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"SOME STUDIES OF CLASSROOM INTERACTION IN INFORMAL INFANT SCHOOLS"

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SUMMARY

A system of interaction analysis has been developed, from the original work of Lauren Resnick, in which nine categories of coding are used to analyse the utterances of infant teachers working in informal patterns of classroom organisation.

It has been shown that infant teachers, using cassette tape recordings, can effectively and quickly use this coding system themselves to study their classroom talk. Some preliminary work has also been carried out in developing guidelines with which teachers can evaluate their classroom performance using this instrument.

Particular emphasis has been placed on the differences between long and short interactions.

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NOTE

All references to Lauren Resnick should be read as 'she' instead of 'he'

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I also acknowledge the advice and encouragement given by staff in the School of Education, Trent Polytechnic throughout the course of my studies. My particular thanks are reserved for Michael Bassey without whose intellectual and practical support this study would not have been undertaken.

NOTES

The majority of primary school teachers are female, and so the feminine gender has been used throughout this thesis to describe infant or junior teachers. "Infant school" refers to schools for children aged five to seven years. In some cases this may mean the infant department of a primary school for children from the ages of five to eleven years.

REFERENCES

Specific reference to sections in books or articles have been cited at the bottom of the relevant page. Further details and references are included in the bibliography.

The research reported in this thesis is concerned with infant school teachers and their recording, analysis and evaluations of classroom activities. Only one paper in the literature of educational research has had a marked influence on the design of this investigation, and that is the work of Lauren B. Resnick (1972) of the University of Pittsburgh. His study of the classroom activities of four teachers in an informal English infant school is discussed in some detail shortly. (1)

A notable feature of Resnick's paper, as published in Britain, is the lack of references to related studies. Although Resnick cites no antecedents it would be misleading to ignore the evidence of a great deal of recent research stemming from direct study in classrooms. Indeed this thesis owes its existence to the general climate of interest in classroom observation. Background reading revealed many research articles which have some bearing on the study of the teachers' classroom activities. But the overwhelming majority refer to classrooms in North America where the teaching styles and curriculum are different to those of informal English primary schools.

The introduction of "informal" teaching methods, encouraged by the Flowden Report (1967) and the establishment of comprehensive secondary education, are two of the factors that have stimulated a concern with the nature of the primary teachers' work and its effects upon the pupils. This has influenced the nature of primary

school research, but the question remains as to whether research has yet provided the findings and resources for teachers to consider and explain what they are doing. In general I would agree with what Wragg (1975) has said:

"If there is one single criticism of British research so far, it is probably that the pay off has been disappointingly small. Few publications have been produced and findings from many projects turn out to be elusive, even illusory. Nor is it clear how the research has affected current practice in schools". (2)

The tradition of classroom observation and analysis is a product of North American research, but in this review I have deliberately concentrated on research within British schools. I felt justified in this selection of material for the following reasons.

Firstly, modern infant teaching with its concern for the individual child has many qualities that cannot be directly compared with American research into teaching. Secondly, detailed reviews of methods and problems in American observational research have already been made by Medley and Mitzel (1963) Flanders and Simon (1973), Simon and Boyer (1968, 1970), Rosenshine and Furst (1973), and in the articles by British authors e.g. Wragg (1973) and Stubbs and Delamont (1976). Thirdly, the techniques used in the Trent project were designed for use by practising teachers rather than research workers with their specific training and resources.

1. RESNICK, L. (1972) 'Teacher Behaviour in an Informal British Infant School', in School Review 81,1.pp 63 - 83. A revised version appeared as "Teacher Behaviour in the Informal classroom" in Journal of Curriculum Studies 4.2 pp 99 - 109.
2. WRAGG, E.C. (1975) "The First Generation of British Interaction Studies" p22.

Three aspects of observing, analysing and evaluating primary teachers at work will now be reviewed:

1. Research reports that have used observation of primary teachers as the major source of data. Some studies in junior classrooms have been included since there are close links between the two stages of primary education. Particular attention has been given to those studies in which the teacher's actions were categories in relation to interactions with the pupils.
2. The technique of interaction analysis as a method of recording and evaluating a teacher's classroom behaviour.
3. The involvement of teachers in the observation and evaluation of their own classroom interactions.

1. The observation and analysis of British primary teachers'
classroom actions

1.1 Early stages

Close observation and study of primary teachers at work in the classroom has only become a standard technique for British research in the last decade. However in the 1950s Dorothy Gardner and Joan Cass were using an inservice course at the University of London as the starting point for a long term observational study of infant and nursery teachers during "free choice" activity sessions.

(Gardner and Cass 1965)

Thirty infant teachers were watched for twenty minute periods and their actions during that time were noted under 79 categories. Four major classifications were subsequently used to analyse and evaluate their observed behaviour, these were:

- I Actions which showed the teacher's concern with the provision of intellectual stimulus or knowledge.
- II Actions which showed a particular concern for fostering and encouraging social attitudes.
- III Ways in which the teacher established, and maintained, a general setting which was conducive to learning, in terms of social, emotional and intellectual welfare.
- IV Actions which did not involve direct contact with the children.

The four fold categorisation places an emphasis on:

- I Imparting educational information
- II Social aspects of education
- III Classroom management and organisation
- IV Miscellaneous aspects and unclassifiable responses

Gardner's analysis of the noted actions showed wide variations in technique and reinforced the view that the good teacher uses her individuality to achieve her teaching purposes. All the teachers were obviously concerned with the children's intellectual development as the most numerous contacts were recorded in categories relating to promoting intellectual skills and imparting information.

The study may be criticised for not fully informing the observed teachers of the reasons why they were being observed by another teacher with a notebook. (3) Nevertheless, it is the first published British study to closely define verbal and non-verbal responses of infant teachers. It took place at a time when "informal" teaching methods were confined to free choice activity periods in progressive nursery and infant schools and incorporates the theories of child development and learning that were available. Structured interviews and short case-studies of several of the teachers expanded the authors' interest in the educational implications and organisational problems of informal teaching.

3. GARDNER, D.E.M. & CASS, J.E. (1965) The Role of the Teacher in the Infant and Nursery School. p24.

Gardner and Cass did not publish their final results until seven years after the final observations had been recorded. During this time more infant teachers were using informal ways of organising their curriculum and "activity sessions". Baird (1967) used Gardner's work as the basis for an M.Ed thesis at Manchester University. She suggests that a wider basis than free activity session is needed to compare teachers in relation to broad educational concepts. Twenty teachers of six and seven year old children were observed for five periods of thirty minutes, using an adaptation of Gardner's categories.

Baird supported Gardner's view that infant teachers were most occupied in fostering intellectual aspects of their pupil's work, with the least amount of attention being given to control and discipline. (4) Free choice activity sessions produced more teacher actions in the social categories, and Baird emphasised the importance of a sound teacher-pupil relationship as a pre-requisite for intellectual development through organised activities.

1.2 Studies at Lancaster University

Another isolated study of the classroom responses of infant teachers was made by John Garner (1972). He observed and recorded the classroom behaviour of diligent and less diligent infant children, and in order to do this he had to produce some measure of the teacher's behaviour. He modified an American schedule for observing classroom activities, the Medley and Mitzel Oscar 2a (1963), which interpreted the classroom in terms of a "social emotional" climate. This followed the earlier work of Withall (1949).

4. BAIRD, C.L. (1967) "The Role of the Teacher of Six and Seven Year Old Children". M.Ed thesis chapter IV pp 51 - 72.

Twelve teachers were observed by Garner, or his assistant, for between seven and nine hours broken down into twenty-two minute sessions. Half this time was spent on watching the teacher and pupils, the rest on looking for "signs", verbal and non-verbal behaviour made by the teacher.

The activities that he observed can be termed "informal" since the children were working individually or in small groups without close supervision. Two types of teacher were defined, one type was relatively immobile, staying at her desk, while the other type moved about and expected the children to stay fairly static in their seats. Garner concluded that the teachers who were more mobile tended to be more task-oriented in their approaches. They had less opportunity to spend time with individual children but could attend to those who found their set tasks uninteresting.

The following year, Garner produced another study of classroom behaviour. (Garner and Bing 1973). Five first year junior classes were observed and the verbal contacts between teacher and pupils were coded to distinguish between those relating to "work" (instruction and educational information) and "procedures" (classroom management). "Contacts" were defined as utterances, or a succession of utterances, that were concerned with one of the categories. Other aspects included discipline remarks, and "response opportunity", which was defined as the frequency with which a child was chosen to answer questions or to give information when the whole class was being addressed. Teacher's ratings of the pupils were compared with the nature and extent of contacts

with them. Significant types of behaviour were related to a cluster analysis of individual pupil's scores. This showed up the types of pupils that could be expected to receive the most, and the least, attention from their teacher.

Carnegie (1972) studied the tape recordings of two of the teachers participating in Garner's study and showed even more conclusively that lack of time resulted in teachers giving short directions and explanations to individual pupils. Only two per cent of teacher utterances expanded the educational implications of a situation.

None of these studies from Lancaster University attempted to provide ways in which the teacher of young children could identify her own style of classroom utterances, or equalize her contacts with the children.

1.3 The work of Lauren B. Resnick

Other studies by British research workers will be examined in the next section of this review. However the work of Resnick has been fundamental to the development of my study, and a description of his investigation is needed at this point in order to relate to other research reports.

Resnick observed four infant teachers in one school at various times of the day. Two were watched for one period of approximately two hours while the others were observed for two such periods. The data obtained from his close observation of their approach to teaching and classroom management resulted in twenty-one categories

of behaviour. He described the individual approach of each teacher and also sought for some generalisations about the type of interactions in an informal classroom.

The twenty one categories were divided into the teachers' use of questions, directions, information, praise or control, helping the children, giving and refusing permission, and a few other responses. Systematic use of the categories made it possible to encode each remark made by the teacher and then to divide these remarks into brief or extended interactions with a child or a group. A brief interaction was defined as one in which four or fewer remarks were used, regardless of the category, and an extended interaction was defined as one of five or more remarks. Resnick also determined the average number of each type of interaction in a given period of time and also when one interaction "interrupted" another.

In several ways Resnick's study can be compared to the earlier work of Dorothy Gardner. She had been interested in the teacher's behaviour in free choice activity sessions and used categories for information and classroom organisation. Nearly twenty years later Resnick was able to study teachers at any point of the school day and observe "activity" methods in a less overtly structured situation. But there was still no British schedule for classroom observation that he could use to evaluate his observations. Resnick raises many issues in the course of a relatively short study. The same general pattern of interactions emerged from his analysis of each of the four teachers despite the continued emphasis upon the individuality of the infant teacher's approach to teaching.

Extended conversations, with a high proportion of substantive content, were interspersed by very brief interactions, frequently initiated by the children. In between the teacher would be involved in a variety of brief responses, sometimes substantive and sometimes concerned with pushing a child to attend to a particular task. Between ten and nineteen per cent of all the noted interactions were extended, and forty-one to fifty-one per cent of remarks fell into these conversations. In an infant classroom Resnick concluded that extended interactions to a child or group were a major opportunity for direct instruction.

The predominance of questions by the teacher was noted at some length in Resnick's report on his research. He gives examples of questions related to different aspects of the infant curriculum and clearly considers this to be an area requiring further investigation by teachers and research workers. In the brief interactions more management directives were noted than questions, and this indicates the importance of classroom organisation and management before the teacher can get down to extended learning interactions.

While Resnick's research used a very limited sample of teachers and observations he produced a series of clearly described tables. His personal relationships with the four staff were apparently conducive to detailed study and discussion of the nature of their classroom actions and the originality and results of this study have benefited. The initial objectives of the investigation were

achieved, and wider implications for the study of informal teaching were suggested.

1.4 "The nature of classroom learning in the primary school" project
Resnick observed the practicalities of a teacher's classroom role when several different activities were occurring in the classroom. He then showed how direct instruction was used in the course of interactions with individual children. Under the guidance of Professor Brian Simon, a research team at Leicester University has produced further information relating primary school classroom organisation to teaching techniques and teacher and pupil interaction.

At an early stage in the project, entitled "The nature of classroom learning in the primary school", Bealing (1972) studied classroom organisation in 39 junior schools in two local authorities. It was found that classrooms were informal in the sense of group seating arrangements and individual and group work. However the majority of the teachers who completed a three part questionnaire employed strategies for classroom control and management that belied this informal structure. One of Bealing's main conclusions was that there is a need to characterize classrooms and teachers in several dimensions.

"..there is an urgent need to consider how the teacher's organisation relates to her aims and objectives on the one hand and to what children actually learn on the other. It is amazing to report that there have been virtually no systematic attempts to monitor or describe how a teacher's goals and organizational techniques influence what children say and do in the classroom and how these experiences affect their intellectual, social, emotional and moral development."(5)

5. BEALING, D. (1972) "The organisation of Junior School Classrooms" in Educational Research 14,3 p 235

This criticism was written in 1972 in the aftermath of the Plowden Report and its recommendations; Bealing followed up her comments with direct observations in an extended study.

Two classroom observation schedules were prepared by the Leicester team, one for the teacher's actions and the other for the pupil's behaviour. In the pilot phase six pairs of observers tested the categories in six junior classrooms while mathematical work was in progress. One observer used the Teacher Record while the other completed the Pupil Record. (Boydell, nee Bealing, 1974, 1975 a, b, c, d).

The Pupil Record was developed from PROSE (Personal Record of School Experiences) which had been used in the observation of nursery school children in the United States (Medley et al 1973). The observer notes a child's behaviour at 25 second intervals from a pre-recorded time signal fed into the ear from a cassette recorder. The child's actions are then noted on the "Statement" section of a record sheet, and after 100 seconds the observer completes a note on general classroom organisation, materials being used and so forth. From the collated details a comprehensive picture can be obtained of the pupil's actions in any type of teaching situation. The Leicester observers watched children one at a time in this manner, in a pre-arranged order.

