terms for each class. This was achieved by first of all calculating the number of friendship choices made in both first and second terms, expressed as a proportion of the number of first or second term friendship choices whichever was the larger*, for each pupil, as shown by the formula below.

$$\text{Stability} = \frac{\text{N. of first term choices also chosen in the second term}}{\underline{\text{Either}}\ \text{N. of first term choices}\ \underline{\text{or}}\ \text{N. of second term choices, whichever is the larger.}} \times 100\%$$

Class scores were developed by calculating the mean percentage stabilities of all the pupils in each class.

A measure was also required for the level of congruence of friendship choices with teacher-derived clusters in the first and second terms. However, the probability of obtaining a high level of congruence by chance increases the larger is the cluster to which the pupil belongs. For example, if a pupil belongs to a cluster of 20 out of a class of 25, there is a much higher chance probability that six friendship choices will belong to the same cluster than if the pupil's cluster contains only six members. This problem is further complicated by the fact that some clusters contain fewer pupils than the number of friendship choices made by pupils.

* to allow for different numbers of friendship choices in different terms.

Of the several measures of congruence possible in this case, a measure of the proportion of friendship choices occurring in the same cluster as the choosing pupil, adjusted for chance occurrences, was considered to be the most appropriate. Consequently, a percentage congruence score was calculated for each pupil, using the following formula:

$$\text{Congruence} = \left(\frac{\text{N. of friendship choices in same cluster as choosing pupil}}{\text{N. of friendship choices}} - \frac{\text{N. in cluster} - 1}{\text{class size} - 1} \right) \times 100\ \%$$

The mean percentage score for the pupils in each class was calculated from each term's data, providing a measure of the similarity between teacher-derived clusters and pupils' friendship choices for each class in each term. Consequently, the resulting class measures indicate the residual percentage of friendship choices which occur in the same cluster, after the deduction of the congruence estimated to occur by chance: thus, a score of 5% indicates that, on average, out of every one hundred friendship choices, only five more than would be expected by chance occur in the pupils' own clusters.

Validity of the Assumption of Homophillic Selection.

Since the assumption of homophillic selection underlies the hypothesised associations between teachers' perceptions of pupils and pupils' friendship choices, a crude test of the validity of this assumption was made by calculating the extent to which the pupils' most-like-self choices also appeared in their friendship choices. Table 11.1 illustrates

Prob./ Teach.	1st term: N.able to make choice	1st term: N. also in group choices	1st term: %	2nd term: N. able to make choice	2nd term: N. also in group choices	2nd term: %
1	11	6	54.5%	18	12	66.7%
2	9	6	66.7%	18	15	83.3%
3	25	20	80.0%	24	17	70.8%
4	14	12	85.7%	18	18	100.0%
5	14	13	92.9%	19	17	89.5%
6	20	16	80.0%	19	15	78.9%
7	13	10	76.9%	19	17	89.5%
8	15	12	80.0%	13	7	53.8%
9	20	18	90.0%	22	18	81.8%
10	22	19	86.4%	16	11	68.8%
11	19	17	89.5%	19	14	73.7%
12	14	9	64.3%	18	15	83.3%

Table 11.1

No. of Pupils in each class able to make a most-like-self choice; no. of occasions where this choice is also included in the friendship choices, and the percentage the latter is of the former in the first and second terms.

that where pupils were able to make a 'most-like-self' choice, this choice also occurred in their group choices in a very high proportion of cases (mean percentage in the 1st term = 78.9% (range 54.5% - 92.9%), mean percentage in 2nd term = 78.3% (range 53.8% - 100%)).

B. The Relationship Between Teachers' Assessments of Their Pupils and The Pupils' Assessments of Themselves and Their Friendship Choices: Results.

1) Analysis of Rating Data.

The relationships amongst the rating data are noted in Tables 11.2, 11.3 and 11.4.

Table 11.2 indicates the correlations between teachers' assessments of pupils and pupils' self-assessments, in the first and second terms, on the constructs of intelligence, behaviour* and motivation (or the constructs used by the teacher, which were judged by the researcher to be closest in meaning to these).

Table 11.3 indicates the correlations between teachers' first term assessments and pupils' second term assessments, and between pupils' first term assessments and teachers' second term assessments on each of the three constructs.

Table 11.4 shows the correlations between pupils' assessments of themselves in the first and second terms, and teachers' assessments of pupils in the first and second terms, on the same three constructs.

* in the case of teacher 11 no behaviour construct was used in the assessment of her pupils.

Probationer/ Teacher	TERM 1				TERM 2			
	Intelligence	Behaviour	Motivation	Mean of 3 Constructs	Intelligence	Behaviour	Motivation	Mean of 3 Constructs
Probationer 1	0.75**	0.49**	0.14	0.46	0.41*	0.22	0.07	0.23
Probationer 2	0.02	0.19	0.26	0.16	0.25	0.41*	0.28	0.31
Probationer 3	0.76**	0.35*	0.22	0.44	0.67**	0.26	0.24	0.39
Probationer 4	0.18	0.66**	0.38*	0.41	0.19	0.07	-0.03	0.08
Probationer 5	0.56**	0.43**	0.22	0.40	-0.02	0.33	0.36*	0.22
Probationer 6	0.68**	0.43*	0.28	0.46	0.79**	0.45*	0.43*	0.56
Teacher 7	0.52**	-0.31	0.04	0.08	0.75**	-0.35	0.25	0.22
Teacher 8	0.21	-0.23	0.24	0.07	0.57**	0.42*	0.63**	0.54
Teacher 9	0.31	0.16	0.65**	0.37	0.63**	0.35*	0.57**	0.52
Teacher 10	0.39*	0.48**	0.51**	0.46	0.74**	0.31*	0.75**	0.60
Teacher 11	0.33	–	0.11	0.22	0.56**	–	-0.01	0.28
Teacher 12	0.82**	-0.44**	0.27	0.22	0.65**	0.15	0.11	0.30
Mean corr. (probationers)	0.49	0.43	0.25	0.39	0.38	0.29	0.23	0.30
Mean corr. (exp. teachers)	0.43	-0.07	0.30	0.24	0.65	0.18	0.38	0.42

* = significant at < 0.05 level

** = significant at < 0.01 level

Table 11.2

Spearman's Correlation Coefficients of Teachers' Assessments of Pupils and Pupils' Assessments of Themselves in 1st and 2nd Terms.

	T1/P2				P1/T2			
Teacher	Intelligence	Behaviour	Motivation	Mean of 3 Constructs	Intelligence	Behaviour	Motivation	Mean of 3 Constructs
Probationer 1	0.36	0.48	-0.09	0.25	0.79	0.08	-0.03	0.28
Probationer 2	0.15	0.27	0.31	0.24	0.15	0.09	0.24	0.16
Probationer 3	0.65	0.36	0.18	0.40	0.85	-0.06	0.18	0.32
Probationer 4	0.46	0.03	-0.06	0.14	0.28	0.44	0.16	0.29
Probationer 5	0.02	0.64	0.53	0.40	0.39	0.55	-0.18	0.25
Probationer 6	0.65	0.59	0.48	0.57	0.74	0.28	0.51	0.51
Teacher 7	0.58	-0.30	0.21	0.16	0.43	-0.40	-0.01	0.01
Teacher 8	0.64	0.52	0.64	0.60	0.15	-0.30	0.16	0.00
Teacher 9	0.69	0.16	0.66	0.50	0.38	0.21	0.49	0.36
Teacher 10	0.64	0.58	0.64	0.62	0.47	0.21	0.55	0.41
Teacher 11	0.44	-	0.29	0.37	0.46	-	-0.03	0.22
Teacher 12	0.68	-0.67	0.14	0.05	0.65	0.59	0.27	0.50
Mean corr. (probationers)	0.38	0.40	0.23	0.33	0.53	0.23	0.15	0.30
mean corr. (exp. teachers)	0.61	0.06	0.43	0.38	0.42	0.06	0.24	0.25

Table 11.3

Spearman's Correlation Coefficients of Teachers' First Term Assessments with Pupils' Second Term Self-Assessments (T1/P2) and of Pupils' First Term Self-Assessments with Teachers' Second Term Assessments (P1/T2).

Probationer/ Teacher	Correlations of Pupils' Ratings of Themselves in 1st, and 2nd Terms				Correlations of Teachers' Ratings of the Pupils in 1st and 2nd Terms.			
	Intelligence	Behaviour	Motivation	Mean of 3 Constructs	Intelligence	Behaviour	Motivation	Mean of 3 Constructs
Probationer 1	0.25	0.65**	0.35	0.42	0.83**	0.07	0.21	0.37
Probationer 2	0.27	0.13	0.42*	0.27	0.49**	0.82**	0.61**	0.64
Probationer 3	0.67**	0.23	0.49**	0.46	0.89**	0.57**	0.74**	0.73
Probationer 4	0.38**	0.11	0.62**	0.37	0.80**	0.80**	0.82**	0.81
Probationer 5	-0.03	0.47*	0.18	0.21	0.94**	0.73**	0.58**	0.75
Probationer 6	0.83**	0.66*	0.50**	0.66	0.71**	0.75**	0.62**	0.69
Teacher 7	0.48*	0.67**	0.18	0.44	0.95**	0.86**	0.82**	0.88
Teacher 8	0.49*	0.18	0.32	0.33	0.80**	0.59**	0.74**	0.71
Teacher 9	0.65**	0.70**	0.91**	0.75	0.85**	0.69**	0.82**	0.79
Teacher 10	0.40*	0.68**	0.41*	0.50	0.74**	0.37*	0.83**	0.65
Teacher 11	0.53**	–	0.51**	0.52	0.85**	–	0.78**	0.82
Teacher 12	0.74**	0.40*	0.41*	0.52	0.89**	0.37*	0.86**	0.71
Mean corr. (probationers)	0.40	0.38	0.43	0.40	0.78	0.62	0.60	0.67
Mean corr. (exp. teachers)	0.55	0.53	0.46	0.51	0.85	0.58	0.81	0.70

* = significant at <0.05 level

** = significant at <0.01 level

Table 11.4

Spearman's Correlation Coefficients of Pupils' Assessments of Themselves in 1st and 2nd Terms and of Teachers' Assessments of their Pupils in 1st and 2nd Terms.

It is demonstrated in Table 11.2 that the correlation between teachers' assessments of pupils and pupils' self-assessments in the first term is generally greater in the case of probationer teachers, four correlations being significant at $p < 0.01$ level in the case of probationers, and two at $p < 0.01$ level and another at $p < 0.05$ level in the case of experienced teachers on the intelligence dimension; three being significant at $p < 0.01$ level and another two at $p < 0.05$ in the case of probationers, and two at $p < 0.01$ level (one negatively correlated) in the case of experienced teachers on the behaviour dimension; however, the only highly significant correlations on the motivation dimension occur in the cases of experienced teachers 9 and 10 ($p < 0.01$), although a correlation significant at $p < 0.05$ level occurs in the case of one probationer. These results are in agreement with the interpretation that probationer teachers are, at least initially, more influenced by pupil self-perceptions.)

Table 11.2 also indicates that correlations between teachers' assessments and pupils' self-assessments in the second term are generally higher for teachers than for probationers. For the teachers, all correlations on the intelligence construct are significant at $p < 0.01$ level, whereas the same occurs only in the case of probationers 3 and 6*, and the correlation for probationer 1 is significant at $p < 0.05$ level. On the behaviour construct, correlations

* one of the probationers with most teaching experience.

are significant at $p < 0.05$ level for teachers 8, 9 and 10 and probationers 2* and 6*. On the motivation construct, correlations are significant at $p < 0.01$ level for teachers 8, 9 and 10 and at $p < 0.05$ level for probationers 5* and 6*. Those probationers with high significant correlations in the second term tend also to have similar correlations in the first term, whereas teachers tend to have considerably lower correlations in the first term with the exception of teacher 12**. This would be consonant with the notion that experienced teachers communicate their perceptions to pupils more effectively.

Table 11.3 demonstrates that in the case of intelligence/ ability ratings, the correlations between pupils' first term ratings and probationers' second term ratings (P1/T2) are only lower than the correlations between probationers' first term ratings and pupils' second term ratings (T1/P2) in one case, whereas the same correlations are lower in five cases for the experienced teachers. Similar trends occur in the correlations of behaviour and motivation ratings in the case of most experienced teachers, but the expected trends do not occur in these ratings in the case of the probationers. These results would suggest that certainly in the case of intelligence and in the case of most

* one of the probationers with most teaching experience.

** teacher with one year's teaching experience.

experienced teachers' assessments of behaviour and motivation, the expected directions of influence occur. However, Table 11.4 suggests a possibly more complex explanation, since in keeping with the conceptualisation of proactive experienced teachers and reactive probationers, one might expect pupils in experienced teachers' classes to have less stable self-perceptions compared to those in probationers' classes, and one would expect probationers' assessments to be less stable than experienced teachers' assessments.

Table 11.4 in fact suggests that in all classes, pupils are generally much less stable in their assessments than their teachers but that pupils in experienced teachers' classes are a little more consistent in their self-ratings than those in probationers' classes. Both experienced teachers and probationers are very consistent in their ratings of pupils, with the exception of probationer 1 on the behaviour and motivation constructs. These results were not anticipated but could be interpreted in terms of a continuous potential variation or 'drift' in pupils' self-perceptions. Pupils may start a school year with perceptions of themselves, partly derived from their previous school experiences. Their self-perceptions are possibly open to various influences and may be far from stable or rigid. In the areas of intelligence and ability especially, their self-concepts may be developed from, and dependent for their continuance upon, cues supplied by the teacher. In the case of proactive teachers, these cues may be readily and regularly supplied and the pupils may sustain or adapt their self-perceptions to reflect the assessment of the teacher. In the case of reactive teachers, pupils may have greater difficulty in identifying cues, relating to their ability, which are probably less frequently provided; there is also a greater chance of error in the identification of cues and a greater chance for other factors, such as peer group or parent influences, to affect the pupils' self-perceptions. Thus, the self-perceptions of pupils in probationers' classes may be less influenced by the teacher and allowed more to 'drift'.

2) Analysis of Sociometric Data.

The stability of friendship choices over the term, expressed as a percentage, and the congruence of friendship choices and teacher clusters in both the first and second terms after the deduction of estimated chance occurrences, are shown in Table 11.5.

In all cases the percentage stability is close to 50%, indicating that approximately half of the friendship choices made by pupils on one occasion were included in the friendship choices made by the same pupils on the other 'test' occasion. With the exception of teacher 7 with a primary 4 class, there is a slight trend for the highest scores to occur with the oldest classes (mean percentage stability for P4's = 51.1, P5's = 52.6, P6's = 49.7, P7's = 58.8). There is no difference in the stability of friendship choices between experienced teachers' and probationers' classes.

Considering the level of congruence between pupils' friendship choices and teacher-derived clusters, most congruence scores are only a little above or below the level

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Teacher	% Stability	% Congruence in 1st term*	% Congruence in 2nd term*
1	42.3	8.3	12.9
2	58.2	7.2	-1.7
3	40.5	8.4	4.2
4	51.0	-1.2	4.8
5	66.3	5.1	-1.6
6	61.3	1.2	3.5
7	60.5	2.9	6.3
8	43.5	-5.6	5.3
9	46.8	-0.2	-2.5
10	52.6	5.6	0.5
11	47.4	9.0	3.0
12	67.7	12.0	-2.9
Mean % for probationers	53.3	4.8	3.7
Mean % for exp. teachers	53.1	4.0	1.6

* residual percentage after deduction for estimated congruence due to chance.

Table 11.5

The Stability of the Pupils' Friendship Choices and the Congruence of Pupil Friendship Choices with Teachers' Clusters of Pupils in Terms 1 and 2.

expected by chance. The level of congruence is generally higher in the first term (especially high with probationers 1, 2 and 3, and experienced teachers 11 and 12). In the second term, the congruence level is generally lower and probationer 1 is the only case where a relatively high score is maintained. This one consistently high score occurred in the case of the teacher who also reported few attributes in the assessments of her pupils, exhibited considerable inconsistency between some of her first and second term ratings of pupils (see Chapter 8), and appeared to be greatly influenced in her assessment of pupils' intelligence by the pupils' self-perceptions (see Table 11.3): these observations could be interpreted in terms of this one teacher being considerably influenced by pupils' self-perceptions and group structure.

3) Summary of Results Concerning the Relationship between Teachers' Assessments of their Pupils andthe Pupils' Perceptions of Themselves and their Friendship Choices.

The correlations between teachers' assessments of pupils and pupils' self-assessments in the first term were found to be greater for probationer teachers; this lends support to the notion that reactive probationers are influenced by their pupils' self-perceptions. Correlations between teachers' assessments and pupils' self-assessments in the second term were generally found to be higher for experienced teachers than for probationers, and in the case of those probationers whose assessments did correlate highly, this correlation was also reflected in the first term's data unlike those of the experienced teachers: this could be interpreted in terms of proactive experienced teachers influencing pupils' self-perceptions. There is also some evidence from the cross-lagged panel analysis that the dominant direction of influence between teachers' and pupils' assessments is in the direction of pupils' self-assessments (especially in the area of intelligence) influencing probationers' assessments of pupils, but, in the case of experienced teachers, in the direction of teachers' assessments influencing pupils'. However, both experienced teachers' and probationers' assessments were equally stable over the term, and the self-assessments of pupils in experienced teachers' classes were marginally more stable than those in probationers', although in both cases stability was not high: this was interpreted in terms of a'drift' in pupils' self-perceptions which may become stabilised in the case of experienced teachers who regularly provide cues regarding their perceptions of the pupils.

An analysis of the stability of pupils' friendship choices and the congruence of these choices with clusters derived from teacher ratings revealed no differences between the data collected from experienced teachers' or probationers' classrooms.

In considering the suggested hypotheses, there is some support for hypothesis (a) (viz. The correlation between teachers' assessments of pupils and pupils' self-assessments in the first term will be greater in the case of probationer teachers), support for hypothesis (b) (viz. In the second term data, an equal or higher correlation will exist between experienced teachers' assessments of their pupils and pupils' self-assessments than between the probationer teachers' assessments and their pupils'), some support for hypothesis (c) (viz. In the case of probationers, the correlation between the teachers' first term assessment and the pupils' second term self-assessment will be lower than the correlation between the pupils' first term self-assessment and the teachers' second term assessment, whereas in the case of experienced teachers the opposite will hold true), and no support for hypotheses (d) and (e) (viz. The stability of pupils' friendship choices between terms will be greater in the case of probationer teachers; there will be a degree of similarity between pupil-determined groups and the clusters derived from the cluster analysis of teachers' ratings, and this degree of similarity will be greater in the probationers' classes in the first term but greater in the experienced teachers' classes in the second).

In conclusion, it would seem that the notion of the proactive experienced teacher and the reactive probationer may be a useful means of explaining some of the trends found in the pupils' self-assessment data and their relationship to teachers' assessments. However, no evidence was found in this data to support the further notion proposed by several researchers (most notably, Nash, 1973), that teachers influence the friendship choices of pupils.