Medley's system was considered relevant to the Leicester investigation because he had indicated that the research emphasis should be placed upon observable actions rather than on trying to pursue

theoretical hypotheses. This is termed the "low inference" approach and provides an instrument that could be used by research workers with a variety of theoretical interests, as well as increasing the relevance of the data to teachers. 13 categories were used in the Leicester version with some subdivisions. The conclusions state that a major part of each child's time was spent interacting with other pupils rather than with the teacher. However almost three-quarters of each lesson showed them engaged on their activity, including waiting to see the teacher. The children working in groups were less occupied in their own work, more concerned with talking to each other, and Boydell has pointed to this finding as a problem for informal teaching. Even more variation might have been noted in an infant classroom with younger children. Sustained conversations with the teacher in which a child could explain and develop ideas were relatively uncommon.

To give a rounded view of the classroom a Teacher Record was evolved from two categories of PROSE (Adults Interaction and Adult's Communication Setting). 19 categories were based on what the teacher was talking about and whether or not she was seeking for an answer. At the end of each observation visit a short account was written to describe the teacher's plans for the lesson. "Task questions" are broadly comparable with the Resnick's substantive questions while the "Routine" conversations are similar to those in Garner and Bings's "procedural" and "disciplinary" contacts. The breakdown of conversation on the children's work is more detailed than that used by Resnick, or by Duthie (1971) in his Scottish survey, which is reported in a later section of this review.

Figure 1.1 gives my attempt to relate Boydell's categories to Resnick's.

FIG 1.1 The Teacher Record (Leicester University) compared with the Resnick code

This table shows:

- i. The nineteen categories of teacher behaviour that were described by Boydell (1974) p 315
- ii. The use of each category in a lesson has been averaged as a percentage of the total categories from a sample of junior school teachers.
- iii. The content of the teacher's comments to her pupils has been compared with the categories used by Resnick (1972).

i. <u>LEICESTER CATEGORIES</u>	ii <u>LESSON AVERAGE</u>	iii <u>RESNICK</u>
1. <u>TASK QUESTIONS</u>		
a) Recalling facts	7	Qs
b) Offering ideas, solutions (one answer) to a child	7	Qs
c) Offering ideas, solutions (several answers) to a child	1	Qs
2. <u>TASK SUPERVISION QUESTIONS</u>		
a) Reporting progress	6	Qm
b) Choosing a task	1	Qm
c) Evaluating own task	3	Qs
3. <u>ROUTINE QUESTIONS</u>		
a) Referring to matters of classroom management	3	Qm

i. <u>LEICESTER CATEGORIES</u>	ii. <u>LESSON AVERAGE</u>	iii. <u>RESNICK</u>
4. <u>TASK STATEMENTS</u>		
a) Of facts	8	Is
b) Of ideas, explanations	3	Is
5. <u>TASK SUPERVISION STATEMENTS</u>		
a) Of written instructions or words or spellings	5	Is
b) Which tell child which task to do or how to do it	15	Im, Dm
c) Which tell child to choose a task	1	Ds
d) Which grant or refuse a task request	2	NP
e) Which praise a child's work or effort	3	Pr
f) Which provide neutral or critical feedback on a child's effort	16	N
6. <u>ROUTINE STATEMENTS</u>		
a) Of information, directions, permissions to do with management	12	Dm
b) Which provide positive or negative feedback on routine matters	5	N, P+, NP
c) Of critical control	3	Dm
d) Of small talk	3	Ip

The frequency with which each method of addressing children was used is expressed as an average lesson percentage for each teacher, and then as a total average for the six teachers. This second total is shown in the table. Each teacher was visited six times, by the pairs of observers in turn, and the lessons lasted for approximately one hour.

Despite the high incidence of work oriented conversation only a quarter of the teacher's comments were directly concerned with the substantive content of children's activities. Half of the work-oriented comments were on the level of telling a child what to do or how to do it, or evaluative comment. Classroom routine figured as prominently in the teacher's interactions as contact with the work:

"The image of the teacher's role which emerges here may be somewhat at variance with the popular view of the informal teacher who stimulates children to formulate their own ideas, probes and extends their level of understanding by detailed questioning, praises their efforts whenever appropriate and refrains from using simple directives, preferring, in the words of the Plowden Report, 'to collaborate with children, to lead from behind' (para 875)" (6)

Further trials were made by the Leicester team to test out the scope and versatility of the two instruments in different curricular areas and different types of classroom, as well as to test out observer agreement. This led to some simplification and modifications in the original record categories, and manuals were produced for their use. Further studies have now been started as a direct result of the formulation and testing of the observation instruments. In one of these studies the classroom experiences of low achieving children have been observed in relation to the teaching style adopted. (7)

In the terms of the Trent Primary Teaching Project the Leicester studies suggest that teachers in an informal setting talk to individual children or small groups as their main teaching method.

6. BOYDELL, D. (1974) "Teacher-Pupil contact in Junior Classrooms" in British Journal of Educ. Psychology 44,3. p 317
7. SSRC project no. HR 3399/1

This interaction can be systematically studied, and in this instance the low level of substantive comment is contrasted with a large amount of comment on classroom routine and management.

1.5 Teacher's perceptions of their pupils

Other research workers have studied the activities within British primary classrooms without developing teacher or pupil observation sheets. Nash (1973) used the techniques of participant observation, observing normal children in normal context. He used the personal construct theory developed in the United States by Kelly to obtain teacher's perceptions of their pupils in six primary schools, and then at the secondary school that they all entered in the following September. With field notes made in the classrooms he compared the roles that the children adopted in both schools. Although this study does not contribute to the observation of teacher's actions it is a unique sociological study of teacher-pupil interaction analysed through the personal constructs of each teacher. It is also an example of the anthropological approach to classroom observational research which has been contrasted with the interaction analysis tradition. (Hamilton and Delamont 1974; Delamont and Hamilton 1976).

1.6 The Teacher's activities throughout the school day: Research in England and Scotland

First hand observation and interpretation of the primary teacher's activities were a major source of the data used in the NFER survey of the Teacher's Day. (Hilsum and Cane 1971). A feasibility study was made in Slough to investigate the possible procedures

and suitable observation categories. (Hilsum, Bell and Cane 1969)

An interesting comparison between video, audio only and direct observation techniques was also included in the preliminary report prior to the study of 129 teachers in 66 junior schools. The objective was to obtain a picture of the junior teacher's professional activities including out of school times, breaktimes and holidays, when preparation and marking might occupy the teacher's time. The chapters reporting the classroom observation highlight the organisational and management problems that can confront a teacher in performing her professional role. Only twenty six per cent of the school day went on instructing pupils in the classroom, while a quarter of the time was devoted to clerical and mechanical chores. In the classroom less than half the time (forty three per cent) went on activities that could be described as educational instruction, and fifteen went on organising the children for their work. Even within the "instruction" much of the teacher's interactions could have been "task supervision", in Boydell's terminology.

The categories adopted for direct observation were evolved from videotapes made in the feasibility study, and from teacher's reports of their activities. This is an important development which is often ignored when the findings of this study are reported. A further report (Hilsum 1972) was also produced for teachers in a cheap paperback form without statistical tables and this is both revealing and readable to a wider audience.

An equivalent investigation was made in Scottish schools (Duthie 1971) for the Scottish Education Department and the Nuffield Foundation. This project had been initiated to consider which teacher activities could be performed by a teaching auxiliary, but it proved too difficult to ignore other perspectives of teacher and pupil behaviour. 37 primary schools from various parts of Scotland were visited and systematic direct observation in each school was supplemented by questionnaire data on the organisation of the schools.

In his classroom observation and analysis of teacher's activities Duthie utilised the OSCAR techniques devised by Medley and Mitzel, for two periods of five minutes on each visit to the schools. This did not provide the research team with information relating the teacher's activities to pupil learning and achievement, so a category system was developed that defined the critical behaviour differences between "traditional" and "progressive" teaching methods. The "instructional" paradigm defined behaviour such as "teacher structures information or question", "pupil answers" and "teacher gives positive feedback". The "self instructional" paradigm was the pattern of progressive primary teaching with activities such as "pupil plans project", "pupil asks for teacher's help" and "teacher interprets". The tables produced provide a great deal of data and serve to meet Duthie's objective that:

"At the level of macro-paradigms we are seeking not only a description of overt events but also a description of those covert events which must be going on to account for learning".
(8)

8. DUTHIE, J.H. (1971) Primary School Survey. A Study of the Teacher's Day p.69

From the paradigms a conceptual framework, that is a theory of education, was devised in terms of aims, implementation and outcome. The widespread dissemination of this information is unfortunately handicapped, in my opinion, by the original terminology that was adopted. This is even more apparent when the study is compared with the NFER survey.

1.7 The work of Neville Bennett

Interaction analysis techniques will be discussed in the second section of this review, and several other British research studies will be mentioned in this context. The work of Neville Bennett and his research team based at Lancaster University must first be mentioned even though it does not use a teacher activity coding system in terms of verbal and non-verbal interactions. 1,200 junior teachers in Cumbria and Lancashire completed a questionnaire on their form of classroom organisation, control, curriculum content and planning, instructional strategies, motivational techniques and methods of assessment. (Bennett and Jordan 1975) As a check on the accuracy of the teacher's data, a sample was made, and the children in the sample were asked to describe a day in their classroom. While Bennett concluded that there were no basic dimensions of primary teaching he devised twelve different "types", or teaching styles, varying from a recognizable progressive-informal teacher to an extreme traditional approach.

This investigation was again reported with follow-up studies of some of the participating teachers in the book 'Teaching Styles and Pupil Progress' (Bennett 1976). The emphasis in the book is

upon the comparative progress of pupils, with teachers of different teaching styles. Inevitably Bennett's finding that some pupils succeeded better within a more formal framework has been popularly used as an admission of failure for informal teaching methods. Another conclusion reached in the book has not received the same attention, but remains pertinent to this review:

"..perhaps another 'ought' for teachers, and the teachers of teachers, is to submit their practices to critical scrutiny. To question critically the bases of one's accepted values and practices can be a disturbing process, but it is an essential one, not only for teachers, but also for the children whose education is the teacher's prime responsibility." (9)

1.8 'Teaching Strategies in the Primary School' project

It is appropriate to finally mention another research project which has not been officially published at the end of my period of research. In October 1973 a Scottish team under the direction of John Powell began unstructured observation of some 30 primary classes with a view to discovering the type of teaching styles used in Scotland. Initial studies revealed that the differences between teachers were so considerable that a number of observed activities must be used to define characteristics. The SCOTS schedule was designed to take account of individualities. Superficial characteristics such as seating arrangements were not used as the major criterion for judging a teacher's 'style'. Work is now in progress for assessing the effects upon the pupils of following some of the observed strategies, and the team has been careful to point out that their findings are based on the observation of teacher's actions, and not on questionnaire responses. (Powell 1976)

9. BENNETT, N. (1976) Teaching Styles and Pupil Progress p.163

2. The technique of interaction analysis as a method of recording and evaluating a teacher's classroom behaviour

2.1 The American tradition

The term "Interaction Analysis" refers to the classroom observation system developed in the United States by Ned Flanders (1970). As a general concept, interaction analysis is also used to describe the systematic study of all that is communicated in a classroom, with the use of an observation schedule that reduces behaviour to a number of categories. Talking is a crucial part of teaching and learning, and forms the principal part of many observation instruments.

All interaction studies involve three initial problems. The first concerns what to observe, the second how frequently to observe and the third under what circumstances to observe. (10) These procedures have become very clearly defined since the early studies of Anderson (1939), and Anderson and Brewer (1945) into "Dominative" and "Integrative" contacts between teachers and pupils, and of Withall's work on the social/emotional climate (1949). Many adaptations and additions have been made to these categories, and in 1970 Simon and Boyer reviewed over seventy category systems, most of which were used in classrooms. They describe techniques that use audio or video recording and others that require an observer to record continuously or at three or five second intervals; some distinguish complex behaviours while others use a checklist of likely events. Eggleston, Galton and Jones (1975) have divided these schedules into five categories according to their stated purpose, and then into a two dimensional matrix based on the way

10. EGGLESTON, J., GALTON, M. & JONES, M. (1975) p56

that a system is developed and the use of the technique. An alternative assessment was made by Rosenshine and Furst (1973), their classification was based on the source of the variables, and then on the purpose and uses of the categories.

A good deal of interaction research has been motivated by the hope that systematic observation would provide a key to "good" teaching. This was the intention in Hughes' (1959) study of the quality of interactions of elementary teachers who were judged to be good teachers, from 129 thirty minute records. Critics of interaction studies have pointed out that the key to "good" teaching has not been found, and an alternative method of "anthropological" classroom research has emerged in the United States. (Delamont and Hamilton 1976). In this system a participant classroom observer completed field notes without a set of predefined categories. A notable example of this technique is described by Smith and Geoffrey (1968).

In the search for generalisations about teaching, interaction analysis systems have also shown the range and individuality of teaching techniques. In a review of nineteen studies that related classroom behaviour to pupil achievement, Rosenshine (1971) found that certain types of teacher behaviour were significantly associated with the pupils' achievement.

American research workers continue to dominate research into classroom interactions. Interaction analysis has found some support among British research workers, and a survey of English teachers indicated their interest in the method (Cane and Schroeder 1970):

"An outstanding request by both infant and junior teachers was for research into the interaction of personalities of child and teacher". (11)

In my search for relevant literature I decided to study the most well-known and tested research schedule, namely Flanders code, and consider its relevance to informal infant classrooms.

2.2 Flanders system of interaction analysis (FIAC)

Flanders' system was devised as a means of coding verbal communication between teachers and pupils. The assumption was made that verbal behaviour was an adequate sample of a teacher's performance. Ten categories are used. Of these seven refer to the teacher, two to the pupils, and the final category ten is reserved for silence or confusion. Teacher behaviour is divided into "indirect teacher influence" (four categories) and "direct teacher influence" (three categories). The observer records the dominant type of behaviour at three second intervals and produces a sequence of behaviours. Calculations of the ratio of indirect to direct teacher activity give an overall picture of the teacher's style of teaching.