CHAPTER 12 - DISCUSSION AND OVERVIEW

This research project started with the question of how beginning teachers learn to adapt to classroom life, and, in particular, how they learn to make the large number of decisions which appear to be necessary during the course of their everyday classroom interaction. Several pilot studies and a main study concerned with the investigation of this area have now been reported. The aim of this chapter is, in the first section, to assemble the findings of the research, to clarify further the nature of teachers' classroom decision-making, to identify some of the possible processes involved in learning to teach, or, more specifically, in learning to make classroom decisions; and in the light of these conceptions, to evaluate the appropriateness of the proposed decision-making model, and to investigate how adequately it accounts for apparently pertinent concepts and relationships within the decision-making process. A second section in the chapter considers the methodological problems encountered in this type of research, illuminating important issues for further investigation; and a third section evaluates the potential contribution of future decision-making research to the practice of teaching.

1) The nature of teachers' classroom decision-making.

In this project, teachers' classroom decision-making was conceptualised as the operation of a number of heuristics which results in the performance of automatised sequences of behaviour in response to the perception of a configuration of cues amongst which the traits of pupils rank high in importance. This model provided the means of posing several hypotheses concerning how teachers learn to teach, and in particular how probationers' perceptions of pupils differ from those of experienced teachers, how these perceptions change during the first few months of teaching, how both experienced and probationer teachers' perceptions of pupils relate to their classroom interaction, how teachers' reasons for their behaviour relate to their perceptions of pupils and patterns of interaction, and the extent to which pupils may influence teachers' perceptions. The data gathered in the testing of these hypotheses were also analysed to investigate the nature of teachers' assessments of pupils and of their classroom interaction and reported decision-making, in order to aid the construction of an improved conceptualisation both of the process of decision-making and of any developmental patterns in the learning of this process.

In the case of the teachers' perceptions of pupils, it was found that the number and nature of attributions which the teachers gave their pupils exhibited the hypothesised patterns: probationers attributed fewer qualities to their pupils in the first term than did experienced teachers, but increased the number of attributions in the second term to the equivalent of the experienced teachers. There was a fair degree of similarity amongst teachers concerning the nature of the attributions made, but probationers made marginally more attitude to work attributions and fewer of a motive attribution or label form in the first term; and there was a trend amongst teachers generally to make more specific ability attributions in the second term. These results can be interpreted as probationers assessing their pupils less quickly than experienced teachers and being less concerned with typifying pupils or identifying underlying motivations, although all teachers appeared to differentiate their pupils more specifically over time.

The factor analysis of teachers' ratings found that one overall 'good pupil' factor or an academic and a behaviour factor were common. These are similar findings to those of Wood and Napthali (1975) with a sample of secondary school teachers, and to the series of studies carried out by Hallworth and Morrison (1964), Morrison, McIntyre and Sutherland (1965) and McIntyre, Morrison and Sutherland (1966): this may be indicative of the importance to teachers in their teaching of an overall assessment, or of academic and behaviour assessments, of their pupils. The apparent dominance of these assessments, over more detailed diagnostic assessments of pupils' knowledge and skills seems interesting, if not alarming, and this matter is discussed later in the chapter in relation to the relevance of decision-making research to the practice of teaching.

It was also found that probationers' factor structures were slightly less stable between terms which is consistent with the proposed hypothesis. However, correlations on individual ratings taken in the two terms were quite stable for probationers and as stable as those of experienced teachers which may be interpreted as evidence for Shavelson's "anchoring heuristic"* occurring in the case of both probationers and experienced teachers. Probationers' factor structures also more frequently loaded highly on behaviour constructs whereas the most experienced teachers' loaded highly on academic constructs, which may be indicative of the probationers' greater concern with classroom behaviour, a similar finding being reported by McIntyre, Morrison and Sutherland (1966) who found younger teachers expressing greater concern with classroom behaviour and older teachers with attainment.

The cluster analysis of teachers' ratings of pupils indicated that, in the first term results, probationers tended to have fewer clusters and more pupils in their largest cluster than did experienced teachers; and in the second term results, all teachers tended to have fewer clusters and a larger number in the largest cluster. This gives additional support to the hypothesis that probationers assess their pupils less quickly and make fewer distinctions amongst them than do experienced teachers. The drop in the number of clusters and the increase in the size of the largest cluster in the second term for all teachers is difficult to

* this implies that teachers' initial impressions influence their later assessments of their pupils.

interpret but one could speculate that it may be indicative of pupils becoming more clearly typified by the teachers.

In considering the interaction in which different clusters engaged, some common, though not statistically significant, trends were found with both experienced teachers and probationers: a group of quiet, intelligent girls tended to engage in little interaction; two groups, one able and talkative, and the other less able, received a large proportion of instructional questioning; and a group of low ability boys tended to receive a relatively large proportion of disciplinary remarks and/or instructional questioning. Apart from the apparent distinction between sexes, the groups were distinguished from one another largely in terms of intelligence/ ability and behaviour, which as the factor analysis results would suggest, appear to be the major areas in which teachers differentiate their pupils. Similar interaction patterns have been identified by Garner and Bing (1973) and Silberman (1969); consequently it would seem that some of the interaction patterns identified in this study may well be quite commonly found in classrooms.

It was suggested that the distribution of interaction amongst the clusters could be interpreted in terms of regularly occurring sequences of behaviour, and that teachers might be able to give particular reasons for adopting such behaviour. In giving 'running commentaries' on tape-recordings of their lessons, experienced teachers tended to give fewer reasons for their actions, which would be expected if their teaching behaviour were in fact more automatised (freed from continuous sensory control). On average, about half of the reasons given by all the teachers, involved making differentiations amongst the pupils, most differentiations relating to the distribution of instructional questioning. Particular pupil differentiations tended to occur with particular reported functions, and teachers reporting the use of instructional questioning for a specific function tended to be associated with certain of the characteristic patterns of classroom interaction noted earlier; some indications could also be found for an association between reasons given by the teachers and the constructs they used to assess pupils. For example, probationers, who were more concerned with behaviour assessments of children, also tended to give more reasons for instructional questioning concerning pacing, attention and balance, which could be considered as predominantly managerial, behavioural functions. These results may offer some support for Lundgren's (1972) suggestion that different groups in the class fulfil different roles, and that the teaching process may result in the formation of particular groups, such as "the steering group" or "the structuring and initiating discussion group".

The finding in pilot study 4 of a close relationship between teacher-derived clusters of pupils and pupils' friendship choices led to the examination of the mechanism suggested by, amongst others, Silberman (1969) and Nash (1973), that teachers influence pupils' perceptions of themselves and therefore their friendship groups which are assumed to be formed through homophillic selection, together with the contrasting view of Brophy and Good (1974) that pupils have as much influence upon classroom processes as teachers. An association was hypothesized between teachers' ratings of pupils and pupils' self-perceptions and friendship choices, and was later elaborated after noting the reactive nature of probationers' interactions and the proactive nature of the experienced teachers'. Teachers' assessments of pupils and pupils' self-assessments were in fact found to correlate more highly in the first term with probationers and in the second term with the experienced teachers. A cross-lagged panel analysis suggested that the dominant direction of influence between the two assessments was in the direction of pupils' self-assessments influencing probationers' assessments of ability/intelligence but experienced teachers' assessments influencing pupils'. However, in the case of teachers' assessments in both terms, probationers were as stable in their assessments as experienced teachers and pupils were generally much less stable in their assessments, although those of pupils in experienced teachers' classes were marginally more stable. This was interpreted in terms of pupils' self-perceptions 'drifting' during the course of the year, and where regular cues regarding the teachers' assessment of the pupils were provided (more probable in the case of proactive teachers), the pupils' perceptions may have drifted in the direction of teachers' and become stabilised. However, it was found that clusters derived from teachers' ratings of pupils bore little relationship to the friendship choices of the pupils. This could be interpreted as factors other than teachers' perceptions of pupils determining pupils' friendship choices, although it is also possible that teacher influence upon friendship choices may only occur in the case of some pupils on some occasions, and consequently the form of investigation adopted here is inappropriate for detecting a relationship of such nature and strength.

As can be seen from Table 12.1, most of the initially proposed hypotheses receive some support from the data analysis.

1. Experienced teachers assess their pupils more quickly than beginning probationer teachers (i.e. attribute more qualitites to more children, early in the term)	Supported (Number of attributes per pupil given by experienced teachers, significantly exceeded the number given by probationers in the first term but not in the second).
2. Experienced teachers' assessments of their pupils are more stable over time.	Unsupported (Correlations on rating scales between terms were not higher for experienced teachers, although factor structures of ratings were more stable for experienced teachers.)
3. There are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them.	Supported (Several clusters emerged from the cluster analysis of teachers' ratings, which were associated with particularly high or low levels of instructional questioning or with high levels of disciplinary contact.)
4. These associations are stronger amongst experienced teachers than probationers	Unsupported (Clusters which were identified with characteristic interaction patterns occurred as frequently, and with equally strong associations, with probationers as experienced teachers.)
5. Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour.	Supported (Teachers stating particular reasons for their behaviour during running commentaries were better represented amongst those exhibiting the expected cluster-interaction patterns.)
6. The reasons given by experienced teachers, which account for their classroom interactions, are different from those, given by probationer teachers, which account for their classroom interactions.	Supported (Experienced teachers gave involvement and marginally more pedagogic reasons whereas probationers gave more pacing, checking understanding, balance and attention reasons; these reasons also generally coincided with expected construct and interaction patterns.)

Table 12.1

Proposed Hypotheses and Main Sources of Evidence Supporting or not Supporting Them.

7. a) The correlation between teachers' assessments of pupils and pupils' self-assessments in the first term will be greater in the case of probationer teachers	Supported
b) In the second term data, an equal or higher correlation will exist between experienced teachers' assessments of their pupils and pupils' self-assessments than between the probationer teachers' assessments and their pupils'.	Supported
c) In the case of probationers, the correlation between the teachers' first term assessment and the pupils' second term self-assessment will be lower than the correlation between the pupils' first term self-assessment and the teachers' second term assessment, whereas in the case of experienced teachers the opposite will hold true.	Supported
d) The stability of pupils' friendship choices between terms will be greater in the case of probationer teachers.	Unsupported
e) There will be a greater degree of similarity between pupil-determined groups and the clusters derived from the cluster analysis of teachers' ratings, and this degree of similarity will be greater in the probationers' classes in the first term but greater in the experienced teachers' classes in the second.	Unsupported (Congruence between clusters is little better than chance).

Table 12.1 (cont'd)

Although the hypothesised relationships amongst teachers' perceptions of pupils, their classroom interaction, their reasons for action and the perceptions which pupils have of themselves are not always very strongly and significantly demonstrated, two main factors hinder the finding of strong relationships: firstly, in classrooms, where a virtually infinite number of variables may be in constant interaction with one another, patterns amongst variables may be easily obscured; secondly, some of the measures adopted in this study such as the identification of teachers' reasons for their behaviour, are sufficiently crude as to limit the finding of very specific trends.

Some of the differences which were hypothesised between experienced teachers and probationers were clearly not found. Experienced teachers' assessments between terms, for example, were no more stable than those of probationers, and the association between perceptions of pupils and classroom interaction was no more evident amongst experienced teachers. These findings suggest that all teachers' perceptions and interaction patterns may be equally liable to change; probationers may simply differ from experienced teachers in the nature of their perceptions and the nature of the interactions in which they engage.

In addition to indicating where there is support for the proposed hypotheses, the results of this project also help in providing some insight into the nature of teachers' classroom decision-making. As would be predicted from the model, teachers' commentaries support the notion of teaching as a routinised, rule-governed activity. There is no evidence of any formal decision-making, and several 'rules for action' or 'heuristics' appear amongst, or could be reasonably inferred from, teachers' commentaries, (e.g. "If the poorer ones have their hand up, I prefer to ask them to see if they understand", "If they can't get an answer, I rephrase it to bring it back to basics"). As noted earlier, many of these rules require teachers to differentiate amongst pupils, generally in terms of ability, behaviour or participation level. Occasions also seem to occur, however, where two heuristics are considered simultaneously and one takes precedence over the other. For example, teacher 12 reports, "Would like to have gone more into it, but the only way of getting feedback was Carol, so I didn't" which suggests that balancing the distribution of interaction throughout the class (the teacher had previously addressed several questions to Carol) and following up a particular part of the lesson by questioning a pupil, were both in the mind of the teacher, although the former, apparently 'automatically', took precedence. Rare occurrences such as this were the only times during the stimulated commentaries when teachers appeared to make any decisions, in the sense of choices, at all, but even here there was no apparent evaluation of alternatives. It could be speculated that instead teachers may have some form of organised cognitive network of rules or heuristics, of which pupil differentiations clearly form a part, and consequently pupil attributes, such as ability, behaviour and participation level, become important distinctions for teachers to make in order to carry out their classroom activity.

Some patterns of interaction which coincide with the use of particular heuristics appear to be common features of teaching, and these interaction patterns also occur with some teachers who have not expressed the use of the heuristics. Although this could be due to the small sample of stimulated commentaries, another interpretation could be that certain regularly occurring sequences of behaviour are, as suggested, automatised and are adopted by teachers who, in some cases, possess a low level of awareness of why they are behaving in a particular way. Teaching may involve a large number of automatised sequences of behaviour, some of which at least appear to be associated with particular heuristics. Consequently, from the features noted here, teachers' classroom decision-making would seem to be quite appropriately described by the proposed decision-making model.

However, it would also seem from the data analysed in this project that pupils may be to some extent influential in determining the classroom interaction and the perceptions formed of them by the teacher, especially in the case of probationer teachers. This trend might be expected if probationers in fact have a less established means of typifying the pupils and a less integrated network of heuristics with which to determine their behaviour in the classroom.

Throughout the analysis of the data some consistent individual differences amongst the teachers have occurred which also lend support to the relationships between teachers' reasons for action, their perceptions of pupils and their classroom interaction, and also provide some insight into an apparently developmental process of learning to make classroom decisions. Probationer 1, for example, who was the only teacher who appeared to quite radically change her perceptions of pupils over the term, also made the least number of attributions concerning her pupils, and had one very large cluster of pupils in both terms with few pupils differentiated from it. She was also amongst those giving relatively few child-differentiating reasons in her running commentary; in her classroom in both terms there was a significant correlation between teacher-initiated and pupil-initiated classroom interaction; and there was a high level of congruence between the clusters derived from her ratings and the pupils' friendship choices. These results could be taken to indicate a probationer who has been slower than most to assess her pupils and to integrate these assessments into her rules for classroom interaction, and whose perceptions of pupils and classroom interactions have been quite strongly influenced by her pupils.

Teachers 7, 9 and 11, who were the eldest, and most experienced teachers in the sample, also consistently differed from other teachers. They made more attributions concerning academic features of the pupils, the factor analyses of their ratings resulted in predominantly academic factors, their interaction with pupils was almost wholly teacher-initiated, consisting of instructional questioning, and the reasons given during running commentaries for their behaviour were mostly pedagogic. These teachers appear to be largely concerned with pedagogic classroom activity and accordingly their differentiations amongst pupils were of an academic nature and their interactions instructional and teacher-initiated.

Many of the differences which were found between experienced teachers and probationers could be interpreted in terms of Brophy and Good's (1974) proactive/reactive distinction. Probationers were generally slower to assess their pupils; more child-initiated interaction occurred in probationers' classrooms; the correlations between teachers' assessments and pupils' self-assessments suggested that pupils may have influenced probationers' assessments of them, whereas experienced teachers influenced their pupils' self-assessments. Such findings lend support to the general notion that probationers tend to be reactive, allowing children to influence classroom interaction and the teacher's own perceptions of them, whereas experienced teachers tend to be pro-active, developing expectations for the pupils and maintaining the initiative in classroom interactions, although, as pointed out earlier, it is possible that proactive teachers may be to some extent lessening the occurrence of child-initiated interaction by knowing their pupils and their subject matter well, anticipating difficulties and dealing with them before the need for child initiation arises.

Another consistent trend occurring in the results provides still further support for the conception of a developmental pattern in decision-making in which beginning teachers may slowly change in the nature of their heuristics, perceptions and classroom interactions as they become more experienced. Of the three probationer teachers with greater teaching experience (probationers 2, 5 and 6) and teacher 12 who had taught for one year, either all or some of them frequently appeared mid-way between experienced teachers and probationers on the measures taken. For example, in all four cases, the number of attributions which they made per pupil were in the middle of the extremes made by probationers and experienced teachers; pacing and balance reasons occurred in teacher 12's commentary whereas the only other teachers stating such reasons were probationers;

and high correlations between teachers' ratings of pupils and pupils' self-ratings occurred with probationers 2 and 6 in the second term, although this was generally only found amongst experienced teachers.

Developmental trends in the process of learning to teach have frequently been suggested (e.g. Fuller, 1969; Evans, 1976). The novice teacher is often construed as entering the classroom with little understanding of what she wants from the class and even less understanding of how she is going to achieve her goals. Her main preoccupation is reported to be with keeping order, or 'survival', and as her experience of teaching grows, it is suggested that her concerns may gradually broaden to encompass academic issues such as the day-to-day learning and progress of her pupils.

Teachers' classroom decision-making could well develop in a similar way. The beginning teacher's'survival' concerns may result in the adoption of particular management heuristics, and influence the distinctions which she draws amongst her pupils, and the ways in which she interacts with them; as her concerns become more academic, her rules for action may become more pedagogically-oriented, she may find herself differentiating amongst pupils in different, more learning-centred ways, and interaction with pupils may change, possibly becoming more proactive; at this point, she may also be likely to have more effect upon the pupils, certainly in as far as they perceive themselves. Consequently, in terms of the proposed decision-making model, the difficulties which face the beginning teacher in making classroom decisions may be construed in terms of forming rules which guide her actions automatically, depending perhaps upon the functions which are predominant amongst her concerns, and being able to make appropriate differentiations, often amongst pupils, so that these rules or heuristics may be put into practice. These problems may continue to face teachers throughout their careers - at different times, teachers may find different heuristics, different classroom behaviour and different pupil distinctions appropriate - although the analysis undertaken in this study would suggest that, apart from some rapid changes at the outset of a teacher's career, the process of change in teachers' classroom decision-making may well be slow.

In spite of the differences which have been found between experienced teachers and probationers, however, it should also be stressed that many of the findings in this study, relating to perceptions, behaviour, and reported cognitions, were common amongst the sample. The type of attributions made by teachers of their pupils, for example, and even the vocabulary used by the teachers, followed a fairly standard pattern, with considerable emphasis on general ability, general behaviour and talkativeness. The factor analysis of teachers' ratings resulted in one or two factors, generally of an academic or academic and behaviour variety. The cluster analysis of teachers' ratings resulted in similar numbers of clusters and in some common types of clusters. Classroom interaction for most teachers involved a relatively high proportion of instructional questioning. And in giving running commentaries, the sample of teachers tended to give fairly similar repertoires of reasons for their behaviour. These common features amongst teachers could be interpreted as teaching being a largely unvaried activity; perhaps, as suggested by Lundgren (1972) and Sharp and Green (1975), the nature of teaching is such that teachers necessarily perceive and act in particular ways; or perhaps conformity pressures or 'socialization' operate strongly amongst teachers.