FIAC has been found to provide useful data without too much intrusion on a lesson. It has been adapted by individual research teams e.g. Amidon and Hunter (1967) divided the teacher question category 4 into "narrow" and "broad" questions. Wragg (1972, 1973) has used it to analyse the performance of English student teachers. An inservice manual has been written to "introduce the notion of investigating verbal communication as an approach to the improvement of classroom instruction" (12). This has also been adapted by Stirling

11. CANE, B. & SCHROEDER, C. (1970) *The Teacher and Research* p 30
12. AMIDON, E.J. & FLANDERS, N.A. (1967)

University (1974) and used in microteaching programmes. The range of its application is one measure of success for a research instrument, and so I studied Flanders' categories in relation to Resnick's system for informal infant classrooms.

Fig 1.2 A comparison of categories used by Resnick, Flanders and Boydell to describe teacher behaviour

This table shows:

1. The categories used by Resnick (1972) to describe teacher behaviour in informal infant classrooms.
2. The categories used by Flanders (1970) and Boydell (1974) that record equivalent teacher behaviour.

<u>CONTENT OF CATEGORY</u>	<u>RESNICK</u>	<u>FLANDERS</u>	<u>BOYDELL</u>
Teacher asks an educational question	Qs	4	1a,b,c,2c
Teacher asks a management question	Qm,Wh	-	2a,b,3
Teacher gives educational information or clarifies a pupil's idea	Is	3,1,5	4a,b,5a
Teacher gives management information	Im	-	6a
Teacher gives a direction	Dm,Ds,Del	6	5b,c
Encouraging a child or his work	Pr	2	5e
Discouraging a child or his work	N	7	6b,c,5f
Responding to a child's request for permission	P+,NP	-	5d
Personal asides, periods of confusion, and unclassifiable responses	Qp,Dp,Ip, R,A,	10	6d
Helping a child, often non-verbal	H,W,Wr	-	-

Note Flander's categories 8 and 9 describe pupil comments.

2.3 A comparison of the Flanders and Resnick coding systems

In Fig 1.2 the basic FIAC categories are compared with those of Resnick (1972) and Boydell (1974), in relation to the definition of teacher talk. The English systems were evolved for informal classroom organisation, although Boydell's categories were adapted from the American work of Medley and Mitzel.

The most obvious difference between the categories is the lack of a "classroom management" section in Flanders code. He has several categories that cover direct educational instruction, but management instructions or questions are not differentiated.

Although Flanders' code is used to define patterns of "indirect" teaching it is most suitable for categorising formal classroom lessons where talking takes the form of a question - answer dialogue. In an informal infant class the teacher may be working with a small group of children and supervising several other activities. Her conversation would not easily fit into the pattern of statement and response required to complete a Flanders matrix. This criticism was made by Walker and Adelman (1975) when they tried to use the code on tape recordings of informal lessons.

Category ten in FIAC covers a very broad area of teacher behaviour, but there is no provision for the teacher demonstrating a skill or helping a child. This is an important part of the infant teacher's role, and Resnick acknowledged this in his code.

Interaction analysis schedules are usually concerned with overt, observable teacher actions. The person recording the coding categories has to guess at the intention of a teacher's comment. This becomes more difficult in an informal conversation where the teacher may convey her meaning in a polite, individual manner. If the teacher can code her own response there is more chance of the correct intention being noted. This has been taken into account in FIAC, and in this respect the code has developed further than that of Resnick. An interested teacher could try to use FIAC on a tape recording of her teaching although she might encounter the problems already mentioned.

Evaluating a teacher's behaviour is a straight-forward process with the Flanders code. The degree of indirect and direct teaching is determined from matrices assembled from the observation data. The ten categories are easily processed to produce compact data which can be used by other research workers or students. Wragg (1973), and other writers have claimed that it is highly recommended as a research tool. Yet this may not assist the individual teacher, and the system fails to identify the child or children who took part in the interactions.

Resnick made a rough comparison of his results with those obtained by Furst and Amidon (1967) in 160 elementary schools. The children were of fairly comparable ages and similar percentages of teacher questions (36 per cent) were found in both studies, but the results did not enable Resnick to compare the types of question. By combining the categories of questioning, permission, praise and

general responses as indirect teacher influence he could obtain comparative indirect-direct teaching ratios. Extended interactions showed a ratio of 2 to 4 while brief interactions showed a ratio of 1 to 4. The combined total of 1 to 8 was still higher than the equivalent ratios of 1, and 1 to 4, of the elementary teachers. Resnick draws the conclusion that the informal English infant teachers had a more indirect form of classroom interaction.

3. The involvement of teachers in the observation and evaluation of their own classroom interactions

The study of interaction analysis has produced a great deal more knowledge about the communication between teachers and pupils. I have indicated that the Flanders code has been used by teachers to record and evaluate their behaviour. In this final section of the literature review I have brought together several English research studies which have also involved the observations and evaluations of teachers.

3.1 The work of the N.F.E.R. and Schools Council

In their study of the Teachers' Day (Hilsum and Cane 1971) the National Foundation for Educational Research asked teachers to keep diaries of their work, including holiday periods and weekends. The teachers were not asked to analyse or evaluate their use of time, this being the task of the professional research workers. However the survey produced a precedent by using findings that were gathered by 129 junior teachers.

Questionnaires are often sent to teachers in order to obtain data from a large sample. This technique can be developed so that teachers can actively participate in the evolution of categories for classroom analysis. This is demonstrated in the Schools Council project on the Aims of Primary Education (Ashton 1973; Ashton etal 1975). Many groups of teachers were consulted for their views, and their opinions were reduced to a checklist of seventy two aims. An associated study (Taylor 1974) focussed on the issues that the teachers felt had influenced their curriculum, and the constraints that were preventing them from achieving their aims. Neither study asked the teachers to criticise their own classroom practices, but they had made teachers think about their teaching in a constructive manner.

3.2 The Ford Teaching Project

The Ford Teaching Project on the nature of Inquiry/Discovery teaching is the only British study to be published through the active collaboration of a professional research team and a group of classroom teachers. The project will be mentioned further in chapter two, and in this section I will concentrate on the role of the teachers in the observation and analysis procedures. (Elliot and Adelman 1975)

Forty teachers from junior, middle and secondary schools were encouraged to define their views on Inquiry/Discovery teaching techniques. A joint description was produced and the teachers were set the task of finding out how their own teaching fitted into the dimensions of this analysis. The approach and techniques

varied with individual teachers, and a set system of interaction analysis was not used. Tape recordings and tape transcripts were made and the teachers picked out different ways that they communicated their meanings to the class.

In one technique an observer tape recorded and observed a lesson. He then discussed this with the teacher and replayed the tape. The session was also discussed with the pupils (without the teacher's presence), and the process was brought full circle by confronting the teacher with the different interpretations of his teaching. Two teachers who worked with the project (Cooper and Ebbutt 1974) found this a valuable experience. The teacher had to be able to admit that the initial intentions of a lesson might not be achieved, and was confronted with the pupil's interpretation of his interactions. Although this particular technique was not used with the younger children, junior school staff were able to participate in the analysis and evaluation of their own and their colleagues', teaching. Listening to classroom tapes and attempting to explain their meaning became as important as the overall definition of Inquiry based teaching. (Bowen et al 1975)

The enthusiasm and involvement of teachers and research workers is shown in the twenty one booklets that were produced by the project. On their own these reports are difficult to digest and analyse. This has been realised by the research team who have organised a series of dissemination conferences to explain and further evaluate this method of "action research".

3.3 Teacher initiated research

Without the aid of an observer or a recording technique a teacher cannot objectively study her classroom interactions. Adelman and Walker (1975b) have provided a guide to various recording techniques, which was published after I had started my research. It offers practical suggestions to students and teachers and offers evaluative guidelines.

I have been unable to find interaction studies that were initiated by practising infant teachers and must assume that these have not been published. This is not a surprising conclusion when one considers that it is the conscientious teacher who organises and maintains a challenging classroom environment who would be most likely to think of analysing her actions.

One investigation has however been published by a junior school teacher (Bates 1970) and this is the only example that I have found. He recorded thirty half hour audio tapes over a period of six months in his own classroom. Two microphones and an open reel tape recorder were positioned in the class until the children had become accustomed to them. From 136 categories of his behaviour Bates grouped eight main sections relating to the organisation of the teaching group. The activity was very time consuming (Bates estimated that it took up to 12 hours to analyse one tape), but had the merit of being self-administered and evaluated. If Bates had been able to adapt an already existing category system his analysis would have been quicker, and his analysis could have covered more recordings.

The following chapters of this thesis report an attempt to adapt the techniques of interaction analysis for personal classroom evaluation.

1. Aim and context

The aim of the research reported here has been to develop a procedure for analysing classroom events which could be used by infant teachers in informal classrooms and which, through providing insights into their patterns of classroom management, might lead to improvements in teaching.

A major premise is that the teacher is an autonomous professional.

Before describing some of the factors which influenced the design of the research programme it is appropriate to elaborate on the terms "autonomous professional" and "informal classrooms" in relation to this thesis. Further references will also be made to the work of Resnick (1972) described in Chapter One.

2. "Autonomous professional"

Teaching has always been a demanding profession for the conscientious practitioner, but as modern curricula increasingly emphasise the needs and problems of individual children, the range of expertise required from a teacher is widened. The primary teacher in particular is required to display competence in many areas of the curriculum while ensuring that there is effective individual learning of basic skills. Specific interests may be chosen by the children, the classroom may be organised to encourage them to take responsibility and initiative in their work, and pupils may be

involved in different activities without the constant attention of their teacher; but it is the teacher who is responsible for organising and maintaining the environment for learning.

Of the many demands made of the teacher, one of the most difficult is the constant exercise of judgement in the classroom. Pupils, parents, colleagues, headteachers and visitors all offer opinions and suggestions, but the judgements determining minute by minute activities can only be made by the teacher; in this sense teaching is an autonomous activity.

Teaching is also a professional activity. As a professional, the teacher is trained for a job that the pupils are not able to do for themselves. But, compared to the doctor or the solicitor, there is little in the way of a precise pattern of action, or a written code of practice to inform her decision making; the majority of the teacher's decisions are based on intuition and previous experience. So, bringing these ideas together, it is appropriate to regard the teacher as an autonomous professional.

If the teacher is autonomous, the responsibility to strive towards improving her performance can ultimately lie only with herself. The question "How can I do more effectively what I believe ought to be done?" is fundamental to her progress. This assumes that she thinks deeply about her classroom actions, and has profound convictions which help her to decide what is appropriate. How far is this the case?

Teachers can usually sense whether her teaching materials or responses to the children were appropriate, but normally there is neither the time nor the stimulus to enter into a deeper self-analysis. Most primary school teachers spend a large amount of each day with their own class and so develop a close understanding of these children. They are concerned with the children's physical, emotional, social and intellectual demands, but the features of each teacher's work become so well known to her that it is difficult to think of day-by-day events as abstract phenomena. Consequently she is unlikely to reflect in a general sense about her relationship with her pupils, or to analyse the merits of various methods of organising the school day.

Outside the classroom there are also few opportunities for the teacher to assess her professional development in a critical manner. Inservice courses may offer fresh approaches and ideas for changing classroom practice, but it is unlikely that they will cover ways of comparing the progress of pupils in relation to different teaching patterns. Moving from one school to another may affect her classroom practice, but when she attempts to compare her work in the previous school with that in her present class her analysis will probably be haphazard because she has few effective constructs to guide her thinking. In consequence, throughout her career it may be that her basic classroom techniques, her relationship with the pupils and the way that she organises herself will alter little.

If this view is correct, it is of value to find ways of helping the teacher to examine closely her classroom actions. Since she is seen as an autonomous professional, it is important to provide help in the form of analytical techniques which she can personally apply, and make her own judgements on.

3. 'Informal classrooms'

In the Nottinghamshire schools that took part in this research, it is usually considered that to be "informal" in teaching is desirable. Indeed, teachers are likely to apologise if they feel that their approach in some respect is other than informal. For example, a teacher may say, "I must confess to being a little formal in my number work".

Yet, the term is ambiguous. It is variously used synonymously with "progressive" "open" or "discovery learning"; it may refer to the grouping of the children, the time intervals of teaching, the arrangement of the furniture, the manner in which the teacher and pupils interact, or all of these aspects.

Bennett (1976) encountered this confusion when he was searching for systematic definitions of teaching styles in primary schools:

"..the same terms are used to describe different aspects of the classroom situation, and different terms are used to refer to essentially the same aspects." (1)

1. BENNETT, N. (1976) Teaching Styles and Pupil Progress p.29

In the Ford Teaching Project, Elliot and Adelman (1975a, b) interviewed primary and secondary teachers in East Anglia to find out how they defined "informal" and "formal" teaching. Generally the description related to the extent to which pupils relied upon their teachers for the initiation of work. In the classrooms which the teachers felt were more informal, the pupils were less dependant on their teacher, although this did not always imply that their work was self-directed, or based on independent reasoning. Pupils could be working independently in the classroom while looking to their teacher for resources, work-cards, etc. Furthermore, other criteria were suggested such as the spatial organisation of the room, the social organisation of the children, and the emotional climate of pupil-teacher interactions. (2)

It would seem however that underlying every view of the meaning of "informal" is the concept of child-centredness. Weber (1971) summarised British infant school techniques for an American readership, in these words:

"The setting, the arrangement, the teacher-child, child-child relationships that maintain, restimulate if necessary, and extend what is considered to be the most intense form of learning, the already existing child's way of learning through play and experience he seeks out for himself". (3)

In common with Elliott and Adelman, Bennett, and others, Weber assumes that there is a minimum concept of an "informal" classroom in which the teacher is actively attempting to foster the children's own interests and their self-responsibility for their actions. This broad view of "informal" has been used in this study.

2. ELLIOT, J. & ADELMAN, C. (1975b) The Language of Informal Teaching. Unit 1. Patterns of Informal Teaching.
3. WEBER, L. (1971) The English Infant School and Informal Education p11.

4. Resnick (1972)

Resnick's categorisation of the classroom behaviour of informal infant teachers was closely studied since he had worked specifically in informal classrooms. Can Resnick's system, or an adaptation of it, be used by infant teachers themselves in informal classrooms, and if so does it help them to gain new insights into their ways of working?

This was the starting point for this study.

5. Form of research

Educational research can be carried out in a variety of forms. The scientific procedure searches for generalisations about educational data. Alternatively the case study approach is concerned with descriptions of particular situations while the philosophical form concentrates on meanings and educational value judgements. There is also the innovative form in which new procedures are developed and tested.

This study is of the last mentioned category: it is a piece of innovative research. It is not a search for generalisations on teaching performance, but an attempt to develop and evaluate a new procedure for classroom analysis by the teacher.

A prime concern has been that the innovation should be useful to a teacher, and in consequence there have been changes in the direction of the research as the investigation progressed. The study is in accord with the concept of action research as expressed by Clark

(1972) that the utility of a study should be integrated into its design. Elliot (1976) has described educational action research in these terms:

"...new concepts are required to aid the problem. As these are generated they in turn dictate the search for more data. The understanding of the problem shifts... The process is systematic but eclectic reflection on the practical problems experienced by teachers with a view to arriving at some decision about what might be done about them". (5)

6. Research aimed at improving teaching performance

The notion of improving teaching is less well established as a research objective in this country than it is in the United States. For example, Amidon and Hunter (1967) entitled their monograph on classroom interaction "Improving teaching: the analysis of classroom verbal interaction". They state that teachers want to improve their teaching performance, that teaching can be subjected to systematic enquiry and that there are distinct teaching "behaviours" which can be identified as worthwhile and then learned systematically. (6)

Flanders, whose earlier work has been one of the most dominant influences in classroom interaction studies has recently (1976) expressed his view in England that when teachers have opportunities to analyse their own teaching the chances are "very high" that they can change or modify their own classroom behaviour. He now considers that improvements in teacher effectiveness will result from:

5. ELLIOT, J. (1976) "Who controls classroom research?" Cambridge Institute of Education
6. AMIDON & HUNTER (1967) Improving teaching: the analysis of classroom verbal interaction pp 202-203

"...a continuous synthesis of research on teaching and instructional development... I suggest that the highest priority objective of inservice teacher education is to provide the incentive, time, space and resources for the periodic study of ones's own teaching..." (7)

Inservice study and research are thus seen to be continuous, complementary elements in the improvement of teaching.

7. Factors influencing the research design

This investigation has been planned with the aim of helping teachers to improve their classroom performance. Such an objective necessarily combines educational research with inservice education. But although teachers may find research results to be an interesting guide to studying their own teaching, they are ill-served if the findings are presented as dogmatic systems to follow. Gabriel Chanan (1974), editor of the NFER journal, considers that research workers are mainly to blame for teacher's antipathy to research, and he urges writers to take more accord of the interests of their audience when they are designing reports. (8)

As a research worker I felt the need to decide what was likely to be the most significant information that could be collected from a teacher's classroom and what would be most relevant to the teacher. But the technical terms which are used in order to give precise meaning to research data might baffle teachers, as the Humanities Curriculum Project team had discovered with their materials:

"...the inbred language of the early stages of experiment will not meet the needs of the diffusion of curriculum development".(9)

7. FLANDERS, N. (1976) "Research on teaching and improving teacher education" in Brit. Journal of Teacher Education 2,2. p 172.
8. CHANAN, G. (1974) "Educational Research and its audience" in Education for Teaching 95 pp 5 - 10.
9. MACDONALD, B. & RUDDUCK, J. (1971) "Curriculum Research and Development Projects: Barriers to Success" in Brit. Journal of Educ. Psychology 41 p 153.

The language and concepts used in this investigation were deliberately designed to be intelligible to infant teachers.

While some specific terms had to be used to define the interaction categories and procedures for analysis these have been formulated with teachers in mind.

8. Practical influences

At an early stage of the investigation permission was obtained from the Nottinghamshire Education Department for me to work with interested teachers in Nottinghamshire infant schools. Initial contact with schools was made through head teachers. All the teachers who participated were volunteers and each understood that she was entitled to withdraw from participation and to have any tape recordings of her work destroyed; in practice no one withdrew or asked for tapes to be erased.

It was decided only to study experienced teachers since they would probably have established patterns of classroom organisation, and would be less disturbed by the presence of recording equipment. Tape recordings were only made during general activity sessions when a variety of activities were occurring in the classroom. In the participating schools the major part of the infant school day is devoted to this form of "activity sessions".

With these aims and constraints the research programme was devised as described in the next chapter.

1. Three stages of the investigation

There were three stages in this investigation. First, it was necessary to find an effective method for recording the observed classroom activities of an infant teacher during an informal teaching session. Second, a procedure for analysing the recording was required so that the teacher's activities and interactions with the children could be categorised. Third, guidelines for evaluating the analysed material and the teacher's reactions were needed.

Since the aim was to enable teachers to carry out these operations themselves, it was essential to design the recording techniques, analysis procedures and evaluative guidelines with this in mind.

2. The development of recording methods

Initial investigations were concerned with the practicalities of video and audio recording in infant classes while normal "activity sessions" continued.

2.1 A fixed camera with video cassette recorder

A simple unit for video recording in schools was assembled. This consisted of a trolley adapted to carry a Shibaden camera with 8 mm wide angle lens mounted at a fixed height of one metre above ground level; a Philips video cassette recorder N1500 on a shelf below the camera; a twelve inch television monitor next to the camera, but facing in the opposite direction; and a four plug socket with a long flex connected to the side of the trolley. When the unit was placed in a convenient position in a classroom it was possible to view about a third of the room.

The video cassette recorder was a standard model, modified to receive a microphone input. The microphone was either suspended from the classroom ceiling in approximately the middle of the room, or the teacher wore it around her neck. An automatic control determined the sound input.

With this equipment it was possible to make thirty minute cassette recordings of classroom activity by switching the equipment on and leaving running without supervision. The video recorder switched itself off automatically at the end of a cassette.

The first trials of the equipment were carried out at Glade Hill and Bosworth Road Infant Schools in Nottingham. The teachers worked in single class units and all had had at least one year's experience of teaching infant children. Some of the classrooms were in a modern brick and glass building while others were in temporary huts. To gain the teachers' confidence in the equipment I worked with groups of children in several classes and videotaped my interactions with them. They were naturally curious about the trolley and excited at seeing themselves on the television monitor screen; when the camera position had been determined the monitor had to be switched off to reduce the distraction. Within a few minutes the children had forgotten about the camera, and according to their teachers worked more or less normally. Similar findings relate to all the video recordings.

Recordings were made of five teachers, in each case during general activity sessions. This meant that a range of activities - mathematics, writing, reading, creative work, home play, etc. were in progress and the teacher was moving about the classroom working with different groups or individual children.

We were interested to see how effective a fixed camera would be for recording the teacher's activity in the classroom. Both the expense and distraction of a cameraman were to be avoided, but a number of technical difficulties became apparent from the first recording.

The main advantages of videotape over film are the facility for instant playback of a recording and the use of ordinary lighting. We worked with the normal classroom light and replayed the recordings during the lunchbreak or after school. The camera had an automatically adjusting iris diaphragm which controls the amount of light allowed into the lens. This accommodated the brightest source of light in the room, but there was a resulting tendency for the view out of the classroom windows to feature more brightly than the classroom's inhabitants. Avoiding windows and bright lights became an important criterion in the positioning of the camera.

The classrooms were also found to be bad acoustic settings for recordings. The automatic recording level of the recorder has the effect of reducing all levels of sound input to the same volume level on the tape. With so many different activities

occurring in the room the teacher's voice was not always the most prominent sound, and the recorder could obviously not distinguish between the most useful conversations. Unless a technician stayed with the machine to constantly alter the sound level the teacher would have to wear a microphone so that her interactions could be studied around the room.

At this stage the visual quality seemed reasonable, for we were not expecting professional standards of television production. The wide angle lens distorted the extreme outer edges and the first few feet of the picture, otherwise the focus was distinct. We recognised the limitation that from time to time the teacher would disappear from view, at other times she would dominate the screen or appear as a small figure in a group of children. Until we were certain what kind of analysis we would use, it was not possible to evaluate the effectiveness of the video recording procedure. But deciding on the most appropriate form of analysis depended partly on what could be observed from a recording. Hence the development of the recording methods and the analysis procedure depended upon each other.

The possibility of using a robot mobile camera was discussed with colleagues in the Polytechnic Department of Electrical and Electronic Engineering and with an outside consultant. The teacher would have to wear a homing device such as a light or an infra-red source on her head, with the camera mounted on a swivelling unit. This was unlikely to be a feasible operation, and the idea was shelved.

The general attitude of the teachers working with us was encouraging, although only one could be persuaded to make the recording completely independently. While they were willing to be videotaped or recorded they treated the equipment with caution. On each occasion the teacher explained to her class that a television recording was going to be made, and she warned them not to touch the equipment. The video cassette recorder is an entirely enclosed machine, and the only likely interference would be for the children to press down the switches or put their hands in front of the camera. We had no instances of this. Only one trailing lead to the nearest power point was used, and in the trials no one tripped over this flex. Occasionally furniture had to be moved out of its normal place to reach the socket, but the classrooms were not specially arranged for recording sessions.

The most obvious difficulty was the sheer weight and shape of the equipment. Negotiating stairs and transporting the unit to and from school proved to be a problem. It had been envisaged that a teacher would take the video recorder home and play back her recording through her own domestic television set. Technically the Philips video cassette recorder is suitable for this since the input is fed into the standard aerial socket of a television receiver. The problem is the weight and delicacy of the machine: at 17 kilograms it is too heavy for a teacher to carry any distance.

The video equipment was then used with a battery operated radio-microphone system at Blue Bell Hill Infant School, Nottingham.

This unit has obvious advantages over an ordinary microphone because it can transmit sound signals over a radius of 4000 metres (a quarter of a mile), without connecting leads. A tiny condenser microphone was clipped to the teacher's chest with a lightweight transmitter and aerial strapped in a pouch at her waist. The signal was picked up by a receiver on the trolley and was then fed into the video recorder. When it was working efficiently the teacher's comments were distinct from all parts of the room, and showed the merit of carrying the microphone, but the equipment was delicate and unreliable. On several occasions a recording had to be stopped because the sound was not being received, and a technician had to be called to the school to find and repair the fault. There was also a possibility of picking up the local police signals instead of the teacher's comments!

Until a video recording was replayed it was not possible with this equipment to know if the teacher's voice would be audible, and if she was visible for most of the recording time. The method of categorising a teacher's actions was considered in relation to this evidence. Unfortunately the semi-open plan design of Blue Bell Hill School showed up the inadequacies of a fixed camera position, while the radio-microphone could obviously not be given to a teacher without technical support. These practical considerations contributed to my final decision to abandon video recordings and concentrate on audio methods.

2.2 A portable audio cassette recorder

The possibilities of sound only classroom recordings were first investigated at Bosworth Road School. An open reel tape recorder would need the same power points and leads as the video trolley, even if a radio microphone was used. A battery operated cassette machine was the obvious alternative and had the advantage of being a familiar piece of school equipment.

A Philips portable cassette recorder N2203 with automatic recording level and separate microphone was tried out by two teachers. The recorder was kept in its carrying case and worn at the waist with the carrying strap either dangling from the near shoulder or worn diagonally across the body from the other shoulder. The microphone was clipped onto the carrying strap near to the throat, and a c60 (thirty minute) cassette tape was inserted. When the teachers had become used to the weight and felt that their class would not be unduly distracted, they switched the recording on from the microphone. The simplicity of this system was very encouraging, and both teachers used the machine with an ease that became a common feature of subsequent recordings. The recorder was light (1.2 kilograms) and comfortable to wear for long periods of teaching time, so that the teachers were free to choose their own recording time.

Cassette tapes are relatively inexpensive to purchase and provide an accurate record of the teacher's verbal comments wherever she moves. The children closest to her are also audible, and some non-verbal actions can be conjectured from the context.

One of the teachers at Bosworth Road school was videotaped while also recording onto a cassette recorder. The speeds of the oral and visual recordings perceptibly varied and sound and picture were soon out of synchronisation. Video recordings could therefore not be made with an audio cassette providing the sound input.

When the potential of video and audio recording methods had been considered it was decided to involve infant teachers in different schools. If it was feasible video recordings would also be made of each teacher in order that the two methods might be compared. Their interaction would be noted in the manner described below.

Nine teachers in infant schools agreed to record themselves and take part in a self-analysis procedure. Initial contact was made through their headteacher, although prior permission for the study had been obtained from the local education authority. Each teacher had been working with infants for at least a year and approached her work in an informal manner with large parts of the day devoted to activity sessions and group work. The school catchment areas varied between urban and suburban, but they were all within easy travelling distance of the city centre of Nottingham.

Subsequently two members of a four-teacher infant team made a sequence of four audio recordings each and agreed to compare their analyses. Final discussion of the recordings was related to the whole sequence of tapes as well as to their individual reactions and evaluations.

While the technical equipment was being developed the methods for quantifying and analysing the classroom data were also under design, as described in the next section.

3. The development of self analysis procedures

The second stage of this study was to develop the procedures for analysing the recordings so that a teacher's activities could be categorised. Verbal and non-verbal behaviour were studied from the trial tapes, and teachers' opinions on useful ways of classifying their recordings were also sought.

3.1 Definition of terms

A teacher's classroom contacts with her pupils provided the basic data. Each verbal comment that the teacher made to a child was termed an utterance. Some non-verbal behaviour was also included, and so the general term action was used to distinguish each separate utterance or activity involving a child, or group of children. When a recording was played back to a teacher she coded each of her actions into the most appropriate category of a coding system. A sequence of actions between the teacher and child was called an interaction.

The review of existing interaction analysis systems shows that there are very few schemes developed specially for use in informal primary school classrooms, and none which were primarily planned for the teacher to use on her own. The Flanders ten category schedule has been used in many different teaching situations, including infant classrooms. Its relevance to formal

teaching made it inappropriate for Nottingham infant teachers and moreover it requires several training sessions before it can be used effectively.