Having outlined a conception of decision-making, and a developmental process in classroom decision-making, which is derived from the results of this project, it is possible to evaluate the appropriateness of the model of classroom decision-making proposed in chapter 6. A model's appropriateness is the extent to which it fits the nature of that which it attempts to explain, and the model could be deemed appropriate if the concepts within it ('heuristics', 'automatised behaviour', 'trait packages') can be identified in real classrooms, and if the relationships amongst the concepts appear to exist as predicted. In this project, as previously noted, teachers did appear at times to respond in a rule-like fashion, and when talking of their teaching sometimes reported what may be described as 'teaching heuristics' or 'rules for action', these heuristics often referred to teaching behaviours which appeared in some cases to be regularly occurring and routinised, and amongst the reasons for these behaviours, pupil characteristics were frequently quoted. The individual differences amongst teachers described above also support the hypothesised associations amongst heuristics, classroom interaction and teachers' perceptions of pupils. Consequently, the proposed decision-making model gains considerable support from the results of this project.

Some further supporting evidence for the proposed model of teacher decision-making comes from a recent, as yet unpublished, study by McKay and Marland at the University of Alberta. McKay and Marland (1979) carried out an investigation of teachers' thought processes during interactive teaching, using a sample of 6 teachers, whose lessons were videotaped for two separate one-hour sessions. Two edited segments, 20 - 30 minutes in length, were produced from these videotapes to stimulate teachers' recollections of their thoughts and feelings during teaching, in an interview held at the end of the school day. McKay and Marland's teachers were well prepared for their commentaries: before each period of videotaping, the teachers were interviewed to determine their goals and any plans or procedures that they intended to use during the lesson to achieve these goals; they were also told of the aims of the project and were asked in advance of the video-taping to provide a detailed account about "(a) thoughts, feelings and moment to moment reactions, and (b) conscious <u>choices</u>, <u>alternatives</u> considered before making a choice, and the <u>reasons</u> for making a choice" (p.4; the emphasis is theirs). Before giving their commentaries teachers were also allowed to view their own videotapes. Whether this degree of preparation may result in teachers imposing a greater degree of 'rationality' upon their behaviour than would normally be evident, is unknown, but it may be the reason why, as McKay and Marland report, the technique resulted in "masses of verbal report data" (p.5).

The thoughts, reported by teachers, which referred to interactive teaching, were coded into eleven categories (viz. perceptions, interpretations, prospective tactical deliberations, retrospective tactical deliberations, reflections, anticipations, information - pupil, information - other, goal statements, fantasies, and feelings), which were derived by the researchers from their "familiarization and preliminary analysis of the data" (p. 6). Each category was further analysed in terms of the referents of the thoughts (e.g. lesson content, materials, pupil characteristics, etc). The commentaries were also examined for the occurrence of decisions (where alternatives have been considered and a conscious choice made), deliberate acts (where the next tactic has been planned but no alternatives have been considered), proactive teaching (where personal interaction with a student reflects deliberate planning and control), principles (working hypotheses), and case histories (series of facts, opinions, beliefs etc. about a student).

McKay and Marland are wary of making generalisations from such a small sample, and presumably for this reason, rather than reporting statistics, report what they see as observable trends. Their analysis suggests that teachers most frequently recalled thinking about the instructional tactics they were going to employ next in the lesson (prospective tactical deliberations) and about what had already occurred in the lesson (reflections): these together accounted for almost half of all the reported thoughts, but McKay and Marland report that the teachers tended to use information which they possessed about pupils when thinking about their classroom interactions.

The researchers found few cases where teachers made decisions during lessons, and where decisions were made there were generally only two alternatives considered; McKay and Marland also quote other unpublished American studies which support this finding in the analysis of teachers' stimulated recall commentaries. Far more frequently, teachers reported engaging in deliberate acts. Amongst the decisions and deliberate acts made by teachers, inferences made by teachers concerning their pupils were greatly in evidence, and McKay and Marland point out that teachers frequently attributed to pupils certain motives for behaving and responding as they did and, also, certain needs and desires: the researchers' suggestion is that these inferences about pupils are frequently used to tailor teaching behaviour to individual pupils, although it would seem from the present project that although teachers' perceptions of pupils relate to their differential behaviour towards pupils, the functions of this behaviour rarely relate to tailoring pedagogic behaviour to individual pupils and probably more often relate to the functions of general classroom management. McKay and Marland report that teachers during their running commentaries frequently launched into giving case histories of particular pupils, these were worded in "common terms from everyday conversation" (p. 16) and the same groups of pupils tended to be discussed by the teachers in both commentaries. McKay and Marland also list cases where teachers have reported their awareness of interacting differentially with particular types of pupils (e.g. always accepting an answer from a shy, introverted child, and rarely accepting answers from pupils attributed with undesirable motives). The teachers also spoke of several teaching principles which reportedly influenced their classroom behaviour (an example quoted in the report is discriminating in favour of a shy, low ability group). McKay and Marland also note that during the commentaries there is little mention of lesson plans.

McKay and Marland's work, although adopting different procedures and using a small sample of American teachers, both of which may have influenced the results obtained, tends to confirm that for a few pupils at least, teachers have built up quite elaborate 'trait-packages' which are conceptualised in everyday terminology, and parts of which are concerned with attributions of motivation. McKay and Marland suggest that these 'trait-packages' influence teachers in their interactions with at least some pupils of the class. These findings, together with the frequent reporting of teaching principles and the proportionately high occurrence of deliberate acts, noted by McKay and Marland, could also be interpreted as support for the heuristic model of teacher decision-making proposed here.

Obviously, much more research is required in order to define and more clearly conceptualise the thought processes involved in classroom teaching. However, what is presently known of how teachers make their classroom decisions suggests that the decision-making model, proposed in this study, may be an appropriate conceptualisation of some of the processes involved; and the model may possibly serve the function of stimulating the necessary further research.

2) Research issues arising from this study.

In a project considering the relationships of teachers' thought processes to their classroom behaviour, it is inevitable that several research problems should be encountered. These problems fall into two main categories: those dealing with the question of appropriateness of research methods, and those relating to the forms of analysis which are required for the kinds of hypotheses and data involved in decision-making research.

Concerning research methods, it would seem that virtually all of the variables of interest in the present study involve some difficulties in their valid, accurate assessment. In investigating teachers' assessments of pupils, the problem arises of how the ways in which teachers think about pupils can be validly accessed and described. Rating and repertory grid techniques are the most common methods of quantifying teachers' assessments; both however, have associated problems. Scales produced by the researcher for use by teachers may comprise irrelevant constructs, the constructs are also open to various interpretations by the teachers, hence generalisations amongst the teachers' ratings become meaningless. Repertory grid techniques tend to produce lists of attributes, some of which are clearly irrelevant to the teachers' classroom activity; they are conceived by teachers in a variety of contexts, which they may not consider when they later rate the individual pupils upon the scales. It would seem, in fact, from what teachers say in describing their pupils that teachers use quite a large number of attributes but many of these attributes are applied to only a few (often only one or two) children in the class. Attributes such as "good general knowledge", "likes to bring things in", "the others laugh at him and he enjoys it" and "a sleekit child" were amongst the attributes used by teachers in this study but which were applied perhaps to only one or two pupils in a class. Some of these attributes may be significant determinants of the teachers' interaction with those children but would clearly not be applied to other children in the class; the use of rating scales developed from these attributes would probably result in little variance throughout the sample on individual attributes and would involve very lengthy assessment instruments. In several cases, the attributes which teachers give their children concern motivational characteristics which may be useful to teachers in predicting how pupils are going to behave; such attributes are sometimes accompanied by the teachers' own rules for action (e.g. "He likes to play about but if you settle him down right at the beginning you can get some good work out of him").

The use of rating scales undoubtedly produces very global measures of teachers' assessments of their pupils and clearly loses many of the idiosyncratic and possibly, to teachers, significant attributes made of a few pupils. On the other hand, rating scales do produce data which is convenient for analysis; and data which more accurately reflects how teachers think about their pupils, which makes explicit the context within which teachers are assessing their pupils, and which indicates significant attributes even although they are rarely attributed to pupils, is clearly more difficult to obtain and certainly more difficult to analyse.

Although behaviour and ability appear from this study to be the major concerns of teachers in assessing their pupils, teachers' assessments may in fact be far more complex, and the identification of classroom mechanisms, involving differentiation amongst pupils, other than the fairly macroscopic ones noted here, may first of all require the exploration of techniques for measuring the types and strengths of attributions which teachers give their pupils.

The results of this study also imply difficulties in the measurement of classroom interaction. For example, from the teachers' running commentaries it is clear that instructional questioning can serve various functions for teachers: amongst such functions would be to check whether a particular pupil understands; to continue or speed up the lesson by asking a pupil whom the teacher knows will give a correct answer quickly; to channel the attention of an inattentive pupil; or simply to even out the teachers' distribution of pupil contacts. The way in which a pupil's response is interpreted and acted upon by a teacher may also be partly determined by the function of the teacher's question. For example, if a pupil expected to give a ready answer to speed up the lesson fails to do so, this may be interpreted in terms of the subject matter being difficult, and part of the lesson may be repeated, whereas an inattentive pupil being unable to answer may confirm the teacher's suspicions that the pupil has not been paying attention and may result in a reprimand or the direction of more questions at a later time. Pupils may also perceive, categorise and respond to different teacher contacts in different ways. However, to an observer, distinctions amongst behaviours in terms of their functions are impossible to draw, yet in order to answer many questions concerning classrom processes, an understanding of teachers' and pupils' interpretations of classroom behaviours is obviously required. It was noted in Chapter 3 that systematic observation, widely used in the study of classrooms, identifies what Kaplan (1964) terms the "action meaning" of behaviour, the meaning behaviour has to an observer because of the shared definitions of behaviour within a culture, and clearly in order to develop an understanding of classrooms in terms of the meanings of behaviour to its participants, and to relate these meanings to observed behaviour, an appropriate complement to the method is required.

This task, however, raises the difficulty of gaining access to teachers' cognitions. De Groot (1965) points out that in some human problem solving situations, generally those involving "automatic responses", subjects are unable to answer such questions as "How did you do it?" and that even in non-automatic response situations, only some specific behaviours can be accounted for by subjects. The method of stimulated recall has been adopted in several areas of research in order to increase the level to which subjects report their cognitions, but the method has only recently been adopted in the study of teaching; there is only a small amount of literature reporting its use, and little consideration has been given to the status and significance of stimulated commentaries, how validly they reflect normal thought processes, and the conditions under which valid commentaries are facilitated.

Teachers certainly differ considerably in the extent to which they talk during stimulated commentaries. It is possible that some may respond differently to tape-recordings of their lessons depending upon the instructions given or other circumstances which prevail. The motivations of teachers or their concerns with presenting themselves in a particular image may influence their commentaries. The training of teachers in self-monitoring for this type of research could be a possibility worth consideration. Alternatively, research of this nature may perhaps be concentrated on teachers able to provide full commentaries; from these commentaries, models of teaching processes may be constructed, which, if they yield predictions concerning the nature of classroom interaction or the major concerns of the teacher, could be tested with another sample of teachers, and the research tools adopted could be more structured, relying less upon the 'free response' of the teachers.

Similarly, methods such as simulation have been used in problem-solving experiments, but rarely in research on classroom processes, and again little consideration has been given to the status and validity of the data collected.

Clearly there are difficulties in developing appropriate and valid methods of research concerning teachers' cognitions. The study of pupils' cognitions is even further complicated by difficulties in obtaining appropriate rapport with the pupils; it may be argued that pupils are even less likely than teachers to appreciate the necessity of research rigour and may be inclined to complete rating scales, answer questions, or justify their behaviour less than honestly. At present, studies in classroom cognitions are possibly as likely to point out problems of methodology as they are to yield fresh knowledge in the area of classroom decision-making, and there is considerable scope for experimentation and refinement of research methods appropriate for this area of study.

Research on classroom decision-making also encounters problems of analysis, which would be easier to solve in the context of a broad history of empirical research. For example, numerous cluster analysis techniques are available which can, in some cases, yield considerably different results, yet little debate and experiment has taken place regarding the most appropriate techniques for this type of study, and few studies are available from which to examine the relative merits and demerits. Interaction analysis and teachers' running commentaries also suggest that behaviours and cognitions occur in sequences (for example, a teacher asks a question of a low-ability pupil, the pupil cannot answer, the teacher becomes aware of losing the class's attention and so addresses the question to an able child, remembering to return to the former child at a later time); such sequences may be more 'natural' units of classroom activity, being closer to teachers' and pupils' conceptualisation of it, yet few attempts have been made to develop research designs or techniques of analysis for identifying classroom behaviour sequences.

The fact that different teachers may have different intentions and different ways of conceptualising similar behaviours also emphasises the importance of treating data collected from teachers individually rather than <u>en masse</u>. Garner and Bing (1973) for example, cluster analysed all teachers' ratings together, combined with other classroom data, after scores had been standardised; such analysis both eliminates the influence of the better discriminating variables and makes the assumption that all teachers used the rating scales in a similar way; this could well result in the overlap of individual teachers' clusters and the subsequent loss of some clusters and the emergence of others with considerable variance in their ratings. Similarly, Solomon and Kendall (1977) inter-correlated the ratings taken from a number of teachers, these correlations forming the basis of a factor analysis. Again differences amongst teachers, both in their interpretation of the scales provided and in their use of scales, were uncontrolled. In considering the relationships between teachers' perceptions and behaviour, the differences amongst teachers on these variables may be sufficiently great to obscure some relationships when the data for all teachers is combined.

Another problem of analysis which arose from this project was the criterion of significance when significance tests themselves are inappropriate: when clusters are of unequal sizes and variance in teacher interactions within clusters is sometimes high, differences in interaction amongst clusters cannot be appropriately tested by F- or t-tests. The possibility of interacting factors obscuring the differences in interaction amongst clusters also emphasises the need for more elaborate research designs, together with more appropriate methods of analysis, in order to identify anything other than global trends in the distribution of interaction.

Given that the methodology and forms of analysis in this area of research require experimentation and refinement, it would also seem advisable that any replications of this project consider a larger sample of teachers and accumulate larger amounts of interaction data from each classroom, hence possibly making trends amongst clusters, and trends between samples of teachers, more apparent. However, in initial studies of teachers' cognitions and behaviour, there may be more advantages in a case study approach. In the study of a very small number of teachers, a wider range of individual cognitions and behaviours, specific to each teacher, may be considered, the researcher has more opportunity to gain insight into the teachers' own perspectives on classroom processes, and specific classroom mechanisms are perhaps more likely to be identified, especially if the teachers studied are able to give detailed commentaries upon their lessons. Once a repertoire of classroom mechanisms has been described, then studies involving larger samples may more appropriately consider the generality of such mechanisms amongst classrooms.

At the present time, there is clearly much research which can be carried out on classroom processes and decision-making and on its associated methodologies and forms of analysis. It is perhaps also important at this time to consider the direction of such research, the questions which it may aim to answer, and the usefulness of such answers, since it will be largely the practical pay-offs of decision-making research which will determine whether this way of conceptualising classrooms and carrying out research will be pursued.

3) The Practical Applications of Decision-Making Research.

A model of teachers' classroom decision-making, which relates classroom interaction to teachers' rules for action and perceptions of pupils, implies particular types of answers to some practical teaching problems.

For example, the fact that a teacher's behaviour may serve different functions on different occasions may present problems for the beginning teacher, learning the skills of teaching. As suggested by Joyce and Harootunian (1964), trainee teachers possibly copy and learn the sequences of behaviour exhibited by other teachers but it is possible that the discriminations which are associated with the behaviours are not so easily identified, and may not be so easily learned. Wagner (1972) suggests that learning certain cognitive discriminations is as effective as microteaching in learning some teaching techniques. The development of classroom decision-making theory may result in a conceptualisation of teaching which enables it to be described cognitively as well as behaviourally and hence may prove facilitative in the training of teachers. The furtherance of empirical research in teachers' classroom decision-making may result in a body of knowledge relating certain cognitions to behaviours in particular areas of teaching. For example, several of the teachers in the sample of this study reported difficulty in the teaching of 'creative writing'*; all followed the technique of producing an object or topic to write about, spending half an hour or so talking about it, producing much "creative" vocabulary on the board and leaving the children to write: the technique was not regarded by the teachers as effective. However, in this sample of teachers, attributes such as "has a good vocabulary", "is good at coming up with ideas", "can express himself well" which one might imagine to be useful discriminations to make amongst pupils in the teaching of creative writing, were very rarely used. An empirical investigation of the pedagogical behaviours of a sample of teachers, rated by some criteria as good at teaching creative writing, and of the discriminations which they make amongst the pupils or amongst classroom events may, compared to the behaviours

* the term was used loosely by teachers to refer to all the composition or "story writing" of the pupils.

and discriminations of other teachers, help to reveal the 'skill' of teaching creative writing, and may for other teachers facilitate the learning and integration of the appropriate behaviours and cognitive discriminations. Similar research could be carried out to help identify the difficulties in teaching other subject areas, or to identify problems of classroom management or class discipline.

Teacher decision-making research may further add to the understanding of teachers' assessments of pupils, and the relationship of these assessments to teaching behaviour. Although primary school teachers have had greater responsibility in the assessment of their pupils since the abolition of the 'eleven-plus' or 'qualifying test', little is known about how teachers actually assess their pupils or how reliable or finely-discriminating their assessments are. It would seem from this study that teachers' assessments may be related to the functions of teachers' behaviour and may figure largely in the cognitive processes of teachers. However, the assessments which teachers in this study appeared to make of their pupils, and those revealed in other studies of teachers' perceptions of their pupils, indicate a marked emphasis upon general ability and behaviour constructs. This study would further suggest that these constructs are useful to teachers in coping with some regularly occurring managerial situations, such as maintaining pupil attention, checking understanding, and keeping a lesson 'flowing'. Possibly such managerial situations play a large part in everyday teaching, but it would seem inevitable that teachers, perhaps when instructing individual, or groups of, pupils, or when assessing the pupils' work, also make more detailed diagnostic assessments of their pupils which guide their teaching. Assessments such as "doesn't appear to understand what a sentence is", "fails to calculate appropriate common denominators when adding and subtracting fractions", "has poor physical coordination", "can't join letters together" might be expected in different areas of the curriculum. Yet these types of assessments were rarely found amongst the attributions or commentaries noted in this study, and do not seem to have been much in evidence in other studies of teachers' assessments. Possibly the research methods adopted, and the time and place of inquiring into teachers' perceptions influences the kinds of results obtained: possibly, at the end of the school day, when asked to talk about, or rate, her pupils, the teacher tends to think of the general differences amongst the pupils, whereas more specific assessments may perhaps only be brought to mind during the interactive teaching process. In any event, the study of whether in fact teachers make diagnostic assessments and how they relate to teaching practice is clearly an important area of study.

As suggested above, the identification in this project of particular associations between teachers' managerial functions and teachers' perceptions of, and interactions with, their pupils may be due to the nature of the research tools and research design adopted. The classrooms were only observed during periods when the teacher was teaching the whole class (a time when managerial concerns such as maintaining attention and the flow of the lesson may be more prominent), only a crude classification of the type of interaction and a measure of its distribution throughout the class was taken, and general assessments of pupils were obtained. Different research tools may have highlighted other associations. For example, the investigation of pedagogic functions may be facilitated if attention is directed to the times of the day when the teacher is interacting with an individual or group of pupils, if other features of interactions, such as the difficulty level of questions, are considered (as noted in the discussion of the matching function in chapter 10, such discriminations would be essential to assess the influence of such functions on teaching behaviour), and if teachers' assessments could be investigated in greater detail. The nature of the research tools and research design adopted in this project restricted the areas in which it was possible to find associations amongst reasons, perceptions and behaviour, and clearly a much broader use of tools, and the matching of appropriate tools to the area of interest, is called for in future research.