3.2 The twelve categories code

Resnick had used twenty one categories of teacher behaviour, which seemed to be too many for a teacher to remember quickly while replaying a tape recording. The categories were reviewed in order to decide which were essential, and the basic outline of questions/directions/information was adopted. The following paragraphs describe the rationale for our twelve categories code, and this is shown alongside Resnick's code in Fig 3.1.

Figure 3.1 Resnick's 21 categories code compared with the 12 categories

<u>RESNICK'S CODE: 21 categories</u>		<u>OUR CODE: 12 categories</u>	
<u>QUESTION</u>		<u>QUESTION</u>	
Qm	management	M	management (equals Qm)
Qp	personal		
Qs	substantive	Q	educational (equals Qs and Qp)
 <u>DIRECTION</u>		 <u>DIRECTION</u>	
Dm	management	D	direction (includes Dm, Dp, Ds and Del)
Dp	personal		
Ds	substantive		
 <u>INFORMATION</u>		 <u>INFORMATION</u>	
Im	management	Im	management
Ip	personal	I	educational (includes Ip, Is, W, Wr and Rd)
Is	substantive		

Fig 3.1 (cont'd)

ENCOURAGING/DISOURAGING
ACTIVITIES

- Pr teacher praises a child
or his work
- N negative statement to a
child
- P+ teacher gives permission.
to a child
- NP teacher does not give
permission when child asks

PRACTICAL ASSISTANCE

- W teacher writes down or
spells a word for a
child or reads when a
child is working
- H teacher helps a child
- Wr teacher writes from a
child's dictation
- Rd teacher reads a story to a child
- Del teacher asks a child to wait

OTHER

- R unclassifiable response
- A teacher speaks to another
adult

BRIEF INTERACTION

four or fewer teacher actions
to one child or a group

ENCOURAGING/DISOURAGING
ACTIVITIES

- E encouraging and praising
a child or his work
(equals Pr)
- C discouraging and checking
undesired activities
(equals N)
- P giving or refusing permission
(equals P+ and NP)

PRACTICAL ASSISTANCE

- Or teacher hears a child read
aloud
- H helping a child in a non-
verbal way (equals H)

OTHER

- O observing a child without
comment
- X other utterances (includes
R and A)

SHORT INTERACTION

three or fewer actions
to one child or a group

Fig 3.1 (cont'd)

EXTENDED INTERACTION

five or more teacher actions
to one child or a group

LONG INTERACTION

four or more teacher actions
to one child or a group

CODING PROCEDURE

coding done by a trained observer
during direct observation

CODING PROCEDURE

coding done by a teacher from
tape recording

Within Resnick's system there was a distinction between utterances that could be related to some aspect of classroom management, those with a substantive (educational) content, and those referring to a child's personal circumstances. The "personal" categories were removed because the social aspect of classroom conversation is considered to be an integral part of the education of young children. The "management" and "educational" categories were retained.

Under "encouraging/discouraging activities" the giving and refusing of permission by the teacher were separated by Resnick into "P+" and "NP" categories. I considered that it was necessary to show when the teacher had to give a quick response to a child's request in an informal teaching situation but it was not essential to know if this was a positive or negative reply. So the category "P" was introduced to cover both types of response. In contrast, the encouragement and discouragement of a child's activities were still kept apart, and the coding initials changed to "E" for "encouragement" and "C" for "checking undesirable behaviour". Both could be initiated by a child's comment, or by the teacher's observation of a pupil's activity, and it was thought that the use of these two

categories might provide some interesting insight into an individual teacher's style of teaching.

The "practical assistance" and "other" categories were also altered. "Helping a child" later turned out to be an ambiguous category, but in the initial design it was used to incorporate Resnick's "W", "H" and "Wr", into a general "H" for helping a child. A great deal of individual attention in activity sessions was obviously devoted to hearing the children read, and so "Or" was devised for these occasions. The teachers did not spend activity sessions reading to the whole class, although they might read a few sentences to a group, so the "Rd" category was incorporated into "I" for educational information. From the twenty one original categories there remained a working outline of twelve.

The major distinction could now be made between the "educational" and "classroom management" aspects of a teacher's interactions, in relation to informal classrooms. The proportion of questions asked, and of instructions given might be relevant to a teacher's future planning. The use of management questions and information could be used to indicate how much class routine had been delegated to the children, and might reveal aspects of the teacher's strategies for organising her classroom. All these issues could be raised once the teacher's actions had been placed in the most appropriate category.

Confusion could arise between the form and the intention of a teacher's action. Thus "Will you start work" may be in the form of a

management question ("M"), but in intention it is clearly a direction ("D"). It was decided that actions would be coded according to the teacher's intentions.

Resnick did not note down the names of individual children involved in an interaction with their teacher. I felt that names were important to the teacher, and in the context of a recording it could be a valuable feature of her coded interactions. When coding, the name of the child concerned was written under the first subscript of an interaction. If the child initiated the interaction his name was underlined; later this was found to be too complicated a process and the practice was omitted.

Each interaction was separated from its neighbours by dashes on the teacher's coding. If she was interrupted and turned to another child during the course of an interaction this was placed in brackets within the original interaction.

The following extract illustrates the form of the coding:

```
.../MQQIQQIQQD / D / QQ/ QQ (Im) QQQ/ Im (I) Im/ D /  
Linda Malcolm Jean Carol Petra Petra Daniel Carol  
  
QD / MQ ...  
Daniel Elsie
```

This is the coding of a teacher initially talking to Linda who was sorting and matching Dienes blocks by shape. The teacher asked Linda if she had completed the activity and then put her a series of questions about shapes. Two pieces of information were given to Linda before she was directed to continue matching. Malcolm and Petra were arguing over a crayon nearby - the teacher told Malcolm

to use a different colour. She turned to Jean's work on the number eight and asked her if she had found eight paper fishes. Carol was struggling with her writing, and a long series of questions followed, interrupted by Petra. She was given some management information and then, after the teacher had finished with Carol, she received some more management information which Daniel interrupted. Carol was still unable to find enough words on her own, so her teacher told her what to do. Daniel was asked a question and told to draw a picture to complete his story. Elsie was hovering by her teacher and was asked about her play activities in the Wendy House ...

The twelve categories had to be suitable for a teacher to use with either a video or audio recording although the "Or", "H" and "O" categories were not particularly relevant to audio recordings.

The categories were then tested in school to find out if the system was feasible. I first used the twelve categories code in Glade Hill Infant School by directly sitting in the classroom and noting down the teacher's actions; a carbon copy of the sheet was then handed to the teacher. Whenever possible I found a convenient corner, such as the book area, and coded for up to thirty minutes at a time. Six hours of this direct observation showed that questions and directions were the dominant feature of the teacher's utterances.

3.3 The nine categories code

Once the decision had been taken to abandon video recordings it became clear that the "Or", "H" and "O" categories were inappropriate.

"H" and "O" could not be detected easily on an audio tape. "Or" ("hearing a child read") in effect was represented by other items in the code, for example "D" ("let me hear you read"), followed by "I" whenever the teacher gave the child a word, "Q" when she asked a question, etc. Thus the "nine categories" code came into being as set out in figure 3.2.

It also became clear that the nine items in the code were all units of the teachers' speech and did not include non-verbal actions as is the case with both Resnick's code and our twelve category code. Thus the term "utterance" became appropriate to describe that which is coded.

Figure 3.2 The 9 categories code

This is the final form of our code. It is based on nine different kinds of utterances by a teacher to a child or to a group of children. The results given in chapter four are in this code.

QUESTION

- Q teacher asks an education question, e.g. "W for ?" "What colour is the sky?"
- M teacher asks a management question, e.g. "Who is in charge of biscuit money this week?"
"Where are you going?"

DIRECTION

- D giving a direction, leaving the child with no choice, e.g.
"Start a new page"; "Put your book away"

Figure 3.2 (cont'd)

INFORMATION

I teacher gives information with an educational content e.g.
"W for windmill" "The sky is blue"

Im teacher gives information relating to classroom organisation
and general management, e.g. "Jane is in charge of biscuit money"
"We are having PE after service".

ENCOURAGING/DISOURAGING ACTIVITIES

E encouraging and praising a child or his work, e.g. "Good work
Jane" "What a super picture!"

C discouraging and checking undesired classroom activities, e.g.
"Less noise please" "Stop that at once"

P giving or refusing permission for a child's request, e.g.
"Yes, you may" "No, you may not"

OTHER

X other utterances

LONG AND SHORT INTERACTIONS

long interactions contain four or more teacher utterances, short
interactions three or less

3.4 Long and short interactions

The four infant teachers that Resnick had observed had at least one common feature in their approach to classroom teaching; they had lengthy conversations with single children or a small group, interspersed and interrupted with a number of short interactions. Between 41 and 55 per cent of the teacher's utterances formed part of one of the extended conversations, and he considered them to be a dominant feature of this style of informal infant teaching.

The notion of two types of classroom interaction, with different purposes, was investigated further with the Nottingham infant teacher's recordings. Resnick's analysis of "brief" and "extended" interactions were closely studied and two forms of interaction were renamed "long" and "short" for this study. Since it was apparent that teachers doing the coding themselves missed some actions I used four or more actions to a child or small group as the dividing line between "long" and "short" interactions. Four or more actions to one child or group was defined as a long interaction.

The idea was explored that long interactions are more significant teaching events while short interactions are usually of management significance. In an informal teaching situation, where many activities involve the teacher's attention, the long interactions provide her with evidence to assess a child's progress and difficulties, to plan with a child, to set new tasks and to promote language development and socialisation. In a short interaction she only has time to observe something that a child is doing, and perhaps make a quick suggestion or direction.

The teacher's codings were divided into long and short interactions as a means of studying the nature of their classroom activity. These might also provide insights into classroom organisation, personal planning and guidance to children, and could possibly be used to evaluate her strength and weaknesses.

4. The development of self-evaluation guidelines

When a teacher has made a recording of her work in the classroom and coded her utterances, what then? From the outset it was planned to prepare guidelines for teachers to engage in self-evaluation of their work, as revealed by the codings.

This part of the study has received the least attention, partly because it could only begin once the recording and coding procedures were in full operation, but mainly because of the personal difficulty of myself as an inexperienced teacher asking professional questions of experienced teachers.

During each coding session I asked the teacher for her reactions to wearing the equipment and to the coding procedure. In addition we discussed the nature of the teaching situation in relation to the coded sequence of utterances.

As a result of these discussions a simple sequence of questions has been framed. These suggest the potential of this procedure but, having been asked of only a few of the participating teachers and in a fragmentary way, it is not possible to give any evaluation of them. The questions are set out in figure 3.3.

These questions point the way for the use of this approach to classroom interaction analysis in inservice education and they indicate that this could be a useful tool for infant teachers exploring the processes of their own teaching. Setting this procedure in a wider context which examines the aims and objectives of the teacher, her classroom strategies and the resources of her classroom is the next step - but it is beyond the scope of this study.

Figure 3.3 Guidelines for self-evaluation after nine category coding of recordings of teaching activity

Count the number of times that each category of utterance has been coded. Count the number of short and long interactions.

1. Consider each category of utterance in turn. Ask for each, "Does this feature more frequently, or less frequently, than I would wish it to?"
2. Consider the differences between the long and short interactions. Is it the case that long interactions are more educationally valuable to the child? Is it the case that short interactions mainly serve to keep everybody busy?
3. Consider the children to whom you spoke during the half hour. Was each child in the class getting as much of your attention as was reasonable? Were some of the long interactions ones which you had planned for today on the basis of your assessment of individuals' needs?
4. If changes in your classroom practice are desirable, how can these be achieved? If fewer 'Ds' or 'Ps' or 'Cs' seem required, or fewer short interactions, or fewer interruptions in long interactions, can these be achieved by changes in the classroom routines, or by provision of more resources? Can some of the 'Is' be delegated to books, or picture dictionaries, or to other children? Do too few of the interactions have a final 'D' and in consequence children are left unsure of what to do next?

1. Introduction

As stated in chapter two, the aim of this study has been to develop a procedure for analysing classroom events which could be used by infant teachers working in informal classrooms and which, through providing individual teachers with new insights into their patterns of classroom management, might lead to improvements in teaching. The development of the procedure has been described in the previous chapter. Here are set out the results obtained from using the procedure in schools.

The most important result is that each of the eleven teachers who participated in this research was able to make and analyse recordings of her speech made during teaching periods when she was moving about the room. The recordings required equipment no more sophisticated than a battery operated audio cassette recorder costing less than £20. The teachers learned to analyse their recordings with no more than fifteen minutes training. On this basis they could analyse a 30 minute recording by spending less than 60 minutes listening to the recording and writing down the analysis in code form. It is important to add that another teacher might characterise some of the actions differently and identify a different number of actions, but the value of the codings is that they gave each teacher new insights into her classroom activity.

It must also be added, however, that it has not been possible to show that the use of the procedure has led to any improvements in teaching in the individual teachers. It was recognised from the

start, of course, that to measure "improvement" was beyond the scope of the investigation, but it was felt to be right to see "improvement in teaching" as the ultimate intention of the work.

Some basic data about the eleven teachers is given in figure 4.1. This shows that they worked in a variety of situations - temporary, Victorian and modern classrooms and open plan schools, that their children were organised in different ways - class grouping, both single age and vertical, and team grouping, and that the children came from different home environments - inner city terraces, council high rise flats, and private housing, etc. They were all experienced teachers and judged by their heads to be both competent and personally confident.

Figure 4.1 Basic data about the eleven teachers

<u>Teacher's initials*</u>	<u>School environment</u>	<u>Teaching situation</u>	<u>Age range of children and size of class</u>
<u>Mrs A</u>	Suburban, private housing	Open plan, team teaching	5 to 6+ Numbers vary during the day
<u>Mrs B</u>	Urban, council redevelopment area	Modern class-room	Vertically grouped, 5 to 7+. 25 children
<u>Mrs C</u>	Urban, council 'high rise' flats & older terraced housing.	Classroom, opening onto a work corridor for art etc. Primary school.	Vertically grouped 5 to 6+. Small percentage of mixed origins.
<u>Mrs D</u>	Suburban, private housing estate	Semi-open plan.	28 children. 6 to 7.
<u>Miss E</u>	Urban, area scheduled for development.	Victorian primary school. High ceiling classroom.	24 children. 5 to 7. Small number of Asian immigrants.

Figure 4.1 (cont'd)

<u>Teacher's initials*</u>	<u>School environment</u>	<u>Teaching situation</u>	<u>Age range of children and size of class</u>
<u>Miss F</u>	Urban, area scheduled for development.	Classroom in a temporary hut.	24 children. 5 to 7. Many likely to move in the near future.
<u>Mrs G</u>	Suburban, private housing estate.	Open plan, team teaching unit.	Numbers vary in teaching groups. Rising 5s to 6+.
<u>Mrs H</u>	Suburban private housing estate.	as above	as above
<u>Miss I</u>	Suburban, council housing estate.	Primary school. Classroom designed for Juniors.	Vertically grouped 5 to 7+.
<u>Mrs J</u>	Suburban, council & private housing.	Classroom.	34 children. 6 to 7.
<u>Miss K</u>	Suburban, private housing estate.	Open plan.	Numbers vary with teaching groups. 6 to 7+.

* Initials have been changed to conceal the teacher's identity.

In Section 2 of this chapter the results obtained from using the nine categories code are described. Section 3 then reports on the results of analysis into long and short interactions. Section 4 is an account of two teachers in a team teaching organisation and their use of the coding system.

2. Results of studies analysed by the nine categories code

The nine categories code has been described in chapter three, section 3.3.

2.1 Count of actions

Figure 4.2 gives the results of seventeen studies involving the eleven teachers who are listed in figure 4.1. Where the curriculum activity of the teacher during the recording period is described as "general" this indicates that mathematics, reading, writing and some creative activities were in hand.

Most of the recordings lasted for exactly thirty minutes, and the teacher chose her own starting time for a recording.

The average number of actions in a three minute time interval is given in this table because this enables a comparison to be made with data given by Resnick. It must be remembered, however, that these codings were made by the teachers; the number of actions identified by them is fewer than would be found by a trained research worker engaged in a "total" coding. This point is elaborated on in the next section of the chapter. Resnick found that he had coded an average of six interactions in a three minute interval, this figure included both brief and extended interactions.

The percentage figures showing the frequencies of the different actions make it clear that for most of these teachers three activities predominate. These are: asking educational questions, giving directions, and giving educational information. For some teachers the giving of encouraging remarks is also a frequent action. The interpretation which led to these codings are discussed in section 2.4.

Fig 4.2 Seventeen studies using the nine categories code;
number and type of actions as coded by the teachers
themselves

<u>Teacher</u>	<u>Nature of work being supervised</u>	<u>Period of recording in minutes</u>	<u>No. of actions per 3 mins.</u>	<u>Percentage frequency of actions</u>									
				<u>Q</u>	<u>D</u>	<u>I</u>	<u>Im</u>	<u>M</u>	<u>E</u>	<u>C</u>	<u>P</u>	<u>X</u>	<u>Total</u>
A	number	30	30	31	31	21	1	0	12	1	0	3	100
* B	general	40	25	23	21	32	2	1	9	2	1	9	100
A	writing	30	22	19	40	27	0	0	5	2	0	7	100
C	general	30	21	25	16	18	6	4	18	1	5	7	100
D	general	60	20	20	30	15	2	7	15	3	1	7	100
A	topic	30	19	21	20	28	4	1	20	1	0	5	100
E	general	30	18	43	31	10	2	5	1	2	3	3	100
F	general	60	16	30	11	20	3	4	22	2	1	7	100
A	reading	30	15	5	33	34	0	3	19	4	0	2	100
G	writing	30	14	18	30	26	2	6	9	2	3	4	100
G	reading	30	13	29	28	24	0	1	9	5	1	3	100
G	number	30	13	35	40	8	0	3	8	2	1	3	100
H	general	30	13	5	41	13	6	5	9	1	7	13	100
I	reading skills	30	10	42	2	41	1	2	10	1	0	1	100
K	writing	30	11	15	30	31	4	0	5	5	6	4	100
J	general	30	9	23	27	18	6	5	8	7	2	4	100
G	topic	30	9	7	42	7	0	15	6	6	8	9	100

* An additional ten minutes of recording was used for this session.

The results from teachers D and F are based on two recording sessions.

2.2 Reliability of the codings

Eight recordings have been examined in the following way. The first three minutes have been analysed by me, with repeated listening, until I have felt confident that I have identified as many utterances as it is possible to find on the tape. This is described as the "total" number of actions on the tape, compared to the "instant" number determined by the teacher. The teachers' analyses of their tapes were more or less based on one play-through; only occasionally did they repeat a section of tape to be clearer on what had been said. Figure 4.3 gives a summary of the numbers of actions identified by eight teachers in "instant" coding and by me in "total" coding. Figure 4.4 gives details of the codings for each of these tapes.

It can be seen on the summary sheet (figure 4.3) that the teachers have only coded between one fifth and a half of the total utterances on the tapes. However it is clear from the details of the codings (figure 4.4) that the teachers have identified nearly every person that they talked to and have usually summarised the interaction by identifying a proportion of the utterances made to each person. Thus ~~XMMXPDD~~ becomes MD and EQEE becomes EQE. Figure 4.5 contains the transcript of the final item of figure 4.4 and this shows that it is the more trivial utterances which have been left out by the teacher in her coding. Thus "Red again, good boy" has been coded by the teacher as E for encouragement; in the total coding this is IE because of the informational content of the first two words, but in intention the teacher's coding is accurate. Similarly "Now leave it there to dry, Tina, and it won't get spoilt, alright?" has been coded perfectly adequately by the teacher as D, meaning

that she has given Tina a direction, but the total coding is DIM because "and it won't get spoilt" is a piece of information and "alright?" is a management question.

Where a system of interaction analysis is developed as a research tool, it is important that different operators obtain the same results when coding the same material. But since the aim of this study is to enable teachers to gain new insights into their own teaching it is not essential that there be a high degree of consistency between one coder and another. What is important is that the general interpretation is consistent. In the briefings given to teachers before they listened to and analysed their recordings emphasis was put on looking for the intention behind each utterance.

Figure 4.3 Eight studies using the nine categories code :
"instant" and "total" codings of the first three
minutes of each tape - summary table

("Instant" coding means the coding produced by the teacher in listening to the tape once. "Total" coding means that produced by me in listening to the tape as often as necessary in order to note every utterance).

<u>Teacher</u>	<u>"Instant" coding: number of actions in the nine categories</u>									<u>"Total" coding: number of actions in the nine categories</u>										
	<u>Q</u>	<u>D</u>	<u>I</u>	<u>Im</u>	<u>M</u>	<u>E</u>	<u>C</u>	<u>P</u>	<u>X</u>	<u>total</u>	<u>Q</u>	<u>D</u>	<u>I</u>	<u>Im</u>	<u>M</u>	<u>E</u>	<u>C</u>	<u>P</u>	<u>X</u>	<u>total</u>
C1	5	3	5	0	2	6	0	0	0	21	10	13	13	0	2	10	0	1	6	55
C2	1	2	3	1	0	0	1	0	1	9	6	2	9	1	2	3	3	0	3	29
C3	0	7	1	7	2	1	0	1	3	22	1	11	15	1	2	4	1	2	2	39
C4	6	13	0	0	6	1	1	1	0	28	8	17	10	3	1	15	1	2	2	59
C5	10	0	3	0	1	0	0	0	0	14	19	6	13	1	1	3	0	0	5	48
C6	0	2	1	4	0	1	0	0	1	9	1	9	9	12	2	1	0	1	7	42
C7	2	5	3	3	0	0	0	0	0	13	2	10	12	2	0	0	0	1	0	27
C8	5	4	5	1	0	2	0	0	1	18	10	19	18	4	0	4	0	0	4	59

Figure 4.4 Eight studies using the nine categories code : "Instant" and "total" codings of the first three minutes of each tape - details of codings

Teacher C1

Total coding (NH) IOE / QOIQIQEQOE / XMXFPDD / DIXEIIIDDIOID / MMD / EQEE (XX) EIIDX / XDDE / EDDII / ...
Jackie Shaun Philip Andrew Yvette ? Jackie Donna

Instant coding (teacher) M / IQEQ / MD / Shaun IIQD / Philip D / EQE / Andrew Yvette ED / ELIE / ...
Jackie Shaun Philip Andrew Yvette Jackie Donna

Teacher C2

Total coding (NH) IQQE / CQIm / EIIIEI / X / ED / MMD / XCC / QIQX / QII / ...
David Paul H Paul W Rachel Tracy Paul H Michael Rachel Nichola

Instant coding (teacher) Q / CIm / I / X / D / D / C / I / ...
David Paul H Paul W Rachel Tracy Paul H Michael Rachel Nichola

Teacher C3

Total coding (NH) DII / M / X / EI / M (P) ED / XEIIQI / ImI / II / DIID / DEIDD / ICIII / P / ...
Susan Group Masood Billy Vivienne Ashley Lloyd Robert Simon Darren Robert Debbie &
D / D / D. / DI ...
Lesley Masod Paul Anna Angela

Instant coding (teacher) D / M / X / E / M (p) D / XIm / Im / Im / DIIm / Im / ImIm / X / ...
Susan Group Masood Billy Vivienne Ashley Lloyd Robert Simon Darren Robert Debbie &
D / D / D / DI ...
Lesley Masood Paul Anna Angela

Figure 4.4 (cont'd)

Teacher C4

Total coding (NH) D / IE / XEE / D / EEE / ImQIImD / DIMED / QE / P / DMEQDQDI / QIEEImD / Tina Simon Kirsty Julian Tina Julian Tina Michael Deborah Dawn
IXDEEQDI / DQQDIDDED / C / ...
Simon Katie Class

Instant coding (teacher) E / E / E / D / E / MD / DD / Q / P / Q D / E / Tina Simon Kirsty Julian Tina Julian Tina Michael Deborah Dawn
EQD / DQQDDED / C / ...
Simon Katie Class

Teacher C5

Total coding (NH) MQEQIIOXIQIIX / ImDID / QXODIIOIDIX / QQIE (X) QQQQEQQID / ...
Lorraine Michael Jane Cathy Pat

Instant coding (teacher) MQIQQIQ / I / QQ / Q / () QQ / ...
Lorraine Michael Jane Cathy Pat

Teacher C6

Total coding (NH) ImImMX (D) ImImImX (XXDXD) ImPIDDDX (Im) ImImMX / EIIImImIQIDDDIII ...
Group Rebecca Jacquie Group

Instant coding (teacher) Im (XD) Im / EIIImD ...
Group Rebecca Jacquie Group

Figure 4.4 (cont'd)

Teacher C7

Total coding D / I / DD / DD / Im / D / Q (I) IQ (I) I (I) I (I)
 (NH) Group ? Group Robert ? Nigel/Simon Group Simon Dean Christopher Robert
 II (II) I (I)
 Nigel Robert

Instant coding D / Im / D / Im / Q / Im / I / II / ...
 (teacher) Group Robert Group ? Nigel/Simon Simon Dean Christopher Robert Nigel

Teacher C8

Total coding DDDQIIDDQIQDDDD (Im) XDDIEDDIX / EQIQIQD / XIm / EImDE / X / EIEQIDImDIEIDIII / QIE /
 (NH) Group Shaun Alan Mark Jonathan ? Trudy/Jackie/Tony ?
 IID / ...
 Mark/Kurt

Instant coding DIDQQDI / EQI / X / ImDE / IQI /
 (teacher) Group Alan Mark Jonathan Trudy/Jackie/Tony
 Q / Mark/Kurt

Teacher 9

Total coding D / IE / XEE / DEEE (ImQIImImD) DIMED / QE / P / DMEQDDI / QIEEImD / IXDEDDII /
 (NH) Tina Simon Kirsty Tina Julian Michael ? Deborah Dawn Simon
 DQQDIDDEED / C / PDIIm / ...
 Katie Class Kirsty

Instant coding D / E / E / DE (MD) DD / Q / P QD / QE / EDD /
 (teacher) Tina Simon Kirsty Tina Julian Michael ? Deborah Dawn Simon
 DQQDDED / C / DD / ...
 Katie Class Kirsty

Figure 4.5 A detailed study of "instant" and "total" coding based on a transcript of three minutes in Mrs X's classroom

<u>Speaker</u>	<u>Utterance</u>	<u>Mrs X's "instant" coding</u>	<u>My "total" coding</u>	<u>Comments on the codings</u>	<u>Comparisons between the codings</u>
Mrs X	Show me your picture then, Tina	D	D	A direction to Tina.	Agreement.
Simon	Red				
Mrs X	Red again, good boy.	E	I E	Information was given to Simon, followed by encouragement.	The predominant utterance was providing reassurance and encouragement, which Mrs X noted.
Kirsty	(Inaudible)				
Mrs X	Let me see. Oh, it's alright. It's alright Kirsty.	E	X E E	"Let me see" is Mrs X talking to herself, followed by two encouraging remarks.	Mrs X's coding accurately describes her intention, but only picks out a third of the utterances.
Julian	Can I play in the sand?				
Mrs X	Let's have a look at Tina's picture.	D	D	Ignoring Julian she gives another direction to Tina.	Agreement.
Julian	Can I play in the sand?				
Tina	They're looking out of the window.				

Figure 4.5 (cont'd)

Mrs X	Oh that's lovely, I like the colours, aren't they lovely!	E	EEE	Three utterances, each of which is intended to encourage Tina. The third utterance could have been coded as Q, if the interpretation had been based on form rather than the teacher's intentions.	Mrs X in her coding is concerned with the overall intention of the utterances.
Julian	Can I play in the sand?				
Mrs X	You have to count and see how many people are in the sand. How many are there?	M	ImQ	One of the classroom routines is being reinforced by Mrs X giving management information. Her query may provide an educational experiences for Julian (hence the Q coding), or it could simply be a management question coded as M.	Different coding, but both recognising the management intention of the interaction.
Julian	Two				
Mrs X	Two, and we only have two in the sand, three's too many, so you go and do something else till they finish.	D	IImImD	Mrs X repeated Julian's comment as a piece of information, followed this with reminders of one of the classroom routines, and then gave a direction.	Mrs X coded only the final intention of the interaction.