Several other areas have also been suggested (see the review of classroom decision-making literature in Chapter 2) where it can be foreseen that classroom decision-making research may have relevance and value. Eggleston

(1977), for example, suggests that research into teachers' classroom decision-making may reveal useful information on how teachers structure and use curricular material, why they structure it in such ways and what restraints they perceive upon their decision-making. Such knowledge could aid the development of curricular material which more closely serves the functions identified by teachers, and consequently may result in more effective classroom teaching and learning.

The question of teacher effectiveness itself has been an important issue in educational research, especially over the past decade or two, but it is plagued with many conceptual and methodological issues. If decision-making research leads to the identification of mechanisms suggesting that teachers interact differently with different pupils for different purposes, this could in turn help to illuminate cause-effect mechanisms within the classroom and add some conceptual clarity to the effectiveness debate.

Classroom decision-making was initially viewed as a problem to the beginning teacher learning to make sense out of the classroom environment, possibly part of what Evans (1976) terms "the culture shock of beginning teaching". The problems of how teachers made decisions, what decisions were made and what teachers learned about making classroom decisions seemed important questions in identifying and clarifying how teachers learn to teach. Clearly several practical problems in the area of teaching can in fact be conceptualised within the framework of teacher decision-making. The degree to which this conceptualisation is deemed adequate or worth further consideration will be determined by whether future decision-making research can answer the questions posed by teachers and teacher trainers, and find satisfactory solutions to educational, and particularly classroom, problems.

SUMMARY

The relevance of decision-making to classroom teaching and to questions concerning teacher effectiveness, teacher training and curricular innovation has been noted by several researchers. However, teachers' classroom decision-making has frequently been conceptualised as a stage-wise, problem-solving task, involving the evaluation of alternative courses of action, and this would appear to be incompatible with the severe time restrictions experienced by teachers in real classrooms. Exploratory studies, investigating classroom interaction and teachers' and pupils' perceptions of it, involving observation, structured interview, repertory grid and rating methods, simulation, stimulated recall and sociometric methods, suggested in fact, that rather than making decisions, teachers tended to respond spontaneously, in a seemingly rule-governed manner, to configurations of cues in which pupil attributes ranked high in importance. A model of teachers' classroom decision-making was derived from the exploratory studies and previous research, and it was suggested that the difficulties encountered by beginning teachers in making classroom decisions could be accounted for in terms of their lack of a cognitive framework of rules for action and their appropriate pupil distinctions. A main study involving six first-year probationer teachers and six experienced teachers was carried out to examine seven hypotheses concerning the

inter-relationships of teachers' assessments of their pupils, classroom interaction, teachers' reasons for their classroom interaction and pupils' self-perceptions and the difference between experienced teachers and probationers on these variables:

hypothesis 1) Experienced teachers assess their pupils more quickly than probationer teachers (i.e. attribute more qualities to more children, early in the term);

2) Experienced teachers' assessments of their pupils are more stable over time;

3) There are associations between the ways in which teachers perceive their pupils and the ways in which they interact with them;

4) These associations are stronger amongst experienced teachers than probationers;

5) Some of the unequal distribution of teacher-pupil interactions can be accounted for by the reasons which teachers give for their behaviour;

6) The reasons, given by experienced teachers, which account for their classroom interactions, are different from those, given by probationer teachers, which account for their classroom interactions;

7) There is a relationship between a teacher's assessments of his/her pupils and the pupils' perceptions of themselves and their friendship choices.

Hypothesis 7, which was intended to illuminate the extent to which pupils may influence the learning of beginning teachers, was further subdivided into five more specific hypotheses, after the finding that the probationer teachers in the sample were more reactive in their classroom behaviour, whereas experienced teachers tended to be more proactive; hence it was anticipated that probationers' assessments of their pupils would be more influenced by the pupils' assessments of themselves, whereas the experienced teachers may be more effective in communicating their assessments to the pupils and thus influencing their pupils' self-perceptions.

Teachers' verbal descriptions of pupils, teachers' ratings of pupils, classroom interaction data, and pupils' self-ratings and sociometric data were collected at the beginnings of both the first and second terms,of the school year. In addition, teachers each gave a commentary stimulated by a tape recording of a lesson taken in the second term.

It was found that experienced teachers made more attributions concerning their pupils than did probationer teachers, although their ratings of pupils were no more stable between terms. A cluster analysis of teachers' ratings resulted in some common clusters which tended to engage in characteristic patterns of interaction, but the differences in interaction amongst clusters were not statistically significant. Teachers who had given particular reasons for their behaviour, which differentiated amongst pupils, were found to be better represented amongst groups of teachers associated with particular cluster/interaction patterns. Although the reasons given by experienced teachers differed to some extent from those of probationers, the occurrence of patterns of interaction with particular clusters was neither more common amongst experienced teachers nor more significant. Consequently, analysis of the data indicated some support for hypotheses 1, 3, 5, and 6, and although support was found for the hypotheses that probationers are more influenced by pupils' self-perceptions whereas experienced teachers have a stronger influence upon pupils' self-perceptions, it was noted that pupil self-perceptions were not very stable between terms and could have a tendency to 'drift', possibly, drifting in the direction of teachers' assessments where the teacher is proactive, regularly providing cues regarding her assessments of pupils. It also appeared that clusters derived from each teacher's ratings bore little resemblance to the clusters derived from pupils' friendship choices thus bringing into question the popularly conceived notion of teachers influencing pupil friendship groups. In addition, the data analysis revealed several consistent individual differences amongst the teachers, in particular between the probationers and the older teachers in the sample, which could be interpreted within the proposed model of classroom decision-making.

In general, the nature of teachers' classroom decision-making which is suggested by the results supports the proposed model, and the issues arising from the study, concerning research methodology, data analysis, possible future research studies and their relevance to practical classroom teaching, and in particular the issue of diagnostic assessments of pupils and their relationship to teaching practice, were noted and discussed.

APPENDIX I

SIMULATION EXERCISE.

Initial Instruction Given to Participating Teachers and Students: "I am about to give you a series of situations which may arise in an ordinary primary school classroom. In each case, I'd like you to tell me what more you would need to know in order to make a decision about what to do, and then to tell me what you would do. In each case, please tell me of any assumptions that you make in reaching your decision (for example, class level). Do these instructions seem clear?" (Instructions repeated and clarified if necessary.)

"The first situation is this...

1) You have your class working individually and quietly when a group of children start talking amongst themselves.

2) A girl comes to tell you that a boy in the class swore at her.

3) Your class finish the morning's work half an hour earlier than you had planned.

4) You ask a child a question on what you've just explained to the class, and the child can't answer.

5) A child comes to you with a written arithmetic exercise for marking and you find the child has the whole exercise wrong.

6) When asked to write imaginatively about a picture, a child produces only four short, simple sentences.

7) While you are discussing a topic with the class, a child asks you a relevant question for which you don't know the answer.

8) A child comes to tell you: "Someone has stolen my pencil-case."

9) Everyone has work to do, and you notice one child who has been looking out of the window for the past few minutes.

10) A child who is usually poor at arithmetic surprises you by getting an arithmetic exercise completely right.

11) A child repeatedly comes to you to ask whether he is doing the right thing.

12) One group in the class occasionally interupt an otherwise fairly quiet classroom by giggling.

13) A child answers your question correctly and the rest of the class laugh. The answer given was not, as far as you can see, funny.

14) A child who is normally very good at arithmetic does very badly in an arithmetic exercise.

15) You set the class to work in groups on projects. Five minutes later, you circulate to see how they are getting on. Everyone is working, except for one group who do not seem to have got started.

16) Without warning, a child comes to school in the morning with his pet rabbit to show the class. The class show a lot of interest in it.

17) You have put a lot of work into planning a lesson which you think is interesting, but the class does not respond with any enthusiasm.

18) During a science lesson, where groups are working from work cards, you find one group that has gone off the track of the workcard and are doing their own experiment.

19) It has been a wet playtime and the children have been in the classroom. You planned to do art afterwards. When you come into the classroom, the noise and activity level is high and you have difficulty keeping it down.

20) You have twice tried to explain a new technique to a pupil and he hasn't understood on either occasion.

21) A child comes into the classroom 5 minutes late at the end of a morning break. You ask him where he has been and he replies: "Where do you think?"

Other questions put to the students:

1) "What do you think the teacher's role, or function in the classroom, is?"

2) "Could you describe the type of teacher you would like to be? What qualities, skills, etc. would she have?"

APPENDIX IIa

OBSERVATION SCHEDULE.

Identification Symbol	Definition	Example
QI	A question of an instructional nature, directed by the teacher to one pupil.	"Who can give me another word for 'bright'? ... ... John?"
QM	A question of a managerial nature, directed by the teacher to one pupil	"Which number are you on, Wendy?"
DM	A direction, given by the teacher to one pupil, managerial in nature.	"When you've finished that exercise, bring it out and let me see."
F	A comment, from the teacher to one pupil, concerning feedback on the pupil's performance	"That's fine."
Disp	A disciplinary remark, given by the teacher to one pupil.	"Geoffrey, shut up!"
VIA	Information or a comment, volunteered by one child and accepted by the teacher.	"I've got a picture of Napoleon in my library book." ... "Yes, show me."
VIR	Information or a comment volunteered by one child but rejected by the teacher.	ditto but instead of being accepted, the teacher refuses to listen or tells the child to be quiet.
CQIR	A question, instructional in nature, addressed by one child to the teacher.	"Which 'there' do you use in this sentence?"
CQMR	A question, managerial in nature, addressed by one child to the teacher.	"What do you do next?"

Identification Symbol	Definition	Example
Inst	A period of individual instruction, involving the teacher and one pupil.	Any series of questions or statements which the teacher directs towards a pupil, with the apparent intention of instruction.

<u>Notes:</u>

(1) Every interaction involving the teacher and one pupil is coded.
(2) Very obvious non-verbal interactions are also coded* (e.g. the teacher moving about the room putting ticks on pupils' jotters).
(3) Interactions with class and groups are ignored.
(4) Interactions relating to routine administration such as registers and dinner money are ignored.

* In practice, these always accompanied verbal interactions.

APPENDIX IIb

RELIABILITY CALCULATIONS FOR OBSERVATION SCHEDULE

The reliability trials involved the coding of scripts, where all the verbal interactions involving the teacher during 15 minutes of a lesson were noted. A total of three scripts was used. Percentage agreement was calculated by the following formula:

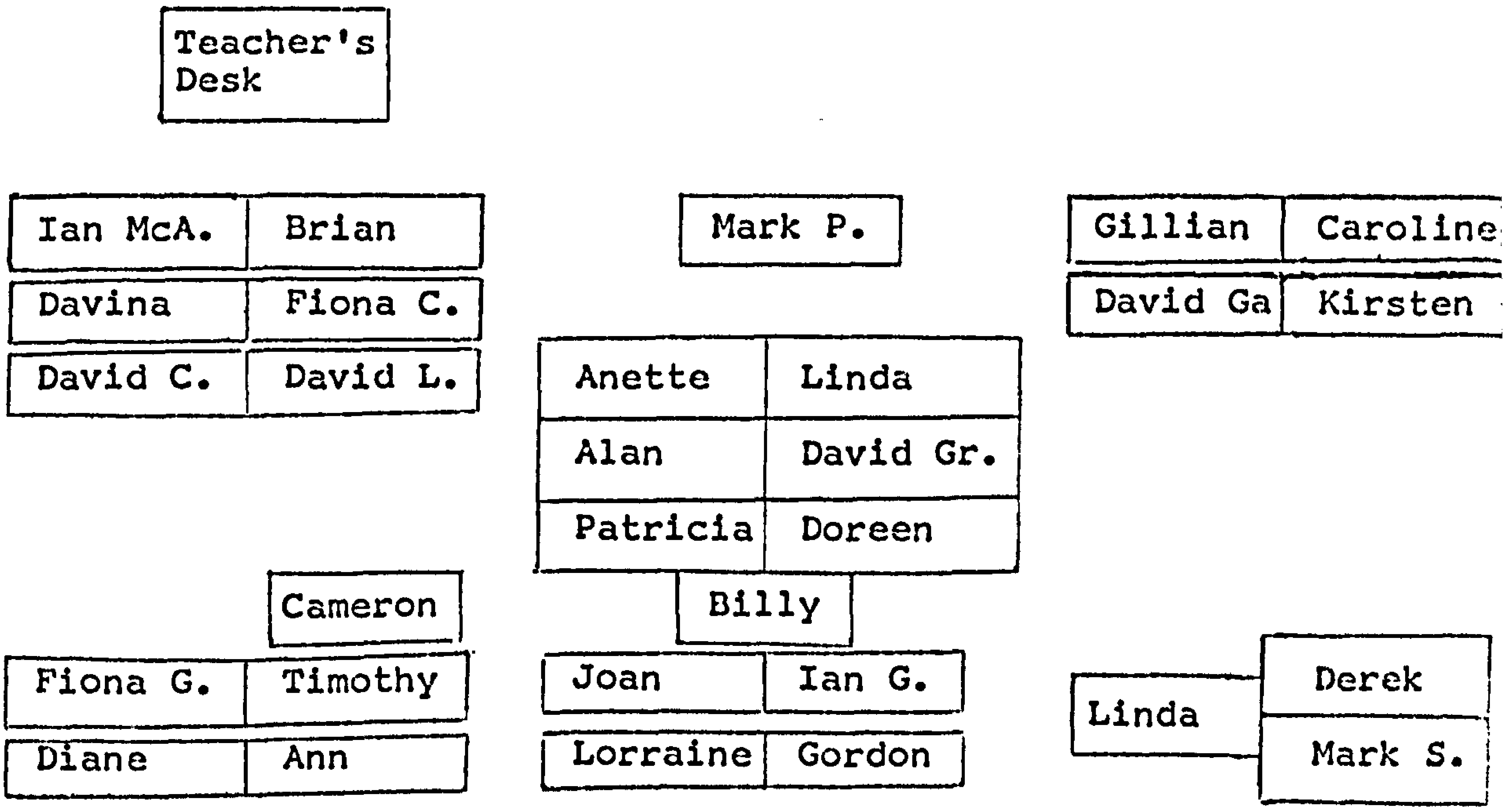
$$\frac{\text{N. of agreements in coding of a script}}{\text{Total N. of dyadic interactions in the script}} \times 100\%$$

Mean observer reliability = 98%

Mean inter-observer reliability = 94%

APPENDIX III

CLASS SEATING PLAN



APPENDIX IVa

ATTRIBUTE CATEGORY SYSTEM

FORM

Simple Description	Personal Comparison	Motive Attribution	Labels
(use of adjective or descriptive phrase)	(comparison of child with himself/herself on same attribute on separate occasions)	(the indication that the teacher knows what the child wants or needs)	(use of nouns which imply a set of particular attributes)

CONTENT

General Ability
(comments relating to a child's overall performance in school work)

General Behaviour
(comments relating to a child's overall conduct in school or class)

Specific Ability
(comments relating to a child's performance in one subject or subject area)

Specific Behaviour
(comments relating to one aspect of a child's conduct in school or class)

Personality
(comments relating to the general, habitual behaviour of a child)

Attitudes to work
(comments relating to the way in which the child sets about his/her work)

Presentation of work
(comments relating to the setting out of work)

Social Information
(comments relating to a child's interactions with parents or peers)

Other
(any comment which cannot be categorised into any of the above 8 categories)

APPENDIX IVb

EXAMPLES OF ATTRIBUTE CATEGORISATIONS

General Ability

"quite bright" - simple description.

"he's not doing as well as he could do" - personal comparison.

"he likes being one of the best in the class" - motive attribution.

"he's a remedial" - label.

General Behaviour

"well-behaved" - simple description.

"not as well behaved as he was at the beginning" - personal comp.

"he likes to get into mischief if he can" - motive attribution.

"he's a pest in the classroom" - label.

Specific Ability

"he's good at art" - simple description.

"he's getting better at his arithmetic" - personal comparison.

"he needs to be forced into doing his sums" - motive attribution.

not encountered, but an example of a label might be - "artistic type"

Specific Behaviour

"talks a lot" - simple description.

"has quietened down a bit this term" - personal comparison.

"he'll play about if he thinks he can get away with it" - motive.

"a chatterbox" - label.

Personality

"very introverted" - simple description.

not encountered, but an example of pers. comp. might be "not as pleasant as he was last term" "likes a lot of attention" - motive attribution.

"the type who'd even get his friends into trouble" - label.

Attitudes to work

"keen" - simple description.

"doesn't try as hard as he used to" - personal comparison.

"he gives up because he thinks he can't do it" - motive attrib.

"a hard worker" - label.

Presentation of work

"tidy in his work" - simple description.

"getting neater" - personal comparison.

"he seems to think anything will do as long as the answer is right" - motive attribution.

label not encountered.

Social Information

"doesn't mix very well" - simple description.

personal comparison not encountered.

"plays with the other children when it suits her"- motive att.

label not encountered.

Other

e.g"plays goalie at football"

APPENDIX V

EXAMPLES OF TEACHERS'/PROBATIONERS' REPORTED ASSESSMENTS*

Probationer 1:	"very immature, always bursting into tears, poor in his work" (1st term)
	"very immature, the rest of the class treat him that way and he likes it" (2nd term)
Probationer 2:	"good at all work, pays attention all the time, has a good general knowledge" (1st term)
	"very conscientious, gets on with his work, has a slight speech impediment, slow but neat, popular in class, general knowledge good, gets on with his work" (2nd term)
Probationer 3:	"thick, untidy" (1st term)
	"he's a funny wee boy, awfully quiet, doesn't come to me much, yet he's not quiet with his friends, very rarely laughs or smiles, work is slightly below average in general, words hard" (2nd term)
Probationer 4:	"talkative, not very neat" (1st term)
	"a chatter, and a pest, slapdash in everything he does, could do better if he tried" (2nd term)
Probationer 5:	"just below average intelligence, a slow worker, talkative, but pleasant kid" (1st term) "a right wee chatterbox, quite poor at number and English, it takes a lot to get something into her, she's a pleasant kid, the other girls like her, talks freely to me" (2nd term)
Probationer 6:	"disruptive, attention span low, her language work is better than maths" (1st term)
	"untidy, smelly,dirty, the other children don't particularly like her, low concentration and very careless, language is poor, extremely talkative, has a vicious temper" (2nd term)
Teacher 7:	"shows more than he gives, tends to be very careless and inattentive, sometimes takes things in when I think he hasn't, he's bright enough to half listen and get away with it, he's a leader, he draws other children towards him, he'll do better in secondary than primary, likeable, anxious to work as well" (1st term)

*both assessments for each teacher/probationer refer to the same child "quite deep, doesn't perform as well as he might in secondary school, he's careless at the moment, has a good head, number and English both good, generally quiet in class" (2nd term)

Teacher 8: "she's the only one who will ever be friendly with Caroline, but only when it suits Tracey to be friendly, she has to be watched, a sleekit child, the rest of her group don't get on with her, she'd like to be part of the group, but whatever she does annoys them, she gives more than her ability would suggest" (1st term)

"arithmetic very good, but very slow, English is poor, she uses Caroline, if Tracey falls out with Caroline, Caroline is no one, Tracey is a good mixer." (2nd term)

Teacher 9: "very bright, top group, very constant, very hard worker" (1st term)

"very intelligent boy, a drawback is his stammer, it doesn't affect the standard of his work, he's very keen on drama and there's no stammer there, he practises a lot, he's good at bringing things in." (2nd term)

Teacher 10: "deaf in one ear, good all-rounder, organiser, sure of self" (1st term)

"a dreamer with a capital D, her work is well done and usually correct, a bit slapdash, an Alice-in-Wonderland, answers well in class, partially deaf" (2nd term)

Teacher 11: "quite a good worker, a bit silly, could do better than he does, has got to be checked" (1st term)

"not so bad on the maths side, spelling not so good, has settled down a bit" (2nd term)

Teacher 12: "one of the poor ones in the class, but very likeable and tries hard to please" (1st term)

"average, very sociable, slightly lacking in confidence, after 3 or 4 examples he'll come out to see if he's got them right, he'll talk away" (2nd term)

TEACHER		Term 1 Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total	Term 2 Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total
1	N	55	3	11	9	7	—	—	12	10	2	109	82	2	6	5	8	12	3	5	9	2	134
	Percentage of Total Interaction	50.0	2.8	10.1	8.3	6.4	—	—	11.0	9.2	1.8		61.2	1.5	4.5	3.7	6.0	9.0	2.2	3.7	6.7	1.5	
	Mean N. per pupil	1.89	0.10	0.37	0.31	0.24	—	—	0.41	0.34	0.06	3.75	2.93	0.07	0.21	0.18	0.29	0.43	0.11	0.18	0.32	0.07	4.78
	Variance	0.95	0.10	0.31	0.22	0.26	—	—	0.47	0.31	0.07	4.11	4.18	0.07	0.25	0.15	0.43	0.48	0.10	0.15	0.45	0.07	13.49
2	N	93	2	3	9	17	7	2	5	3	1	142	117	17	10	6	23	6	—	8	10	3	200
	Percentage of Total Interaction	65.5	1.4	2.1	6.3	12.0	4.9	1.4	3.5	2.1	0.7		58.5	8.5	5.0	3.0	11.5	3.0	—	4.0	5.0	1.5	
	Mean N. per pupil	3.88	0.13	0.13	0.4	0.71	0.29	0.08	0.21	0.13	0.04	5.92	4.88	0.71	0.42	0.25	0.96	0.25	—	0.33	0.42	0.13	8.33
	Variance	4.14	0.11	0.11	0.51	0.91	1.09	0.08	0.43	0.11	0.04	19.56	8.81	1.61	0.25	0.28	2.65	0.28	—	0.32	0.43	0.11	29.71
3	N	20	1	3	1	12	—	1	10	22	1	71	21	2	—	2	7	1	—	19	23	—	75
	Percentage of Total Interaction	28.2	1.4	4.2	1.4	16.9	—	1.4	14.1	31.0	1.4		28.0	2.7	—	2.7	9.3	1.3	—	25.3	30.7	—	
	Mean N. per pupil	0.63	0.03	0.09	0.03	0.38	—	0.03	0.31	0.66	0.03	2.13	0.68	0.06	—	0.06	0.23	0.03	—	0.61	0.74	—	2.42
	Variance	1.27	0.03	0.09	0.03	0.44	—	0.03	0.48	1.14	0.03	4.16	0.83	0.06	—	0.06	0.38	0.03	—	1.38	1.00	—	3.58

APPENDIX VI The number of recorded interactions (N) broken down by term, by class and by behaviour category, expressed also as a percentage of the total class interaction, together with the mean number of interactions per pupil for each behaviour category in each term, and the variance in the distribution of interactions among pupils in each class in each term.

TEACHER		TERM 1											TERM 2										
		Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total
4	N	14	4	16	16	2	6	2	18	19	2	99	53	4	4	16·	6	7	–	8	14	5	117
	Percentage of Total Interaction	14·1	4·0	16·2	16·2	2·0	6·1	2·0	18·2	19·2	2·0		45·3	3·4	3·4	13·7	5·1	6·0	–	6·8	12·0	4·3	
	Mean N. per pupil.	0·43	0·13	0·50	0·50	0·06	0·18	0·06	0·56	0·59	0·06	3·09	1·71	0·13	0·13	0·53	0·20	0·23	–	0·27	0·47	0·17	3·84
	Variance	0·51	0·11	0·58	0·32	0·13	0·22	0·06	0·97	0·39	0·06	7·55	5·15	0·12	0·12	0·39	0·29	0·65	–	0·41	0·66	0·14	15·26
5	N	35	4	1	–	7	–	–	5	1	–	48	88	7	4	6	3	–	–	2	17	2	129
	Percentage of Total Interaction	72·9	8·3	2·1	–	14·6	–	–	10·4	2·1	–		68·2	5·4	3·1	4·7	2·3	–	–	1·6	13·2	1·6	
	Mean N. per pupil.	1·42	0·17	0·04	–	0·29	–	–	0·21	0·04	–	2·17	3·67	0·29	0·17	0·25	0·13	–	–	0·08	0·71	0·08	5·38
	Variance	1·47	0·23	0·04	–	0·56	–	–	0·17	0·04	–	2·75	7·19	0·30	0·23	0·2	0·11	–	–	0·08	1·43	0·08	10·50
6	N	80	2	7	9	7	–	–	14	3	2	122	37	5	7	2	11	7	1	4	5	9	88
	Percentage of Total Interaction	65·6	1·6	5·7	7·4	5·7	–	–	11·5	2·5	1·6		42·0	5·7	8·0	2·3	12·5	8·0	1·1	4·5	5·7	10·2	
	Mean N. per pupil.	3·2	0·08	0·28	0·36	0·28	–	–	0·56	0·12	0·08	4·88	1·48	0·20	0·28	0·08	0·44	0·28	0·04	0·16	0·20	0·36	3·52
	Variance	5·88	0·22	0·23	0·24	0·29	–	–	0·84	0·11	0·08	13·97	1·59	0·17	0·29	0·08	0·51	0·54	0·04	0·14	0·33	0·24	7·68

APPENDIX VI (cont'd)

TEACHER		TERM 1											TERM 2										
		Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total
7	N	83	-	6	7	6	-	-	-	-	-	102	138	-	48	6	10	2	-	-	-	4	208
	Percentage of Total Interaction	81·4	-	5·9	6·9	5·9	-	-	-	-	-		66·3	-	23·1	2·9	4·8	1·0	-	-	-	1·9	
	Mean N. per pupil	3·32	-	0·24	0·28	0·24	-	-	-	-	-	4·08	6·00	-	2·09	0·26	0·43	0·09	-	-	-	0·17	9·04
	Variance	3·13	-	1·02	0·29	0·27	-	-	-	-	-	5·79	12·73	-	2·54	0·29	0·44	0·17	-	-	-	0·15	24·59
8	N	32	7	13	5	13	13	1	3	13	-	100	58	7	15	5	15	5	-	24	23	12	164
	Percentage of Total Interaction	32·0	7·0	13·0	5·0	13·0	13·0	1·0	3·0	13·0	-		35·4	4·3	9·1	3·0	9·1	3·0	-	14·6	14·0	7·3	
	Mean N. per pupil	1·19	0·26	0·48	0·19	0·48	0·48	0·04	0·11	0·48	-	3·70	2·15	0·26	0·56	0·19	0·56	0·22	-	0·89	0·89	0·44	6·15
	Variance	1·54	0·28	0·41	0·16	0·57	0·57	0·04	0·10	0·80	-	8·91	2·82	0·28	0·41	0·23	0·56	0·41	-	0·64	0·79	0·64	14·21
9	N	56	-	-	2	6	-	-	-	1	-	65	63	1	2	1	4	-	-	-	-	-	71
	Percentage of Total Interaction	86·2	-	-	3·1	9·2	-	-	-	1·5	-		88·7	1·4	2·8	1·4	5·6	-	-	-	-	-	
	Mean N. per pupil	1·81	-	-	0·06	0·19	-	-	-	0·03	-	2·10	2·03	0·03	0·06	0·03	0·13	-	-	-	-	-	2·29
	Variance	4·03	-	-	0·06	0·16	-	-	-	0·03	-	4·62	1·56	0·03	0·13	0·03	0·18	-	-	-	-	-	2·48

APPENDIX VI (cont'd)

TEACHER		TERM 1											TERM 2										
		Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total
10	N	112	7	10	17	7	6	-	6	8	-	173	34	3	1	1	3	2	-	2	3	2	51
	Percentage of Total Interaction	64.7	4.0	5.8	9.8	4.0	3.5	-	3.5	4.6	-		66.7	5.9	2.0	2.0	5.9	3.9	-	3.9	5.9	3.9	
	Mean N. per pupil	3.65	0.19	0.32	0.55	0.23	0.19	-	0.19	0.26	-	5.58	1.10	0.10	0.03	0.03	0.10	0.06	-	0.06	0.10	0.06	1.65
	Variance	5.64	0.29	0.43	0.39	0.45	0.16	-	0.16	0.66	-	13.25	1.49	0.09	0.03	0.03	0.16	0.06	-	0.06	0.09	0.06	3.30
11	N	113	2	-	7	4	-	-	-	-	-	126	51	4	3	7	6	-	-	1	1	-	73
	Percentage of Total Interaction	89.7	1.6	-	5.6	3.2	-	-	-	-	-		69.9	5.5	4.1	9.6	8.2	-	-	1.4	1.4	-	
	Mean N. per pupil	4.52	0.08	-	0.28	0.16	-	-	-	-	-	5.04	2.04	0.16	0.12	0.28	0.24	-	-	0.04	0.04	-	2.92
	Variance	7.84	0.19	-	0.71	0.14	-	-	-	-	-	12.96	3.53	0.22	0.19	0.54	0.27	-	-	0.04	0.04	-	7.58
12	N	94	21	2	11	2	2	-	-	6	4	142	50	10	13	12	4	-	-	3	5	9	106
	Percentage of Total Interaction	66.2	14.8	1.4	7.7	1.4	1.4	-	-	4.2	2.8		47.2	9.4	12.3	11.3	3.8	-	-	2.8	4.7	8.5	
	Mean N. per pupil	3.62	0.81	0.08	0.42	0.05	0.08	-	-	0.23	0.12	5.46	2.00	0.40	0.52	0.48	0.16	-	-	0.12	0.20	0.36	4.24
	Variance	4.65	1.12	0.07	0.49	0.07	0.07	-	-	0.26	0.19	9.53	1.67	0.67	0.68	0.68	0.14	-	-	0.19	0.25	0.74	7.52

APPENDIX VI (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
1	cluster 1	21	1·76 (0·79)	0·05 (0·05)	0·29 (0·21)	0·29 (0·21)	0·33 (0·33)	—	—	0·38 (0·45)	0·43 (0·36)	0·05 (0·05)	3·57 (4·46)	2·90 (1·09)	3·00 (1·40)	3·57 (0·96)	2·95 (1·35)	2·29 (0·91)
	cluster 2	3	2·33 (1·33)	—	—	0·33 (0·33)	—	—	—	—	—	—	2·67 (2·33)	2·00 (0·00)	2·33 (0·33)	1·67 (0·33)	5·00 (0·00)	3·33 (0·33)
	cluster 3	3	1·67 (2·33)	0·33 (0·33)	1·00 (1·00)	0·33 (0·33)	—	—	—	0·67 (1·33)	0·33 (0·33)	—	4·33 (0·33)	3·67 (0·33)	4·00 (1·00)	4·67 (0·33)	1·67 (0·33)	2·00 (0·00)
	cluster 4	2	3·00 (0·00)	0·50 (0·50)	1·00 (1·00)	0·5 (0·5)	—	—	—	1·00 (0·00)	—	0·50 (0·50)	6·50 (0·50)	3·50 (0·50)	3·00 (0·00)	2·00 (0·00)	4·00 (0·00)	2·50 (0·50)
TOTAL		29	1·90 (0·95)	0·10 (0·10)	0·38 (0·32)	0·31 (0·22)	0·24 (0·26)	—	—	0·41 (0·47)	0·34 (0·31)	0·07 (0·07)	3·75 (4·11)	2·93 (1·00)	3·03 (1·25)	3·38 (1·39)	3·10 (1·67)	2·38 (0·82)

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
1	cluster 1	23	3·09 (4·17)	0·09 (0·05)	0·22 (0·27)	0·17 (0·15)	0·35 (0·51)	0·52 (0·53)	0·09 (0·08)	0·17 (0·15)	0·39 (0·52)	0·04 (0·04)	5·13 (13·39)	3·13 (0·94)	2·78 (0·36)	3·26 (0·57)	2·91 (0·81)	2·75 (0·91)
	cluster 2	2	1·00 (0·00)	—	—	—	—	—	—	—	—	—	1·00 (0·00)	1·50 (0·50)	1·00 (0·00)	1·00 (0·00)	2·00 (0·00)	3·00 (0·00)
	cluster 3	3	3·33 (6·33)	—	0·33 (0·33)	0·33 (0·33)	—	—	0·33 (0·33)	0·33 (0·33)	—	0·33 (0·33)	5·00 (19·00)	4·33 (0·33)	2·33 (0·33)	1·00 (0·00)	4·33 (0·33)	4·33 (0·33)
TOTAL		28	2·93 (4·18)	0·07 (0·07)	0·21 (0·25)	0·18 (0·15)	0·29 (0·43)	0·43 (0·48)	0·11 (0·10)	0·18 (0·15)	0·32 (0·45)	0·07 (0·07)	4·79 (13·49)	3·14 (1·16)	2·61 (0·54)	2·86 (1·24)	3·00 (0·96)	2·96 (1·00)

APPENDIX VII: Clusters Resulting from the MODE Analysis, the Interactions Engaged in and their Construct Ratings: the table indicates the numbers in each cluster, and the mean number of interactions in each interaction category, the mean number of total interactions and the mean ratings, per pupil, for each cluster, and for the whole class; variances in the distribution of these measures throughout the clusters (or class, in the case of totals) is noted in brackets.

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
2	cluster 1	12	4·08 (5·36)	0·25 (0·20)	0·08 (0·08)	0·17 (0·33)	0·58 (0·45)	0·08 (0·08)	0·08 (0·08)	0·08 (0·08)	0·17 (0·15)	0·08 (0·08)	5·67 (11·33)	2·17 (0·52)	1·92 (0·27)	3·25 (0·75)	2·58 (0·99)	—
	cluster 2	5	2·80 (1·20)	—	—	0·40 (0·80)	0·40 (0·80)	0·20 (0·20)	—	—	—	—	3·80 (6·70)	3·40 (0·30)	2·00 (0·00)	1·80 (0·70)	3·20 (0·70)	—
	cluster 3	7	4·14 (4·14)	—	0·29 (0·24)	0·71 (0·57)	1·14 (1·81)	0·71 (3·57)	0·14 (0·14)	0·57 (1·29)	0·14 (0·14)	—	7·86 (41·47)	3·71 (0·57)	4·14 (0·48)	4·00 (0·67)	5·00 (0·00)	—
TOTAL		24	3·88 (4·14)	0·13 (0·11)	0·13 (0·11)	0·38 (0·51)	0·71 (0·91)	0·29 (1·09)	0·08 (0·08)	0·21 (0·43)	0·13 (0·12)	0·04 (0·04)	5·92 (19·56)	2·88 (0·98)	2·58 (1·30)	3·17 (1·25)	3·42 (1·73)	—

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
2	cluster 1	6	3·67 (3·07)	0·33 (0·67)	0·33 (0·27)	0·33 (0·27)	0·33 (0·27)	1·67 (0·17)	—	0·50 (0·30)	0·33 (0·67)	0·17 (0·17)	6·17 (9·37)	1·50 (0·30)	1·67 (0·67)	1·33 (0·27)	2·83 (0·97)	1·50 (0·30)
	cluster 2	3	3·67 (2·33)	—	0·33 (0·33)	0·33 (0·33)	0·67 (0·33)	—	—	—	0·67 (0·33)	—	5·67 (2·33)	1·67 (0·33)	1·67 (0·33)	3·00 (0·00)	1·67 (0·33)	1·00 (0·00)
	cluster 3	3	3·67 (0·33)	0·33 (0·33)	0·33 (0·33)	—	0·33 (0·33)	0·67 (1·33)	—	0·67 (1·33)	0·33 (0·33)	0·33 (0·33)	6·67 (0·33)	1·67 (0·33)	2·33 (0·33)	5·00 (0·00)	2·67 (0·33)	1·67 (0·33)
	cluster 4	3	6·00 (3·00)	—	0·33 (0·33)	—	—	0·33 (0·33)	—	—	—	0·33 (0·33)	7·00 (1·00)	3·33 (0·33)	2·67 (0·33)	3·00 (1·00)	2·33 (0·33)	2·33 (0·33)
	cluster 5	4	3·00 (10·00)	0·75 (0·92)	0·25 (0·25)	—	1·75 (2·25)	0·25 (0·25)	—	0·50 (0·33)	0·50 (0·33)	—	7·00 (26·67)	4·00 (0·67)	3·00 (0·00)	4·75 (0·25)	3·75 (0·25)	3·25 (0·25)
	cluster 6	5	8·60 (10·30)	2·20 (3·70)	0·80 (0·20)	0·60 (0·50)	2·20 (8·70)	0·20 (0·20)	—	0·20 (0·20)	0·60 (0·80)	—	15·40 (57·30)	4·60 (0·30)	4·80 (0·20)	4·00 (1·50)	4·80 (0·20)	3·80 (0·70)
TOTAL		24	4·88 (8·81)	0·71 (1·61)	0·42 (0·25)	0·25 (0·28)	0·96 (2·65)	0·25 (0·28)	—	0·33 (0·33)	0·42 (0·43)	0·13 (0·11)	8·33 (29·71)	2·83 (2·06)	2·75 (1·67)	3·33 (2·32)	3·17 (1·45)	2·33 (1·36)

APPENDIX VII (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
3	cluster 1	10	0·90 (1·21)	—	—	0·10 (0·10)	0·20 (0·18)	—	0·10 (0·10)	0·40 (0·93)	0·30 (0·23)	0·10 (0·10)	2·10 (2·99)	1 30 (0·41)	1·20 (0·16)	2·40 (0·32)	1·70 (0·16)	1·10 (0·09)
	cluster 2	10	0·40 (0·49)	0·10 (0·10)	0·10 (0·10)	—	0·30 (0·23)	—	—	0·10 (0·10)	0·30 (0·23)	—	1·30 (1·57)	3·30 (1·21)	2·00 (0·20)	2·40 (0·38)	2·00 (0·20)	2·00 (0·20)
	cluster 3	12	0·58 (2·08)	—	0·17 (0·15)	—	0·58 (0·81)	—	—	0·42 (0·45)	1·25 (2·20)	—	3·00 (6·55)	3·67 (0·22)	3·42 (0·56)	4·25 (0·35)	3·67 (0·56)	3·50 (1·25)
TOTAL		32	0·63 (1·27)	0·03 (0·03)	0·09 (0·09)	0·03 (0·03)	0·38 (0·44)	—	0·03 (0·03)	0·31 (0·48)	0·66 (1·14)	0·03 (0·03)	2·18 (4·16)	2·81 (1·72)	2·28 (1·23)	3·00 (1·49)	2·53 (1·17)	2·28 (1·64)