Figure 4.5 (cont'd)

Mrs X	Now leave it there to dry Tina and it won't get spoilt alright?	D	DIM	A direction is explained and is then followed by a management question.	Mrs X again coded the overall implication of her utterance.
	Good girl, hang up your apron won't you.	D	ED	Encouragement to Tina, and a reminder.	
Mrs X	Have you done that other wish yet Michael? That's very careful, good boy.	Q	QE	A question about Michael's previous work, which is then praised.	Mrs X did not note the comment after the question.
?	Miss, can I have another book?				
Mrs X	Yes, of course you can.	P	P	Permission granted.	Agreement.
Mrs X	Let's have a look at Deborah's work, where's today's picture then Deborah? (Deborah shows her) I like him, who's that?	Q	DMEQ	In effect this is a direction to Deborah to show her work to the teacher. It is followed by a management question, encouragement and another question.	Mrs X does not give a long coding for the interaction. Possibly she was unsure of the distinction between her comments since Deborah's replies were obviously hard to understand.
Deborah	It's a man and I forgot to put his hair on.				

Figure 4.5 (cont'd)

Mrs X	Pardon?	-	D	Deborah is told to repeat what she has said.
Deborah	I forgot to put his hair on.			
Mrs X	You forgot to put his hair on? Well you'd better go and do that. He's a bald headed man!	DQ	QD1C	Another question checks up on Deborah's reply, and leads Mrs X to tell her what to do next, and also to use a new word "bald".
Mrs X	What does this say at the bottom?	Q	Q	An education question intended to produce a verbal response from Dawn.
Dawn	Dawn B-			Agreement.
Mrs X	Dawn B-, good girl. That's lovely work Dawn. I'll put it on my desk and you can do something else now.	E	IEE	Mrs X repeats "Dawn" and so reinforces the child's knowledge; she then encourages her twice. She tells her to find another activity although directing her to a specific area.
Simon	Red again	-	ImD	

Figure 4.5 (cont'd)

Mrs X	Red again, let me see - look at that red hoop, you have been busy. Lovely!	E	IXDEE	The red is repeated to reinforce Simon's knowledge and this is done again in the direction "look at that red hoop". This I in a D is not coded. Mrs X ends with two encouraging remarks.	These utterances were so short that Mrs X interpreted the whole interaction as an encouraging comment.
Mrs X	Now do some more in the yellow hoop.	Q	Q	She asks Simon to put more things in the yellow hoop, using this chance to use the word "yellow". Although there is an I in the Q I have not coded this because it is <u>within</u> the Q.	Agreement.
Mrs X (to Simon)	Find some more yellow things for me. I don't think we'll be able to fit any more in the red hoop. Now we're onto yellow.	D	DII	Mrs X gives a direction and then gives two bits of information on colours.	The overall implications of this long interaction have been coded in an identical manner. Mrs X was using this activity for colour recognition skills, and acknowledged her direction of the activity.

Figure 4.5 (cont'd)

Mrs X	Katie, find some yellow as well. Is there anything yellow along there?	D	DQ	A direction to Katie, bringing her into the interaction. The educational question encourages the child to look at the objects for colour recognition.
Katie	Yes			
Mrs X	Where? Show me, no, down there.	QD	QDI	The long interaction continues with Mrs X asking a question, then directing Katie and affirming "yellow".
Mrs X	Yes, lift it down and down and put it in the yellow hoop. In the yellow one. Good girl, good girl. Now you find something else.	D	DD	
		E	EE	Two final encouragements leading to a direction.
		D	DE	Agreement.
Mrs X	Oh not too much noise please	C	C	A correction to the whole class.
				Agreement.

2.3 Discussion of each of the nine categories

2.3.1 Educational questions (Q)

Resnick commented that "the most striking feature is the high percentage of questions directed by the teacher to the child. Between 45 and 60 per cent of the total number of utterances were questions of one type or another". (1) The Nottingham teachers do not demonstrate an identical pattern: giving directions, information and sometimes encouragement feature as frequently as asking questions in their dialogue.

This difference is particularly interesting in relation to Resnick's

hypothesis that the high proportion of questions asked by informal teachers is intended to foster an attitude of inquiry and self-motivated investigation. All of the Nottingham group considered themselves to have an informal approach which allowed at least some of the pupils the opportunity to choose activities, but nevertheless these teachers found it necessary to engage extensively in providing information and giving instructions. The majority had vertically grouped classes, and so the high percentage of directions cannot be explained in terms of the children's lack of school experience.

(1) RESNICK, L. (1972a) p 71.

Some examples of this category follow:

- i) What colour is the sea?
- ii) It's 'w' for?
- iii) What kind of dog is it?
- iv) You take eight away, how many left?
- v) When it rains, what happens to the water on the roof?
- vi) And another two makes?
- vii) How else could you put the same ones together?
- viii) Can you fasten the poppers for yourself?
- ix) How do you write 'take away'?
- x) Can you remember the story that I told you in the service yesterday?
- xi) Are you having tea in your house, can I come? (Wendy House)
- xii) Do our old bits of train track fit this track?

Questions (i) to (iii) are asking the child to recall information. Numbers (iv) to (vii) are posed to determine the child's grasp of a conceptual notion such as number bonds and general powers of reasoning. Questions (viii) and (ix) relate to particular skills of manual dexterity. The final three require the child to show if he has paid attention to the teacher's earlier comments and his own activity at that particular moment.

2.3.2 Directions (D)

This category was designed to show a direct influence by the teacher on a child's actions. It can be compared with category six of Flander's code which tallies directions or commands that a pupil is expected to obey. Apart from one teacher with 2% of her utterances

coded as directions while teaching reading skills the rest of the Nottingham group coded over 11% of their utterances as directions.

Examples of this category are:

- i) Collect your milk now.
- ii) Make a pathway through so that the biscuit children can get to the middle.
- iii) Leave it there to dry.
- iv) Take this to Mrs V.

In some instances the conventions of politeness veiled an implicit direction:

- v) Can you tell Mrs Y that we have finished with the milk.
- vi) Would you like to bring me a metre rule.

Although apparently questions, these were directions in their intention, for they did not leave the pupil with a choice. The happy, stable atmosphere apparent in these classrooms was partly maintained by the use of polite, and positive, influences on the children's activities. It is possible that some of Resnick's questions were also directions in disguise. When the teachers reflected on their style of classroom organisation and objectives for a teaching session the use of implicit directions was sometimes discussed; several commented that they had to use directions when a child had finished a task, or when they wanted to pursue particular manual or cognitive skills.

2.3.3 Educational information (I)

This was the third most common category used by the Nottingham teachers when coding their recordings. This could take many forms

in the course of an interaction e.g. "If you put them end to end and make one long string I'll staple them together, that's twice as long". This comment was recorded during a collage making session where the teacher was using the practical experience to reinforce the child's concepts of number.

At other times a child's ideas formed the basis for direct teaching e.g. "Tracy has put black clouds on her picture so that we will think that it is going to rain". But some skills and facts are still provided in the conventional form of teacher instruction, and this was particularly noticeable in reading activities where "I" frequently denoted the teacher supplying a letter or whole word e.g. "There is no c in kangaroo".

2.3.4 Encouragement (E)

Up to 22% of the teachers' utterances were coded as encouragement to the children. This includes praise for their work. One teacher said that she consciously used "good" halfway through hearing each child read to give encouragement and renew his motivation. This was evident from her coding sheet. Some praise was non-verbal, a smile or a nod would not appear on the tape, therefore the total of "E" underestimates the reinforcement that these informal teachers provided. In an individualised activity session there are so many demands upon the teacher's attention that an encouraging "good" may be the only attention that a child receives during the course of a session. But as Boydell (1975) observed, many of these contacts may be with the same group of children. A high percentage of the "E" cannot therefore

be related to the teacher's attention to each of her pupils.

2.3.5 Checking deviant behaviour (C)

This category did not appear in large numbers, except for one teacher who scored 11% during the particular half hour of the recording. As experienced teachers it would be unlikely for this group to need to constantly check the children. The frequency of using the category would also vary according to the mood of the class.

Perhaps it can be expected that teachers who agree to record themselves at work will be reasonable confident in their overall management of the children. The fact that the recordings were made during activity sessions, when a proportion of children were involved in interesting creative or play pursuits of their own choice, may also have decreased the likelihood of general admonishments.

Utterances coded as "C" included:

- i) Don't throw things chick, you might hurt someone.
- ii) What are you doing here, I asked you to do your number work.
- iii) I'm not having it John, you can stop colouring those little bits on your writing, scribbling like that.

2.3.6 Permissions (P)

Giving or refusing permission was also a little used category. The low totals reflect the teachers' trusting relationships with their classes and competent levels of organisation. As one teacher put it, "They know that they can go into the Wendy House if they have read to me and finished their writing. They don't need to ask".

2.3.7 Management questions (M) and management information (Im)

The asking of management questions, and giving out management information occurred relatively infrequently. Examples are:

- i) Where is today's picture? (M)
- ii) We will have PE after assembly. (Im)
- iii) We are going tomorrow. (Im)

It is noteworthy that the Flanders (1974) system does not identify this type of category in a formal teaching situation, but Boydell (1974) provides a similar coding in her junior school schedule.

With experienced teachers it is to be expected that these would be at a minimum as utterances distinct from the teaching. Several of the teachers recorded had the part time assistance of an infant helper who prepared materials and helped to minimise the use of management instructions during the activity sessions.

2.3.8 Unclassifiable utterances

The X category denotes any utterance that does not fit into the other categories. As in Flander's category ten and Resnick's R any periods of confusion are coded as X. When the audio-recorder was adopted as the most appropriate recording technique the O, Or and H categories were omitted.

Resnick used similar categories; W for reading a word while a child is reading, and H for helping in a physical sense. But he was still primarily concerned with actions that were supported by

a verbal comment. While non-verbal actions play an important part in the social interaction between teacher and pupil they are not usually recognisable on an audio tape recording.

3. Results of studies analysed into long and short interactions

The concepts of long and short interactions were introduced in chapter three section 3.4. A long interaction contains four or more actions; a short one three or less. Figure 4.6 gives the frequencies of these interactions in three and five minute periods in terms of the "instant" coding of the teachers. This shows that in the seventeen studies there were between 0 and 4 long interactions and between 5 and 19 short interactions per five minutes.

It needs to be remembered that these figures are based on the teachers' "instant" codings; since more actions are usually found in a "total" coding this would reduce the number of short interactions and increase the number of long ones. But the choice of four as the dividing point for the number of actions defining a long interaction is arbitrary.

Do long interactions have a different content of actions from short interactions? This question is examined in figure 4.7. The categories Im, M, C, P and X are slightly more prominent in short interactions. This is in accord with the view that short interactions are the means whereby the teacher keeps the whole class busy by dealing in quick succession with incidents. Beyond this it would be unwise to draw distinctions for Q D and I stretch over similar ranges in both long and short interactions.

A detailed analysis of a long interaction is given in figure 4.8.

Mrs A's "instant" coding reads:

.../DEEEIIDE/...
Ian

My "total" coding reads:

.../EDEDMMEEEDDDIDDPIEDE/...
Ian

Mrs A was listening to Ian reading (Ladybird book 2b). He was fairly fluent and she was urging him on through his book. It was an opportunity to practice an oral skill ("Open your mouth"), and led to some writing to consolidate the learning of the words. She gave positive directions and encouragement designed to stretch his reading ability. The asking of educational questions does not arise in this case, but Mrs A had other long interactions in which she asked pupils about words or their meanings and could then diagnose their difficulties. The transcribed interaction was more straightforward as Mrs A could hear Ian's difficulties and did not need to ask questions.

By way of comparison with figure 4.8, one minute's worth of short interactions, as recorded and analysed by Mrs D is given in figure 4.9. Her "instant" coding reads:

.../DD / P / I / DQ (I) (D) ...
Gina ? Julian Mark Simon Gina

My "total" coding is very similar:

.../EDED / PD / I / DQIDIQ (II) (D) ...
Gina ? Julian Mark Simon Gina

This illustrates one of the difficulties in defining "long" interactions: my "total" coding reveals more utterances than the teacher's "instant" coding and so would lead to a higher proportion of long interactions as defined by four utterances plus.

In this extract, lasting one minute, Mrs X is responding to five children and thinking about collage, writing and number work.

When she tries to concentrate her attention on Mark's work, she is twice interrupted by other children.

In discussion I found that the amount of interrupting, as revealed by the bracketted interactions in the codings, was an embarrassment to some of the teachers. They saw it as an unsatisfactory feature of their classroom organisation and they would prefer to have had more long interactions. Their problem was how to achieve this.

This investigation offers no solution to the problem of how to increase the proportion of long interactions, but at least it provides a means whereby teachers can determine whether their classroom dialogue is very fragmented.

Figure 4.6 Seventeen studies analysed into long and short interactions:
frequencies in three minute and five minute time intervals;
based on the teachers' "instant" codings

(A "short" interaction consists of 1-3 utterances by the teacher. A "long" interaction contains 4 or more utterances).