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
3	cluster 1	6	1·33 (1·87)	—	—	—	0·17 (0·17)	—	—	—	0·67 (0·67)	—	2·17 (4·97)	1·00 (0·00)	1·00 (0·00)	2·33 (1·07)	1·83 (0·57)	1·00 (0·00)
	cluster 2	12	0·67 (0·61)	0·08 (0·08)	—	—	0·42 (0·81)	0·08 (0·08)	—	1·00 (2·73)	0·50 (0·45)	—	2·75 (4·20)	2·75 (0·39)	2·42 (1·17)	3·58 (1·36)	2·25 (0·39)	2·50 (1·36)
	cluster 3	13	0·38 (0·42)	0·08 (0·08)	—	0·15 (0·14)	0·08 (0·08)	—	—	0·54 (0·60)	1·00 (1·67)	—	2·23 (2·86)	3·54 (0·77)	2·85 (0·64)	2·54 (0·77)	2·54 (0·77)	2·85 (0·64)
TOTAL		31	0·68 (0·83)	0·06 (0·06)	—	0·06 (0·06)	0·23 (0·38)	0·03 (0·03)	—	0·61 (1·38)	0·74 (1·00)	—	2·42 (3·58)	2·74 (1·33)	2·32 (1·16)	2·90 (1·29)	2·29 (0·61)	2·35 (1·24)

APPENDIX VII (cont'd)

TERM I

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
4	cluster 1	6	0·33 (0·27)	—	0·17 (0·17)	0·83 (0·57)	—	—	—	0·83 (0·17)	0·50 (0·30)	—	2·67 (1·07)	1·33 (0·22)	1·33 (0·22)	1·33 (0·22)	1·00 (0·00)	1·00 (0·00)
	cluster 2	8	0·50 (0·57)	0·13 (0·13)	0·50 (1·14)	0·50 (0·29)	—	0·25 (0·50)	0·13 (0·13)	0·75 (3·07)	0·75 (0·79)	—	3·50 (16·00)	2·88 (0·61)	2·00 (0·25)	2·00 (0·50)	2·00 (0·25)	1·88 (0·36)
	cluster 3	13	0·15 (0·14)	0·23 (0·19)	0·38 (0·26)	0·31 (0·23)	0·15 (0·31)	0·15 (0·14)	—	0·23 (0·36)	0·23 (0·19)	0·08 (0·08)	1·92 (3·41)	3·54 (0·56)	3·15 (0·13)	3·38 (0·36)	2·85 (0·13)	3·38 (0·39)
	cluster 4	3	0·67 (0·33)	—	1·00 (1·00)	0·67 (0·33)	—	0·33 (0·33)	0·33 (0·33)	0·67 (0·33)	1·00 (0·00)	—	4·67 (6·33)	3·00 (0·00)	3·33 (0·22)	4·33 (0·22)	4·00 (0·00)	3·33 (0·22)
	cluster 5	2	2·00 (2·00)	—	1·00 (2·00)	1·00 (0·00)	—	0·50 (0·50)	—	0·50 (0·50)	1·00 (0·00)	0·50 (0·50)	6·50 (12·50)	5·00 (0·00)	4·00 (0·00)	4·00 (0·00)	3·50 (0·25)	4·00 (0·00)
	TOTAL	32	0·44 (0·51)	0·13 (0·11)	0·47 (0·58)	0·53 (0·32)	0·06 (0·13)	0·19 (0·22)	0·06 (0·06)	0·53 (0·97)	0·53 (0·39)	0·06 (0·06)	3·00 (7·55)	2·97 (1·32)	2·59 (0·90)	2·78 (1·39)	2·44 (0·96)	2·59 (1·35)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
4	cluster 1	4	0·25 (0·25)	—	0·25 (0·25)	0·50 (0·33)	—	—	—	—	0·25 (0·25)	—	1·25 (0·92)	1·00 (0·00)	1·00 (0·00)	1·25 (0·25)	1·25 (0·25)	1·50 (1·00)
	cluster 2	9	1·89 (5·11)	0·11 (0·11)	0·11 (0·11)	0·56 (0·53)	—	0·44 (1·78)	—	0·22 (0·19)	0·56 (1·03)	0·11 (0·11)	4·00 (16·25)	2·67 (0·25)	2·11 (0·11)	2·56 (0·53)	2·22 (0·19)	2·00 (0·50)
	cluster 3	13	1·92 (4·47)	0·23 (0·19)	0·15 (0·14)	0·46 (0·44)	0·31 (0·40)	0·15 (0·31)	—	0·31 (0·73)	0·38 (0·59)	0·08 (0·08)	4·00 (18·50)	3·62 (0·42)	3·31 (0·23)	3·54 (0·44)	3·00 (0·17)	3·31 (0·56)
	cluster 4	4	2·50 (13·67)	—	—	0·75 (0·25)	0·50 (1·00)	0·25 (0·25)	—	0·50 (0·33)	0·75 (0·92)	0·75 (0·25)	6·00 (14·00)	5·00 (0·00)	4·00 (0·00)	4·00 (0·67)	3·25 (0·25)	4·25 (0·25)
	TOTAL	30	1·77 (5·22)	0·13 (0·12)	0·13 (0·12)	0·53 (0·40)	0·20 (0·30)	0·23 (0·67)	—	0·27 (0·41)	0·47 (0·67)	0·17 (0·14)	3·90 (15·26)	3·17 (1·52)	2·73 (1·03)	3·00 (1·17)	2·57 (0·60)	2·80 (1·34)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
5	cluster 1	6	2·00 (0·80)	—	—	—	0·17 (0·17)	—	—	0·17 (0·17)	—	—	2·33 (2·27)	2·17 (0·97)	1·67 (0·27)	3·17 (0·57)	1·83 (0·17)	—
	cluster 2	9	1·00 (1·25)	0·11 (0·11)	—	—	—	—	—	0·44 (0·28)	0·11 (0·11)	—	1·17 (1·75)	2·11 (0·61)	3·00 (0·00)	3·89 (0·36)	2·44 (0·53)	—
	cluster 3	9	1·44 (2·03)	0·33 (0·50)	0·11 (0·11)	—	0·67 (1·25)	—	—	—	—	—	2·56 (4·28)	3·89 (0·86)	3·89 (0·86)	3·56 (2·53)	2·78 (0·44)	—
TOTAL		24	1·42 (1·47)	0·17 (0·23)	0·04 (0·04)	—	0·29 (0·56)	—	—	0·21 (0·17)	0·04 (0·04)	—	2·17 (2·75)	2·79 (1·48)	3·00 (1·13)	3·58 (1·21)	2·42 (0·51)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactⁿ	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
5	cluster 1	3	2·67 (14·33)	0·67 (0·33)	—	0·33 (0·33)	—	—	—	0·33 (0·33)	0·67 (0·33)	—	4·67 (25·33)	2·00 (0·00)	2·67 (0·33)	2·33 (0·33)	2·67 (0·33)	2·33 (0·33)
	cluster 2	8	4·50 (10·29)	0·13 (0·13)	0·13 (0·13)	0·25 (0·21)	0·13 (0·13)	—	—	0·13 (0·13)	—	—	5·25 (11·07)	1·63 (0·55)	1·63 (0·27)	2·13 (0·13)	3·88 (0·98)	2·38 (0·27)
	cluster 3	13	3·38 (4·59)	0·31 (0·40)	0·23 (0·36)	0·23 (0·19)	0·15 (0·14)	—	—	—	1·15 (2·14)	0·15 (0·14)	5·62 (9·26)	3·69 (1·06)	3·62 (0·92)	3·54 (0·60)	3·69 (1·40)	2·69 (0·23)
TOTAL		24	3·67 (7·19)	0·29 (0·30)	0·17 (0·23)	0·25 (0·20)	0·13 (0·11)	—	—	0·03 (0·03)	0·71 (1·43)	0·08 (0·09)	5·37 (10·50)	2·79 (1·74)	2·83 (1·45)	2·92 (0·86)	3·63 (1·20)	2·54 (0·26)

APPENDIX VII (cont'd)

TERM I

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
6.	cluster 1	4	2·75 (0·25)	—	0·25 (0·25)	0·50 (0·33)	—	—	—	—	—	—	3·50 (0·33)	1·75 (0·25)	2·00 (1·33)	2·75 (0·25)	2·75 (0·25)	—
	cluster 2	5	3·00 (6·50)	—	0·40 (0·30)	0·40 (0·30)	0·20 (0·20)	—	—	0·40 (0·30)	0·20 (0·20)	0·20 (0·20)	4·80 (12·70)	2·80 (0·20)	2·60 (0·30)	[illegible]	2·00 (0·00)	—
	cluster 3	10	3·00 (6·44)	0·20 (0·18)	0·20 (0·18)	0·30 (0·23)	0·30 (0·23)	—	—	0·80 (1·51)	0·20 (0·18)	—	5·00 (13·11)	3·30 (0·23)	3·50 (0·72)	2·70 (0·90)	3·40 (0·27)	—
	cluster 4	6	4·33 (9·47)	0·33 (0·67)	0·50 (0·30)	0·33 (0·23)	0·50 (0·70)	—	—	0·67 (0·67)	—	0·17 (0·17)	6·83 (27·37)	3·83 (0·57)	4·67 (0·27)	4·83 (0·17)	2·67 (0·67)	—
TOTAL		25	3·28 (5·88)	0·16 (0·22)	0·32 (0·23)	0·33 (0·27)	0·28 (0·29)	—	—	0·56 (0·84)	0·12 (0·11)	0·08 (0·08)	5·16 (13·91)	3·08 (0·74)	3·36 (1·41)	3·60 (1·50)	2·84 (0·56)	—

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
6.	cluster 1	16	1·50 (2·27)	0·19 (0·16)	—	0·13 (0·12)	0·44 (0·53)	0·25 (0·60)	0·06 (0·06)	0·13 (0·12)	0·19 (0·30)	0·25 (0·20)	3·13 (10·12)	3·39 (0·52)	3·19 (0·70)	3·25 (1·00)	3·25 (0·73)	3·38 (0·38)
	cluster 2	3	1·00 (1·00)	—	0·33 (0·33)	—	0·33 (0·33)	1·00 (1·00)	—	0·33 (0·33)	—	0·33 (0·33)	3·33 (5·33)	1·67 (0·33)	2·00 (0·00)	3·00 (0·00)	2·00 (0·00)	2·00 (0·00)
	cluster 3	3	1·67 (0·33)	0·67 (0·33)	1·00 (0·00)	—	0·67 (1·33)	—	—	0·33 (0·33)	—	1·00 (0·00)	5·33 (1·33)	1·67 (0·33)	2·00 (0·00)	2·00 (0·00)	3·00 (0·00)	1·67 (0·33)
	cluster 4	3	1·67 (0·33)	—	1·00 (1·00)	—	0·33 (0·33)	—	—	—	0·67 (1·33)	0·33 (0·33)	4·00 (3·00)	4·00 (0·00)	4·00 (0·00)	5·00 (0·00)	2·67 (0·33)	4·33 (0·33)
TOTAL		25	1·48 (1·59)	0·20 (0·17)	0·28 (0·29)	0·08 (0·08)	0·44 (0·51)	0·28 (0·54)	0·04 (0·04)	0·16 (0·14)	0·20 (0·33)	0·36 (0·24)	3·52 (7·68)	3·04 (1·04)	3·00 (0·83)	3·28 (1·21)	3·00 (0·67)	3·12 (0·94)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact[n]	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
7	cluster 1	2	4·00 (2·00)	—	—	—	—	—	—	—	—	—	4·00 (2·00)	1·00 (0·00)	1·00 (0·00)	5·00 (0·00)	1·00 (0·00)	1·00 (0·00)
	cluster 2	4	3·00 (0·67)	—	—	—	—	—	—	—	—	—	3·00 (0·67)	2·00 (0·50)	2·00 (0·50)	4·00 (0·50)	1·50 (0·25)	2·00 (0·50)
	cluster 3	6	3·33 (4·27)	—	0·17 (0·17)	0·33 (0·27)	—	—	—	—	—	—	3·83 (5·77)	3·17 (0·81)	3·00 (0·00)	1·67 (0·22)	2·00 (0·33)	1·83 (0·14)
	cluster 4	5	3·40 (2·80)	—	—	0·60 (0·80)	—	—	—	—	—	—	4·00 (5·00)	3·60 (0·64)	3·00 (0·40)	1·60 (0·24)	3·00 (1·20)	4·00 (0·40)
	cluster 5	4	4·25 (6·25)	—	1·25 (6·25)	0·25 (0·25)	0·50 (0·33)	—	—	—	—	—	6·25 (17·58)	5·00 (0·00)	5·00 (0·00)	1·75 (0·69)	2·00 (0·00)	1·75 (0·19)
	cluster 6	4	2·00 (2·67)	—	—	0·25 (0·25)	1·00 (0·67)	—	—	—	—	—	3·25 (2·25)	3·75 (0·69)	3·50 (0·75)	4·75 (0·19)	3·25 (1·19)	4·50 (0·25)
TOTAL		25	3·28 (3·13)	—	0·24 (1·02)	0·28 (0·29)	0·24 (0·27)	—	—	—	—	—	4·04 (5·79)	3·28 (1·80)	3·08 (1·49)	2·80 (2·40)	2·44 (1·10)	2·64 (1·82)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact[n]	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
7	cluster 1	3	7·00 (9·00)	—	2·33 (2·33)	—	0·33 (0·33)	0·67 (1·33)	—	—	—	—	10·33 (16·33)	1·67 (0·33)	1·00 (0·00)	4·33 (0·33)	1·00 (0·00)	1·67 (1·33)
	cluster 2	6	6·00 (1·20)	—	1·50 (0·70)	0·17 (0·17)	0·17 (0·17)	—	—	—	—	—	7·83 (2·17)	2·50 (0·70)	2·50 (1·10)	1·67 (0·27)	1·67 (0·27)	2·33 (0·27)
	cluster 3	4	6·00 (23·67)	—	2·25 (2·25)	0·25 (0·25)	0·25 (0·25)	—	—	—	—	0·25 (0·25)	9·00 (47·33)	4·50 (0·33)	4·25 (0·92)	1·50 (0·33)	2·50 (1·00)	4·25 (0·25)
	cluster 4	3	4·00 (12·00)	—	0·67 (0·33)	—	0·33 (0·33)	—	—	—	—	0·33 (0·33)	5·33 (22·33)	5·00 (0·00)	4·67 (0·33)	1·00 (0·00)	1·67 (0·33)	1·67 (0·33)
	cluster 5	7	6·43 (21·62)	—	3·00 (4·33)	0·57 (0·62)	0·86 (0·81)	—	—	—	—	0·29 (0·24)	11·14 (37·45)	3·71 (0·90)	3·57 (0·62)	4·43 (1·29)	3·43 (1·62)	4·00 (1·33)
TOTAL		23	6·00 (12·73)	—	2·09 (2·54)	0·26 (0·29)	0·43 (0·44)	0·09 (0·17)	—	—	—	0·17 (0·15)	9·04 (24·59)	3·43 (1·71)	3·22 (1·91)	2·74 (2·74)	2·26 (1·47)	3·00 (1·82)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
8	cluster 1	2	—	—	0·50 (0·50)	—	—	—	—	—	—	—	0·50 (0·50)	1·00 (0·00)	1·00 (0·00)	2·00 (0·00)	2·00 (0·00)	2·50 (0·25)
	cluster 2	8	1·63 (2·27)	0·13 (0·13)	0·50 (0·29)	0·13 (0·13)	0·63 (1·41)	0·75 (0·79)	—	—	0·25 (0·21)	—	4·00 (5·71)	2·00 (0·25)	2·88 (0·61)	[illegible]·75 ([illegible])	1·88 (0·11)	1·88 (0·61)
	cluster 3	9	0·59 (1·11)	0·44 (0·53)	0·56 (0·53)	0·33 (0·25)	0·44 (0·28)	0·11 (0·11)	0·11 (0·11)	0·22 (0·19)	0·56 (0·53)	—	3·67 (6·00)	2·89 (1·23)	1·89 (0·32)	1·78 (0·40)	3·78 (1·06)	3·56 (0·91)
	cluster 4	8	1·38 (1·41)	0·25 (0·21)	0·38 (0·55)	0·13 (0·13)	0·50 (0·29)	0·75 (0·79)	—	0·13 (0·13)	0·75 (1·93)	—	4·25 (17·07)	3·88 (1·11)	3·75 (1·19)	3·38 (0·73)	3·75 (0·19)	3·75 (0·69)
TOTAL		27	1·19 (1·54)	0·26 (0·28)	0·48 (0·41)	0·19 (0·16)	0·48 (0·57)	0·48 (0·57)	0·04 (0·04)	0·11 (0·10)	0·49 (0·80)	—	3·70 (8·91)	2·78 (1·64)	2·67 (1·46)	2·85 (1·51)	3·07 (1·30)	3·04 (1·42)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
8	cluster 1	4	1·25 (3·58)	0·25 (0·25)	0·25 (0·25)	—	0·25 (0·25)	—	—	0·75 (0·42)	0·25 (0·25)	—	3·00 (8·67)	2·00 (0·00)	2·00 (0·00)	2·75 (0·25)	1·75 (0·25)	1·25 (0·25)
	cluster 2	12	2·67 (2·61)	0·33 (0·42)	0·75 (0·39)	0·25 (0·39)	0·58 (0·63)	0·17 (0·15)	—	0·92 (0·81)	1·00 (0·55)	0·83 (1·06)	7·50 (10·27)	3·42 (0·63)	3·33 (0·61)	3·17 (0·33)	3·83 (0·33)	3·58 (0·45)
	cluster 3	9	2·33 (2·25)	0·11 (0·11)	0·56 (0·53)	0·22 (0·19)	0·78 (0·69)	0·44 (1·03)	—	1·00 (0·50)	1·11 (1·36)	0·11 (0·11)	6·67 (16·25)	2·67 (0·25)	3·11 (0·36)	3·66 (0·50)	2·33 (0·25)	2·33 (0·25)
	cluster 4	2	—	0·50 (0·50)	—	—	—	—	—	0·50 (0·50)	0·50 (0·50)	0·50 (0·50)	2·00 (2·00)	4·00 (0·00)	2·50 (0·50)	2·00 (0·00)	4·00 (0·00)	4·00 (0·00)
TOTAL		27	2·15 (2·82)	0·26 (0·28)	0·56 (0·41)	0·19 (0·23)	0·56 (0·56)	0·22 (0·41)	—	0·89 (0·64)	0·89 (0·79)	0·44 (0·64)	6·15 (14·21)	3·00 (0·69)	3·00 (0·62)	3·19 (0·54)	3·04 (1·04)	2·85 (1·13)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
9	cluster 1	10	1·20 (1·51)	—	—	—	0·30 (0·23)	—	—	—	0·10 (0·10)	—	1·60 (2·27)	1·70 (0·23)	1·40 (0·27)	1·70 (0·23)	1·50 (0·28)	1·10 (0·10)
	cluster 2	2	5·50 (0·50)	—	—	—	—	—	—	—	—	—	5·50 (0·50)	1·00 (0·00)	3·00 (0·00)	1·00 ([illegible])	3·00 (0·00)	1·00 (0·00)
	cluster 3	7	0·71 (0·90)	—	—	—	0·14 (0·14)	—	—	—	—	—	0·86 (1·14)	2·86 (0·48)	1·00 (0·00)	[illegible] (0·29)	2·57 (0·62)	1·43 (0·29)
	cluster 4	8	1·75 (4·21)	—	—	0·13 (0·13)	—	—	—	—	—	—	1·88 (4·41)	3·25 (0·21)	2·38 (0·27)	2·88 (0·13)	2·88 (0·41)	1·50 (0·29)
	cluster 5	4	3·50 (7·00)	—	—	0·25 (0·25)	0·50 (0·33)	—	—	—	—	—	4·25 (8·25)	3·50 (0·33)	3·75 (0·25)	4·00 (0·67)	4·25 (0·25)	2·50 (0·33)
TOTAL		31	1·81 (4·03)	—	—	0·06 (0·06)	0·19 (0·16)	—	—	—	0·03 (0·03)	—	2·10 (4·62)	2·55 (0·92)	1·97 (1·03)	2·68 (1·16)	2·55 (1·12)	1·45 (0·39)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interact^n	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
9	cluster 1	7	2·00 (2·67)	—	—	—	0·29 (0·57)	—	—	—	—	—	2·29 (5·24)	2·29 (0·57)	1·29 (0·24)	1·71 (0·24)	1·29 (0·24)	1·00 (0·00)
	cluster 2	7	2·29 (1·90)	—	0·29 (0·57)	—	0·14 (0·14)	—	—	—	—	—	2·71 (2·57)	1·86 (0·14)	2·71 (1·57)	1·57 (0·29)	2·71 (0·24)	1·00 (0·00)
	cluster 3	10	1·80 (1·51)	—	—	—	—	—	—	—	—	—	1·80 (1·51)	3·10 (0·32)	1·30 (0·46)	3·00 (0·00)	2·40 (0·27)	1·00 (0·00)
	cluster 4	3	2·33 (2·33)	—	—	—	0·33 (0·33)	—	—	—	—	—	2·67 (4·33)	4·00 (0·00)	1·00 (0·00)	4·33 (0·33)	3·00 (0·00)	1·00 (0·00)
	cluster 5	4	2·00 (0·00)	0·25 (0·25)	—	0·25 (0·25)	—	—	—	—	—	—	2·50 (0·33)	3·75 (0·25)	4·25 (0·25)	3·75 (0·92)	4·25 (0·25)	1·75 (0·25)
TOTAL		31	2·03 (1·57)	0·03 (0·03)	0·06 (0·13)	0·03 (0·03)	0·13 (0·18)	—	—	—	—	—	2·29 (2·48)	2·81 (0·83)	1·97 (1·70)	2·61 (1·18)	2·52 (0·99)	1·10 (0·09)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
10	cluster 1	4	4·25 (7·58)	—	—	0·25 (0·25)	—	0·25 (0·25)	—	0·25 (0·25)	—	—	5·00 (6·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)	1·00 (0·00)
	cluster 2	6	3·50 (7·50)	0·17 (0·17)	0·17 (0·17)	0·17 (0·17)	—	0·17 (0·17)	—	0·33 (0·27)	—	—	4·50 (13·10)	1·33 (0·27)	2·17 (0·17)	2·00 (0·40)	1·00 (0·00)	1·00 (0·00)
	cluster 3	9	2·67 (5·25)	0·11 (0·11)	0·44 (0·28)	0·56 (0·53)	0·11 (0·11)	0·11 (0·11)	—	0·11 (0·11)	0·78 (1·94)	—	4·89 (21·86)	2·44 (0·28)	2·89 (0·86)	2·67 (0·75)	2·33 (0·25)	2·44 (0·28)
	cluster 4	12	4·25 (4·75)	0·33 (0·61)	0·42 (0·81)	0·83 (0·33)	0·50 (1·00)	0·25 (0·20)	—	0·17 (0·15)	0·08 (0·08)	—	6·83 (9·79)	4·25 (0·57)	4·50 (0·45)	3·75 (1·11)	4·42 (0·63)	4·50 (0·44)
TOTAL		31	3·65 (5·64)	0·19 (0·29)	0·32 (0·43)	0·55 (0·39)	0·23 (0·45)	0·19 (0·16)	—	0·19 (0·16)	0·26 (0·66)	—	5·58 (13·25)	2·74 (2·06)	3·13 (1·95)	2·74 (1·60)	2·71 (2·50)	2·77 (2·58)

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
10	cluster 1	24	1·00 (1·39)	0·13 (0·11)	—	0·04 (0·04)	0·13 (0·20)	0·08 (0·09)	—	0·04 (0·04)	0·13 (0·11)	0·04 (0·04)	1·58 (3·64)	3·08 (0·95)	3·58 (1·91)	3·29 (0·82)	3·29 (1·26)	2·13 (0·55)
	cluster 2	7	1·43 (1·95)	—	0·14 (0·14)	—	—	—	—	0·14 (0·14)	—	0·14 (0·14)	1·86 (2·45)	1·00 (0·00)	1·86 (0·48)	1·86 (0·48)	1·14 (0·14)	1·00 (0·00)
TOTAL		31	1·10 (1·49)	0·10 (0·09)	0·03 (0·03)	0·03 (0·03)	0·10 (0·16)	0·06 (0·06)	—	0·06 (0·06)	0·10 (0·09)	0·06 (0·06)	1·65 (3·30)	2·61 (1·51)	3·19 (2·09)	2·97 (1·10)	2·81 (1·83)	1·87 (0·65)

APPENDIX VII (cont'd)

TERM 1

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
II	cluster 1	5	4.00 (9.50)	—	—	0.20 (0.20)	—	—	—	—	—	—	4.20 (11.70)	1.40 (0.30)	2.00 (0.50)	1.60 (0.30)	1.80 (0.70)	2.20 (0.20)
	cluster 2	7	5.57 (6.95)	0.29 (0.57)	—	0.71 (2.24)	0.29 (0.24)	—	—	—	—	—	6.86 (20.81)	1.57 (0.29)	1.71 (0.24)	3.00 (0.00)	2.86 (0.14)	2.86 (0.48)
	cluster 3	13	4.08 (9.08)	0.08 (0.08)	—	0.08 (0.08)	0.15 (0.14)	—	—	—	—	—	4.38 (8.92)	3.38 (1.09)	3.62 (1.09)	3.62 (0.76)	3.77 (0.86)	3.31 (0.90)
TOTAL		25	4.48 (7.84)	0.12 (0.19)	—	0.28 (0.71)	0.16 (0.14)	—	—	—	—	—	5.04 (12.96)	2.48 (1.59)	2.76 (1.52)	3.04 (1.04)	3.12 (1.19)	2.96 (0.79)

TERM 2

TEACHER / CLUSTER		N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
II	cluster 1	7	1.71 (2.90)	—	—	—	—	—	—	0.14 (0.14)	—	—	1.56 (3.48)	2.00 (1.00)	2.29 (0.90)	1.86 (0.48)	1.57 (0.29)	1.71 (0.24)
	cluster 2	14	2.21 (4.64)	0.21 (0.34)	0.21 (0.34)	0.21 (0.34)	0.14 (0.13)	—	—	—	—	—	3.00 (8.92)	2.93 (0.84)	2.86 (0.90)	3.36 (0.40)	3.50 (0.27)	3.64 (0.55)
	cluster 3	4	2.00 (2.00)	0.25 (0.25)	—	1.00 (2.00)	1.00 (0.67)	—	—	—	0.25 (0.25)	—	4.50 (9.00)	4.50 (1.00)	4.50 (1.00)	4.75 (0.25)	5.00 (0.00)	5.00 (0.00)
TOTAL		25	2.04 (3.54)	0.16 (0.22)	0.12 (0.19)	0.21 (0.54)	0.24 (0.27)	—	—	0.04 (0.04)	0.04 (0.04)	—	2.92 (7.58)	2.92 (1.49)	2.96 (1.37)	3.16 (1.31)	3.20 (1.59)	3.32 (1.64)

APPENDIX VII (cont'd)

TERM 1

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
12	cluster 1	4	4·75 (7·54)	0·25 (0·25)	0·50 (0·33)	0·75 (0·92)	—	—	—	—	0·50 (1·00)	—	6·75 (14·25)	1·00 (0·00)	1·00 (0·00)	4·25 (0·25)	1·00 (0·00)	—
	cluster 2	7	3·43 (1·62)	1·29 (1·57)	—	0·29 (0·24)	—	—	—	—	0·14 (0·14)		5·29 (2·57)	1·71 (0·24)	1·71 (0·24)	3·29 ([illegible])	3·29 (0·24)	—
	cluster 3	4	3·25 (3·58)	0·50 (1·00)	—	0·50 (1·00)	0·25 (0·25)	0·14 (0·14)	—	—	0·25 (0·25)	0·25 (0·25)	5·00 (2·00)	4·00 (1·33)	4·00 (1·33)	[illegible] (0·33)	4·25 (0·25)	—
	cluster 4	8	3·75 (7·93)	0·63 (1·13)	—	0·50 (0·57)	—	—	—	—	0·25 (0·21)	0·25 (0·50)	5·50 (20·29)	3·50 (0·57)	3·38 (0·55)	3·38 (0·55)	2·88 (0·13)	—
	cluster 5	3	2·67 (4·33)	1·33 (1·33)	—	—	0·33 (0·33)	0·13 (0·13)	—	—	—	—	4·33 (10·33)	3·33 (0·33)	3·00 (0·00)	3·33 (0·33)	4·00 (0·00)	—
TOTAL		26	3·62 (4·65)	0·81 (1·12)	0·08 (0·07)	0·42 (0·49)	0·08 (0·07)	0·08 (0·07)	—	—	0·23 (0·26)	0·12 (0·19)	5·46 (9·53)	2·69 (1·66)	2·62 (1·53)	3·19 (1·12)	3·04 (1·16)	—

TERM 2

TEACHER	CLUSTER	N. in cluster	Q_I	Q_M	D_M	F	Disp.	VIA	VIR	CQIR	CQMR	Inst.	Total N. of Interactn	Rating 1	Rating 2	Rating 3	Rating 4	Rating 5
12	cluster 1	5	1·40 (0·30)	0·40 (0·80)	0·40 (0·30)	0·20 (0·20)	0·20 (0·20)	—	—	—	0·60 (0·80)	0·20 (0·20)	3·40 (6·30)	1·00 (0·00)	1·00 (0·00)	2·00 (0·80)	1·40 (0·30)	1·20 (0·20)
	cluster 2	7	2·43 (0·62)	0·57 (1·29)	0·57 (0·62)	0·57 (0·62)	0·14 (0·14)	—	—	0·14 (0·14)	0·14 (0·14)	0·29 (0·24)	4·86 (4·48)	2·14 (0·14)	2·00 (0·00)	2·71 (0·90)	2·57 (0·29)	2·00 (0·33)
	cluster 3	13	2·00 (2·67)	0·31 (0·40)	0·54 (0·94)	0·54 (0·94)	0·15 (0·14)	—	—	0·15 (0·31)	0·08 (0·05)	0·46 (1·27)	4·23 (10·19)	3·46 (0·44)	3·62 (0·59)	3·00 (0·67)	3·31 (0·40)	2·85 (0·31)
TOTAL		25	2·00 (1·67)	0·40 (0·67)	0·52 (0·68)	0·48 (0·68)	0·16 (0·14)	—	—	0·12 (0·19)	0·20 (0·25)	0·36 (0·74)	4·24 (7·52)	2·60 (1·25)	2·64 (1·49)	2·92 (0·99)	2·72 (0·58)	2·28 (0·71)

APPENDIX VII (cont'd)

APPENDIX VIII

ANALYSIS OF VARIANCE TABLES (INTERACTION CATEGORY BROKEN DOWN BY CLUSTER) WHERE F ATTAINED SIGNIFICANCE ($p<0.05$)

	Teacher and Interaction Category		Sum of Squares	Degrees of Freedom	Mean Square	F Value
Term 1	Probationer 1 (Management Directives)	between groups	2.54	3	0.85	
		within groups	6.29	25	0.25	3.37
		total	8.83	28		
	Probationer 3 (Child-initiated Managerial Questioning)	between groups	6.77	2	3.38	
		within groups	28.45	29	0.98	3.45
		total	35.22	31		
	Probationer 4 (Instructional Questioning)	between groups	6.18	4	1.55	
		within groups	9.69	27	0.36	4.31
		total	15.88	31		
	Teacher 7 (Disciplinary Comments)	between groups	3.56	5	0.71	
		within groups	3.00	19	0.16	4.51
		total	6.56	24		
	Teacher 9 (Instructional Questioning)	between groups	50.81	4	12.70	
		within groups	70.03	26	2.69	4.72
		total	120.84	30		
	Teacher 12 (Management Directives)	between groups	0.85	4	0.21	
		within groups	1.00	21	0.05	4.44
		total	1.84	25		

	Teacher and Interaction Category		Sum of Squares	Degrees of Freedom	Mean Square	F Value
Term 2	Probationer 2 (Instructional Questioning)	between groups	104.76	5	20.95	
		within groups	97.87	18	5.44	3.85
		total	202.63	23		
	Probationer 4 (Individual Instruction)	between groups	1.60	3	0.53	
		within groups	2.56	26	0.10	5.43
		total	4.17	29		
	Probationer 6 (Management Directives)	between groups	4.37	3	1.46	
		within groups	2.67	21	0.13	11.48
		total	7.04	24		
	Teacher 11 (Disciplinary Comments)	between groups	2.85	2	1.42	
		within groups	3.71	22	0.17	8.43
		total	6.56	24		

APPENDIX IX

THE FORMAT OF TEACHERS' FIRST TAPE-RECORDED LESSONS

Probationer/Teacher (Subject of lesson)		Format of Lesson
1.	(Creative Writing)	As in the second tape-recorded lesson, the probationer spends most of the time asking questions to elicit a list of ideas and adjectives e.g. "How would you feel if you were left there on your own?" "What words would you use to describe the island?"
2.	(Interpretation)	This probationer goes through the same sequence, as in the second lesson, of reading the story then asking the children to read the questions and answer them orally. In both tape-recordings there are frequent comments to quieten the children or to redirect their attention back to work, and frequent reminders to "look back at the passage".
3.	(Arithmetic)	The children work mostly on their own. Three questions are addressed to individual children, eleven instructions are addressed to the whole class and the remainder of the interaction consists of children occasionally coming out to the teacher with managerial or instructional questions. The small sample of interaction makes comparison difficult.

Probationer/Teacher (Subject of lesson)	Format of Lesson
4. (Arithmetic)	The probationer demonstrates to one group of pupils how to do two time problems on the board, involving the children in the calculations e.g. "When does the man set out from home?" "How many minutes is it from 8.20 a.m. to 9.00 a.m.?" then sets the pupils a book exercise. Most of the other interactions are child-initiated, where pupils request help with their work or where they want to know what to do next. The general form of the lesson is similar to that in the second tape-recording.
5. (Project)	Many of the questions request facts previously taught to the children, and these questions are changed or simplified if wrong answers or no answer is received e.g. "What sorts of things do we get from warmer countries?...What do we eat that we can't grow in Britain because it's too cold?"
6. (Project)	Probationer 6 also asks many questions which require the pupils to recall previously taught facts e.g. "Who can remember what we said caused the plague?" especially at the start of the lesson.

Probationer/Teacher (Subject of lesson)	Format of Lesson
7. (Interpretation)	Teacher 7 follows the same sequence of reading the story, selecting children to read it, then going over the vocabulary and finally the questions and answers. She brings out several spelling points and often directs the children on how to find the answer to her questions e.g. "Look back at the book ...Where does it tell you who he met?"
8. (Creative Writing)	Teacher 8 also follows the same sequence as in the second tape recording, asking questions such as "Let's think of words that would be good to describe the noises you'd hear" and writing many words on the board. Before the children start writing she tells them how to begin e.g. "Where the haunted house is and who you're with..." and makes the suggestions as to what to include in the story, reminding the children to write in sentences beginning with capital letters and ending with full stops.
9. (Project)	This teacher reads from a leaflet about Iceland, with the children, then questions them about this information and about a television programme which they saw in the morning. The teacher only accepts

Probationer/Teacher (Subject of lesson)	Format of Lesson
	specific answers to her questions e.g. "What name did they give to the hot water which comes spurting out of the ground?"
10. (Arithmetic)	The teacher asks questions about the metric measurement of temperature and weight which was the subject of a previous lesson. She later introduces a conversion chart from ft. and ins. to metres and asks many questions of different children in the class, requiring them to convert from one scale to the other e.g. "If Ronnie were 4ft 6ins., what would that be in metres?"
11. (Arithmetic)	Teacher 11 has the work for her three arithmetic groups written on the board, and after a few initial managerial instructions, spends most of the time going over the sums with the lowest ability group, demonstrating the various steps involved e.g. "'Find the difference' means...? So what sort of sum do we set out?" This is virtually the same format as in the second lesson.

Probationer/Teacher (Subject of lesson)	Format of Lesson
12. (Project)*	Teacher 12 starts with a few disciplinary remarks which appear to settle the class. He talks about the conversion of map distances to real distances and asks the pupils to do various examples. Only three girls are asked, but nine boys are asked (three of the latter three or four times) - in the running commentary of the second tape-recording the teacher mentioned that he thought boys "picked up more small details".

* although described by the teacher as a Geography lesson, the content of the lesson would seem more like arithmetic.

APPENDIX X

THE REASONS FOR THEIR CLASSROOM BEHAVIOUR, GIVEN BY TEACHERS DURING STIMULATED COMMENTARIES, THE EVENTS IMMEDIATELY PRECEDING THE TEACHERS' REASONS, AND WHETHER THE REASONS DIFFERENTIATE AMONGST PUPILS (THE COMMON FUNCTIONS WHICH THE BEHAVIOURS APPEAR TO SERVE ARE NOTED IN BRACKETS, WHERE TEACHERS' REASONS ARE PUPIL DIFFERENTIATING AND WHERE FUNCTIONS ARE APPARENT).

PROBATIONER 1's COMMENTARY

Lesson: Creative Writing; T. has read the 1st chapter of "The Lion, The Witch and The Wardrobe" and is asking the children to imagine what happens next.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour	Diff = Pupil Differentiating Reasons
T. asks: "What do you think happened to Lucy?"	"I was trying to get ideas for the whole class - I feel most of the class lack good ideas."	
T. asks: "What sort of creepy adjectives would you use?"	"Trying to get adjectives different from the normal ones."	
T. asks: "How would you feel if you were shut in a wardrobe?"	"This was to get at how they would feel in the wardrobe."	
T. says: "Right, Alan." Several children have their hands up to give their ideas.	"He was making a noise so I got him to answer."	Diff (Attention)
T. says: "Right, Elizabeth, what have you thought up?"	"I asked her because she hadn't got her hand up and most of the others had."	Diff (Attention)
After child has given his ideas, T. says: "Another one about ghosts, and Frankensteins". (T. generally makes some brief comment after listening to C's ideas).	"Trying to get their ideas together."	
T. asks Brian for his ideas.	"I generally chose the children with good ideas."	Diff (Pedagogic)
T. has asked C's to start writing. Tape ends.	"I think talking about it helps them when they're writing a story."	

PROBATIONER 2's COMMENTARY

Lesson: Interpretation. T reads the story, then asks the children to read the questions and to answer them orally.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour	Diff = Pupil Differentiating Reasons
T. says: "Tony, that's enough from you." (T. has just read the story and is about to get the children to read the questions.)	"Tony is a pest. That was to get him settled. I thought if I did that, he'd settle down for the rest of the lesson."	Diff (Attention)
T. says: "What do you have to remember when writing the title of a story?... Linda?"	"Linda doesn't often answer and I wanted to know if she'd remembered."	Diff (c/u)*
T. choosing children to read the questions out loud.	"I ask the children to read the questions to see if they understand them."	
T. asks Karen to answer question 2 which has just been read out, and the class has been instructed to look at the part of the story that tells the answer.	"This is to get them into the habit of looking back at the passage and setting the answers out in sentences."	
T. asks: "How do you spell 'lived'? ... Neil?"	"Neil has difficulty answering."	Diff
No answer received.		
T. asks: "The answer, Peter?"	"I asked Peter because he was first with his hand up and he gives clear answers."	Diff (Pacing)
T. says: "SH!"	"It's getting noisy."	

* c/u = checking understanding.

PROBATIONER 2's COMMENTARY (Continued)

T. explains an easier way of answering question 3 so as to avoid using an apostrophe	"I told them to write it like that because I thought they would get confused with the apostrophe s."	
T. says: "Answer, Tony?"	"Tony is one of the poorer ones again."	Diff
T. replies "Good" to Tony.	"That's good for him."	Diff
T. tells the class to turn to the part of the story which gives them the answer to question 4.	"I felt they weren't looking at it. I wanted to encourage them to look at the story."	
T. starts to read the questions instead of asking the children.	"I started to read because I thought they were getting restless and taking too much time."	
T. asks Craig to answer question 6.	"If the poorer ones have their hand up, I prefer to ask them to see if they understand."	Diff (c/u)
After a child gives an answer to question 7, T. says: "He didn't just swim to the bottom, what's the word that's used in the book?"	"I was trying to get things from the book."	
T. tells the class to look at the book to find the words to answer question 8.	"I wanted to get them to look at the book and get the right spelling."	
T. asks the children to put their hands up when they've found the words.	"If I ask them to put their hands up, there's more competition."	
T. reads out question 10.	"I spent a long time on this one because it was the most difficult."	
T. asks Martin to answer question 10.	"I asked Martin first of all because he wasn't thinking much."	Diff (Attention)

PROBATIONER 2's COMMENTARY (Continued)

After helping Martin to give a correct answer, T. eventually asks Sinclair.	"He didn't express it well either."	Diff
After getting a correct answer from David, the teacher asks the class to listen carefully while Martin says it again.	"I asked him to repeat it so the others could hear."	
Some children are shouting out answers.	"They call out a lot, but I don't tell them off because it slows things down."	
T. asks the class to find a word in the passage that means 'in no danger', and several hands go up.	"I knew the others hadn't looked in their books, so I let Dawn answer."	Diff (Pacing)
T. asks class to find the word meaning 'strong or very great' and Tony shouts out the answer.	"I didn't say anything to Tony so the others didn't know whether his answer was right or wrong."	
T. asks Campbell to spell 'mighty'. He spells 'might' and T.says "You're right in the first part."	"That was to encourage him because he's poor."	Diff

PROBATIONER 3's COMMENTARY

Lesson: Arithmetic; the teacher is revising simple fractions with the whole class.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. asking many questions of the form "How do you find a fourth of something?" to various pupils in the class.	"I was asking the people who knew the answers, then on to people who didn't know once there was a steady stream."	Diff (Pacing)
T. asks: "What's a quarter of sixty?"	"Asked Evelyn because she had her hand up."	
T. asks: "What's a sixth of an hour?"	"Mairead was off yesterday - that's why I asked her."	Diff
Long pause after Mairead is asked the question.	"Gave her a bit of time, but she didn't know."	
T. asks: "And four-sixths would be?"	"Asked Seonaid, because I thought I was ignoring the top people."	Diff (Balance)
T. asks: "What's four-twelfths of an hour?"	"Asked Gordon to give him a chance since he was volunteering for a change."	Diff (Balance)
T. asks: "What would six-twelfths be?" and this is followed by a pause.	"I was waiting for someone to work it out."	
T. asks: "Eight-twelfths, Mairead?"	"To see if she was following it yet."	Diff (c/u)
T. asks: "Nine-twelfths, Lorraine?"	"Asked Lorraine because I hadn't asked her before."	Diff (Balance)
T. asks: "Ten-twelfths, Jacquie?"	"I knew she wasn't very sure about it, so I asked her."	Diff (c/u)
T. asks: "What would eleven be?...Julie?"	"Back to the top group because I thought I was ignoring them."	Diff (Balance)

PROBATIONER 4's COMMENTARY

Lesson: Arithmetic; teacher instructing a large group in the class in how to do problems concerning time.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. says: "Right, Frankie, would you like to read the first question?"	"Frankie's a good reader, so chose him to start."	Diff (Pacing)
"What kind of sum would you do in that question, Brian?"	"To get the lesson started - he's good at arithmetic."	Diff (Pacing)
T. says: "If it's fast, it's?"	"Gary is good - gets the lesson going."	Diff (Pacing)
T. says: "Therefore, what kind of sum would I do? ... Masuma?"	"Masuma is a bit slow at maths."	Diff
T. says: "When does it get into Stirling?... Graham?"	"He wasn't paying attention."	Diff (Attention)
T. says: "When does it leave Aberdeen?... Margaret?"	"Margaret is a bit poor."	Diff
T. says: "When does it leave Aberdeen to get into Stirling at that time? ... Bruce?"	"Bringing in someone at the back."	Diff (Balance)
"What are you asked to do? ... Tanya?"	"Taking someone at the front to balance."	Diff (Balance)
T. has asked Stuart how to do a problem, and after a pause the child has given a wrong answer. T. points to another boy to answer.	"Stuart couldn't do it, so I got Gary to do it."	Diff (Pacing)
T. says: "How long would it take train two to get from Aberdeen to Stirling? ... Karen?"	"Karen is quite good, but sometimes has difficulty with minutes and hours."	Diff (c/u)
T. says: "What about number three? ... Who can I pounce on? ... Graham?"	"Asked Graham to wake him up. He's a day-dreamer."	Diff (Attention)

PROBATIONER 5's COMMENTARY

Lesson: Project work, discussing what the children have learned about William Wallace.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons.
T. says "Sh."	"I was waiting for peace."	
T. asks: "Whose throne was she going to take over?" No hands go up, and T asks: "What was she going to become?"	"I was rephrasing the question to make it easier. If they can't get an answer, I rephrase it to bring it back to basics."	
T. asks: "Who was Margaret's father? ... Scot?" .... "Where did she come from?"	"These are very open questions, perhaps I should have been more definite."	
T. asks: "How did Margaret die?" ... "She was on a ship, what was she doing?"	"I was trying to get the fact that she was sailing from Norway to Scotland."	
T. asks: "What was the Coronation Stone ... Graham? .... Graham has just decided to waken up."	"I was trying to get the facts from him, but he wasn't able to answer."	

PROBATIONER 6's COMMENTARY.

Lesson: History project work; a discussion of what the children have learned about Medicine in the Past, and an introduction to anaesthetics in operations.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. starts talking about, and asking questions about, smallpox.	"Getting the subject of last week's lesson and bringing in the sensationalist part."	
T. asks: "What was it's nickname, Stephen?"	"I'm asking people who don't normally answer and aren't normally interested."	Diff (Attention)
T. asks: "Why were women especially scared of this disease ... Janice?"	"I asked Janice about the scars because she's very fashion-conscious."	Diff
T. asks: "Do you remember the name of the doctor who lived in the country ..... Karen?"	"I chose Karen because she had spelt it wrongly."	Diff
T. asks: "What was Jenner's big experiment?"	"Leading up to last week's lesson."	
T. asks: "What did dairymaids get instead, Michelle?"	"She never normally remembers."	Diff
T. asks: "What was cowpox like ... Helen?"	"Normally doesn't remember either - didn't expect an answer."	Diff (c/u)
T. asks: "Do you remember the name of the person who used this?"	"Leading up to the point about vaccination."	
T. asking several questions about the first vaccinations.	"I'm mostly asking people who aren't interested - they're either not paying attention or they need reinforcement."	Diff (Attention)

PROBATIONER 6's COMMENTARY (Continued)

T. asks: "Vaccination gives you what against a disease? What's the word you learned?" ... Yvonne."	"That's incredible from her."	Diff
T. starts to talk about amputations.	"Sensationalist bit to get their interest."	
T. shows a picture of an early amputation.	"Getting interest for the lesson."	
T. asks class what happens in cowboy films when someone gets a bullet in them.	"Relating it to what they've seen."	
T. asks: "What else might you do to stop someone from feeling pain?"	"Leading up to the main point - anaesthetics - none of them knew anything about it."	

Note: The teacher-pupil discussion continues for approximately five minutes longer, but this probationer makes no further comment on the interaction.

TEACHER 7's COMMENTARY

Lesson: Interpretation; T reads the story, then selects children to read it, then goes over the vocabulary, and finally the questions and answers.

Activity occuring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. reads the story.	T. explains that by reading the story herself with the children following it, she hopes to stimulate their interest and aid their understanding of the story.	
T. selects children to read the story.	"This gives them a second chance for comprehension. It's a chanceto involve the children, to help those stumbling over the words, although I don't interrupt the flow. I wouldn't choose a child who is poor at reading."	Diff (Pedagogic)
T. starts to select words from the passage. "What does 'display' mean?"	"There were only three or four hands up. I asked Alan to give him the chance to get it right, because I knew the others knew the answer."	Diff (c/u)
T. asks: "What does the word 'widens' mean? ... Craig?"	"Craig's lazy but his English is good."	Diff
T. has asked one child what 'nosing' meant, and later asks: "What animal in the story would use its nose?"	"That was to follow the theme - the dog sniffing."	
T. asks: "Can you give me the names of any people in the story?"	"I wanted to bring out the characters in the story."	

TEACHER 7's COMMENTARY (Continued)

T. has chosen one girl to read a question and another to answer it. T. then says: "Now, could you give me that in a sentence."	"I insist on answers in sentences	
T. asks: "Spell the word basket, Alan?"	"I stress the spelling so they'll write it correctly in their books."	
T. says: "Spell the word 'picnic', Alan."	"He spelt it wrongly and he's a bright boy."	Diff
T. asks: "What does the 'it' mean? What is the 'it' we are talking about, Lesley?"	"I knew she didn't understand what 'it' was, and I wanted her to work it out for herself."	Diff (Pedagogic)
T. says: "Next question, Elaine." and then "Now look at the story." ... "Now back to the question."	"She's a sensible girl, but mumbles, so I was directing her back to the passage and then back to the question. She's quite clearly muddled."	Diff (Pedagogic)
T. says: "Spell the word 'sandwiches', Elaine."	"Elaine's very poor on spelling - gets special attention."	Diff
T. says: "Next question, Gail." Gail reads it and takes a long while to answer.	"Gail is very slow and it was a difficult question, so I was giving her plenty of time to think about it."	Diff (Matching?)
Catherine is slow at answering her question, T. refers her to the last part of the story, and asks "Can you tell me what the word 'searching' means?" The word was in the question.	"I thought she didn't understand the question - I didn't expect her to get it."	Diff (c/u)

Note: The teacher frequently has spells of questioning 'round the class', but doesn't rigidly follow this sequence.

TEACHER 8's COMMENTARY

Lesson: Creative Writing; teacher preparing children to write about "My Living Room".

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff - Pupil Differentiating Reasons
T. encouraging pupils to use "describing words".	"I wanted to encourage them to use adjectives."	
T. has been asking pupils what they would find in their living room, and putting the words on the board.	"Putting the words on the board to help them with their spelling."	
T. asks: "What word do we not start a sentence with?" and goes on to mention other do's and don'ts.	"I give a bit of formal English at the end of the talk."	
T. says: "Hands up for any words you want on the board, first of all."	"I chose mostly those who have difficulty with spelling."	Diff (Pedagogic)

TEACHER 9's COMMENTARY

Lesson: Project, discussing wood pulp and papermaking in Canada.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. asks Helen to come out to the front to read a passage from a book.	"I was going to ask Alan to do this but he wasn't here today, so I chose Helen instead - she's another good reader."	Diff (Pedagogic)
T. asking various questions relating to passage. (e.g. "What would the best quality wood be used for?")	"I was bringing as many children into it as possible.	
T. explains difference between product and by-product.	"I wanted to bring out the difference between products and by-products of wood."	
T. asks several questions about by-products of wood, e.g. "What do you take with you on holiday to keep a record of what you've done?" (T. frequently asks a question, gets no reply, and asks the question again in another (simpler?) way).	"I had to give them clues to get the answers back."	

TEACHER 10's COMMENTARY

Lesson: Arithmetic; the conversion of percentages to fractions, with many oral examples taken from a book.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. says "... reduced by 10%. Does that mean the goods are going to be dearer or cheaper?"	"That was to show the difference between increase and decrease: some of them might not know."	
T. says: "What is 10% as a fraction?"	"To show fraction and percentage conversion."	
The teacher was asking questions similar to those above, addressing the questions to various pupils in the class.	"I was involving as many as possible to see how many of them know."	
T. says: "$7\frac{1}{2}$% - what's that as a fraction?"	"I wanted to revise how to deal with the $\frac{1}{2}$, and how to cancel the fraction down."	
T. asks Donald: "What's 5%?"	"That's good for Donald."	Diff
T. says: "50% is? ... Ronnie?"	"... and good for Ronnie too."	Diff
T. says: "30% ... Billy?"	"Asked Billy, he's quite a poor one."	Diff
T. asks many questions similar to those above of various people.	"I was trying to involve as many as possible."	
T. says: "35%?"	"Didn't expect Ronnie to get that but I wanted to see if he knew."	Diff (c/u)

TEACHER 11's COMMENTARY

Lesson: Arithmetic; 3 groups working on 3 different topics.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for her behaviour.	Diff = Pupil Differentiating Reasons
T. 'going over' mental arithmetic exercise, explaining what the questions mean, and asking related questions to some children.	"These are poor ones, they need to be helped quite a bit."	Diff (Pedagogic)
as above.	"Poor ones again, they need a lot of help."	Diff (Pedagogic)
as above	"Albert, Kevin and Brian are very poor."	Diff (Pedagogic)
T. instructs another group in 'Sets', after leaving the previous group with some written work.	"This is the other group.. explaining sets to them."	

TEACHER 12's COMMENTARY

Lesson: Project; the Teacher spends most of his time asking the children what they've found out from their project cards on "medicine through the ages", and adding further information.

Activity occurring at and immediately preceding the teacher's comment.	Teacher's reasons for his behaviour.	Diff = Pupil Differentiating Reasons
T. says: "What did you find out about primitive men and medicine?"	"I was asking Campbell to get things going, get a good start, get them keen to talk."	Diff (Pacing)
T. says: "Yvonne, like to listen, please!"	"Yvonne opting out, she has nothing to do with the class situation."	Diff (Attention)
T. says: "Who became a witch doctor?"	"Asked Lynn - one of the good girls. She wanted to say some- thing - get her involved at an early stage.	Diff (Pacing)
T. says: "What can you tell me about the early civilisations?"	"Colin's quiet, got to ask him something to get him involved."	Diff
Alison volunteers information	"She's quite articulate can talk a long time."	Diff
T. says "What about the Greeks? Did they have good doctors?...Gillian?"	"No reaction."	
T. talking of Hypocrates, and Carol giving a lot of information.	"Would like to have gone more into it, but the only way of getting feedback was Carol, so I didn't."	Diff (Balance)
T. says: "What happened about 4 - 500 A.D.?"	"Trying to get Henry in here, to get the boys involved."	Diff (Balance)
T. says: "What sorts of medicines did they have?" Cameron is asked to answer.	"He doesn't always want to talk, but given the chance he'll talk on and on."	Diff

TEACHER 12's COMMENTARY (Continued)

T. talks about the Dark Ages.	"I thought Cameron was getting off the point, I wanted to bring it back."	
T. says: "Who were the people who had the skills in herbs?"	"William - wanted to bring him in, he hasn't said anything."	Diff (Balance)
T. says "The Great Plague ...Ian?"	"I'd seen him talking about the plague before so I chose him to answer."	Diff
T. asks Lynn, who has her hand up to volunteer information.	"I was trying to go from boys to girls to get a good mixture."	Diff (Balance)
T. has nearly always elaborated upon pupils' responses.	"I'm constantly repeating things so that they pick it up."	
T. asking questions about the heart.	"The boys are a bit more interested - I go back to ask them when stuck, the boys seem to pick up more small details."	Diff (Pacing)

APPENDIX XI

THE PUPIL-DISTINCTIONS (CATEGORISED AS HIGH ABILITY, LOW ABILITY, INATTENTION, PARTICIPATION LEVEL OR OTHER) MADE BY EACH TEACHER DURING THE STIMULATED COMMENTARY AND THE TEACHER BEHAVIOURS (CATEGORISED AS DIRECTION, QUESTION OR REACTION) WHICH WERE ASSOCIATED WITH THE PUPIL DISTINCTIONS.

Probationer 1	High Ability	Low Ability	Inattention	Child's Partici-pation Level	Other
Direction					
Question	1		2		
Reaction					
Probationer 2					
Direction			1		
Question	2	4	1	1	
Reaction		2			
Probationer 3					
Direction					
Question	3	1		2	2
Reaction					
Probationer 4					
Direction	1				
Question	3	3	2	2	
Reaction					

	High Ability	Low Ability	Inattention	Child's Partici-pation Level	Other
Probationer 5					
Direction					
Question			NONE		
Reaction					
Probationer 6					
Direction					
Question		3	1	1	2
Reaction					
Teacher 7					
Direction	2	2			
Question	1	3			
Reaction		1			
Teacher 8					
Direction		1			
Question					
Reaction					
Teacher 9					
Direction	1				
Question					
Reaction					

Teacher 10	High Ability	Low Ability	Inattention	Child's Partici-pation Level	Other
Direction Question Reaction		4			
Teacher 11 Direction Question Reaction		3			
Teacher 12 Direction Question Reaction	3		1	4	4

APPENDIX XII

FISHER EXACT PROBABILITIES OF TEACHERS REPORTING PARTICULAR REASONS FOR THEIR BEHAVIOUR AND EXPRESSING PARTICULAR INTERACTION OR CONSTRUCT TRENDS

For each of the common, identified functions of teachers' behaviour and each associated interaction and construct trend, a 2 x 2 contingency table was drawn up as follows:

	N. of teachers exhibiting the associated behaviour/ construct trend	N. of teachers not exhibiting the associated behaviour/ construct trend	
N. of teachers reporting the function			
N. of teachers not reporting the function			
			12

The following probabilities were found:

	Associated Interaction Trend	Associated Construct Trend
Pacing	0.42	0.25
Checking Understanding	0.38	0.50
Attention	0.14	0.67
Balance	0.41	0.75
Involvement	0.30	0.55

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