<u>Teacher</u>	<u>Nature of work being supervised</u>	<u>Three minute intervals</u>			<u>Five minute intervals</u>		
		<u>No. of intervals averaged</u>	<u>No. of SHORT INTRCTNS.</u>	<u>No. of LONG INTRCTNS</u>	<u>No. of intervals averaged</u>	<u>No. of SHORT INTRCTNS</u>	<u>No. of LONG INTRCTNS</u>
F	General	20	5	1	12	8	1
J	General	10	7	0	6	12	0
C	General	10	11	1	6	18	1
D	General	20	4	2	12	5	3
H	General	10	9	1	6	8	1
K	Writing skills	10	11	1	6	18	1
I	Reading skills	10	8	1	6	5	2
B	General	14	5	2	8	9	4
E	General	10	12	1	6	19	1
A	Reading	10	6	1	6	10	2
A	Writing	10	10	1	6	17	2
A	Number	10	8	2	6	13	4
A	Topic	10	9	1	6	15	1
A	Mean of 4 areas	40	8	1	24	14	1
G	Reading	10	4	1	6	7	2
G	Writing	10	8	1	6	14	1
G	Number	10	6	1	6	10	2
G	Topic	10	7	0	6	12	0
G	Mean of 4 areas	40	6	1	24	11	1
Resnick	teacher A	33	4	1			
	teacher B	37	5	1			
	teacher C	14	5	1			
	teacher D	7	8	1			

Figure 4.7 Seventeen studies analysed into long and short interactions: percentages of utterances in the nine categories featuring in the two kinds of interaction; based on the teachers' "instant" codings

Teacher	LONG INTERACTIONS									SHORT INTERACTIONS										
	Q	D	I	Im	M	E	C	P	X	Total	Q	D	I	Im	M	E	C	P	X	Total
F	40	12	26	2	4	11	1	0	4	100	24	11	18	3	4	31	3	1	5	100
J	0	0	0	0	0	0	0	0	0	100	23	27	18	6	5	8	7	2	4	100
C	5	25	45	0	2	23	0	0	0	100	20	17	19	9	6	15	1	5	8	100
D	38	24	18	0	3	14	0	0	3	100	8	41	9	4	11	16	4	1	6	100
E	68	19	9	0	2	2	0	0	0	100	36	30	11	3	7	1	3	4	5	100
H	0	50	17	8	0	17	0	8	0	100	5	40	12	6	5	6	9	7	16	100
K	43	57	0	0	0	0	0	0	0	100	13	28	33	4	0	6	6	6	4	100
I	45	2	40	1	3	9	0	0	0	100	20	6	37	4	0	22	7	0	4	100
B	30	21	32	0	0	9	2	1	5	100	10	21	34	5	1	10	3	1	15	100
A	5	24	44	0	1	26	0	0	0	100	5	42	23	0	4	16	6	0	4	100
A	28	24	35	0	0	4	0	0	9	100	15	44	24	0	0	8	2	0	7	100
A	32	23	27	0	0	17	0	0	1	100	30	38	15	1	0	9	1	0	6	100
A	26	28	37	0	0	4	2	0	8	100	16	43	25	0	0	8	2	0	6	100
G	41	16	31	0	0	9	3	0	0	100	13	44	14	0	2	9	9	2	7	100
G	28	24	35	0	0	4	0	0	9	100	17	30	27	2	6	9	2	2	5	100
G	45	39	7	0	0	7	2	0	0	100	30	40	8	0	5	9	1	1	6	100
G	0	0	0	0	0	0	0	0	0	100	7	42	7	0	17	5	5	8	9	100
Mean	28	22	23	∅	∅	10	∅	∅	2		18	31	20	3	4	12	4	2	9	
Resnick*	57	13	7	1	2	3	0	1	15	100	21	20	5	2	4	6	2	9	31	100

*Resnick's results have been adapted from his original chart. See Resnick (1972) p71 table 3.

∅ Totals considerably less than 1%

Figure 4.8 A detailed study of a long interaction based on a transcript: teacher A

<u>Speaker</u>	<u>Utterance</u>	<u>Mrs A's "instant" coding</u>	<u>My "total" coding</u>	<u>Comments on the coding</u>
A	Come on Ian, see if you can remember it now	D	ED	Encouraging Ian to start reading, followed by a clear direction.
Ian	"You like the dog. You and I like the dog".			
A	Good boy, another page.	E	ED	Encouragement to urge Ian onto the next page.
Ian	"I like sweets. You like sweets. You and I like sweets."			
A to Paul	Did you find one? Good, where is it?		MM	Management asides to Paul.
Ian	"You want toys, I want toys. You and I want toys."			
A	Good	E	E	Agreement
Ian	"I like Jane. You like Jane. We like Jane".			
A	Aren't you going quickly!	E	E	Agreement on coding, phrased as a question, but intended as encouragement.
Ian	Here.			
A	Open your mouth.	I	D	Mrs A gives several directions which she heard as one utterance. She treated this as educational information, presumably because she wanted to get Ian to practice his sounds.
Ian	"Here are shops"			
A	Again.		D	
Ian	"Here are shops"			
A	Again		D	

Figure 4.8 (cont'd)

<u>Teacher</u>	<u>Utterance</u>	<u>Mrs A's</u> <u>"instant"</u> <u>coding</u>	<u>My</u> <u>"total"</u> <u>coding</u>	<u>Comments</u> <u>on the</u> <u>coding</u>
Ian	"Here are shops. We like shops. We like shops. We..."			
A	Well look at it, you learned it a little while ago.	I	DI	Direction, followed by a recall of previous work.
Ian	"You can fish".		L	
A	Shout it.		D	
Ian	"You can fish. I can fish. We can fish".			
A	I think you could go and write me that page, Ian, please.	D	D	Agreement.
Ian	Can I finish my book?			
A	Ooh, you couldn't possibly finish it today, you only started it, was it yesterday? It will take a few more days than that but you're coming on ever so well. Off you go and write it for me. Good boy.	E	E D (E) I E D E	Intended to motivate Ian but also used to explain that he cannot progress quite as quickly as he would like to.

Figure 4.9 A detailed study of short interactions based on a transcript: teacher D

<u>Speaker</u>	<u>Utterance</u>	<u>Mrs X's</u> <u>"instant"</u> <u>coding</u>	<u>My</u> <u>"total"</u> <u>coding</u>	<u>Comments</u> <u>on the</u> <u>coding</u>
Gina	Shall we fill in the gaps?			
D	Yes, all the gaps need filling in.	D	ED	"Yes" is an encouragement.
Gina	Shall we do on top of the bus?			
D	Yes, on top of the bus.	D	ED	
Another child	Can I help?			
D	Course you can, roll up your sleeves.	P	PD	Agreement but Mrs D missed the second part of this statement.
Julian	What's this?			
D	It's a tape recorder.	I	I	Agreement.
D	Let me see Mark. What have you missed out there?	DQ	DQ	Agreement.
Mark	"I"			
D	"I", see if you can fit "I" in because you've missed it out, haven't you?		ID IQ	Information, followed by a direction, further information and a rhetorical question.
D	That's not really yellow Simon, that's more brown.	I	I I	Two pieces of information for Simon who has interrupted her discussion with Mark.
Gina	Miss I don't want to do it.			
D	Do a little more please	D	D	A further interruption.

4. Results of eight studies analysed in terms of four curriculum areas

These studies were made of teachers A and G, as listed in figure 4.2, who worked in a team in an open plan school. With two other members of staff (not studied for this purpose), they took weekly responsibility for work in one of the four areas of reading, writing, number and topic. This provided an opportunity to use the coding system on teachers engaged in one curriculum activity at a time. Over a four week period four recordings were made and analysed by these teachers, one for each curriculum area.

At a preliminary meeting the teachers were instructed in the use of the cassette recorder and in the coding system. For both teachers the first coding session took about forty minutes, to code a thirty minute tape. By the third session they had mastered the code and worked through without stops. They found it useful to have their tick list record sheets for the morning's work available when coding the tapes and with this aid were able to note the names of all the children involved in long interactions and most, but not all, of those involved in short interactions.

Figure 4.10 Eight studies of two teachers working in four curriculum areas: thirty minute recordings analysed to show the numbers of actions in terms of the nine* categories code; teachers' instant codings

(*actually eight categories were used here, Im being included in M).

See next page:

(In each histogram 1mm represents 1 action)

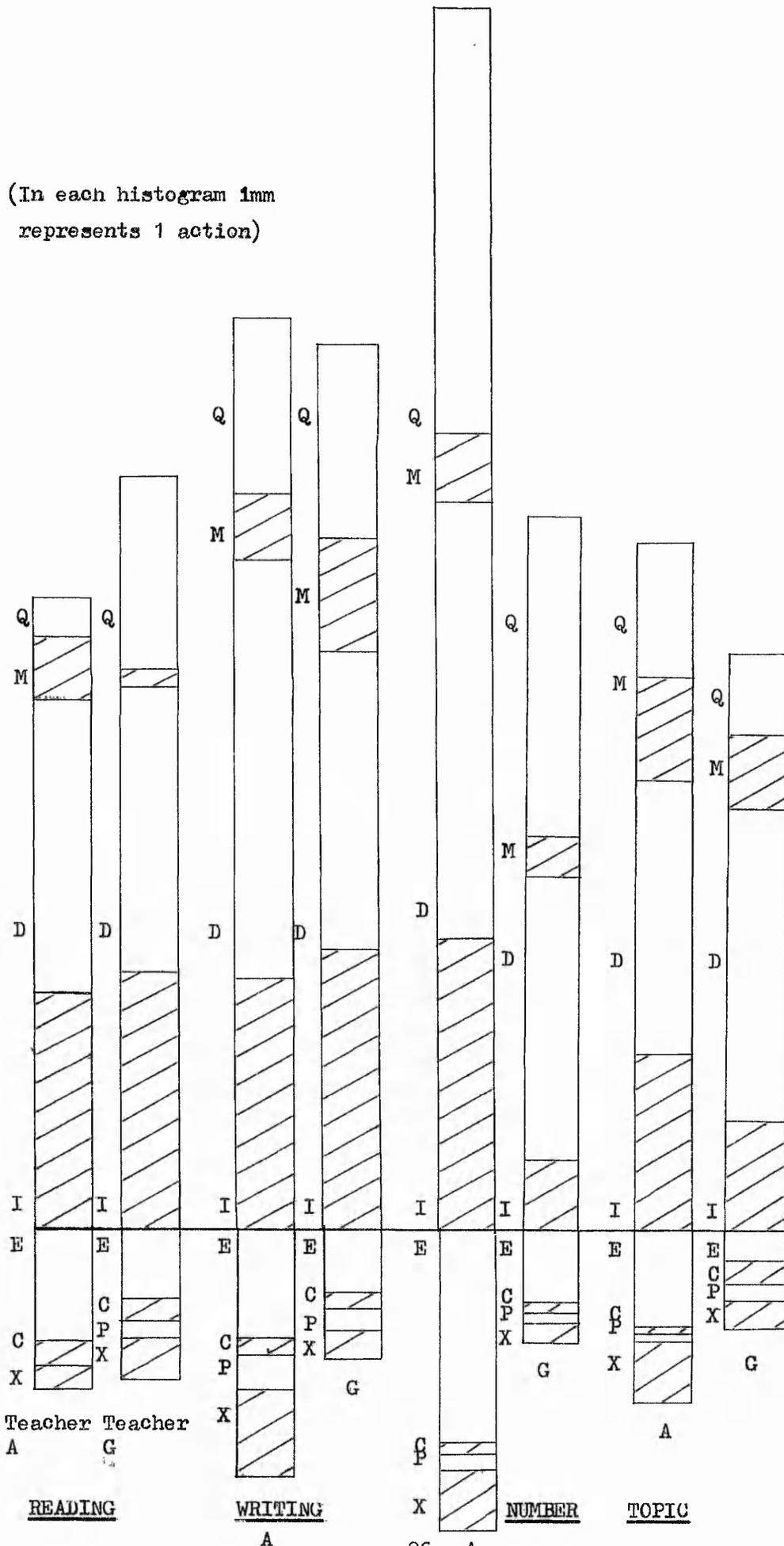


Figure 4.10 gives the numbers of the different kinds of actions in thirty minute periods as recorded and analysed by the two teachers. Figure 4.11 gives the percentages of actions which belonged to long interactions.

Figure 4.11 Eight studies of two teachers working in four curriculum areas: thirty minute recordings analysed to show the percentages of actions occurring in long interactions; teachers' "instant" codings

<u>Curriculum area</u>	<u>READING</u>		<u>WRITING</u>		<u>NUMBER</u>		<u>TOPIC</u>	
	A	G	A	G	A	G	A	G
<u>Teacher</u>	16%	30%	8%	2%	25%	13%	6%	0%

Long interactions account for up to 30% of the teacher's utterances in any one area of the team unit. Short interactions predominate in all areas with both teachers.

These results give no encouragement to any expectation that generalisations can be made about the frequency of particular actions in specific areas of the infant curriculum. They did however stimulate some interesting points of discussion with the teachers concerned, and also with their headmistress. For example:

Mrs G was surprised to find that in Topic she had given much less information (I) to the children than her colleague. But it seemed that this result was a feature of a particular session where there had been a great deal of craftwork, set up by Mrs G. She had wanted to practice manual skills of cutting, sticking, etc.

In the writing area Mrs G was also surprised to learn that she had asked a relatively large number of management questions. The

children were familiar with the teaching routine and utterances such as "Where are you going?" seemed unlikely. Then she remembered that for a time there had been organisational upheaval because there were no rubbers available and she had to deal with this problem during the recording!

The difference in the giving of information between the two teachers in the number area is attributable to different activities being in progress on the two occasions. Mrs A used the shop to introduce decimal money. She sat at the table and the children came to her and asked for various sweets at different prices. She explained the coinage during the transactions. Nearly the whole half hour was occupied in this fashion. Mrs G however had the children working from cards. She moved around the three tables correcting work and querying some of the children's responses. Mrs A chose to keep close contact with a group while Mrs G allowed the children to carry on and then check up on their progress. Both methods can truly be termed 'informal' although a different pattern of interactions is observed in their taped responses.

When the two teachers compared their codings, in the form of figure 4.10, Mrs G was rather concerned to see that she gave fewer encouraging remarks than her colleague. Since this was the case in all four areas of the curriculum it seemed to be a notable difference between their teaching styles.

These examples from the coding sessions and subsequent analysis indicate the kinds of insights into their work that teachers can gain from the procedure.

A system of interaction analysis has been developed from the original work of Resnick, in which nine categories of coding are used to analyse the utterances of infant teachers working in informal patterns of classroom organisation.

I have decided, on the basis of the data and results obtained from a group of Nottinghamshire infant teachers, to amalgamate the two management categories, and the revised categories are:

- Q Asking a question designed to promote the educational development of a child, or children.

- I Giving information designed to promote the educational development of a child, or children.

- D Giving a direction to a child or children to carry out a task.

- M Asking a question or giving information which is primarily concerned with the management of activities in the classroom rather than with the educational development of a child or children.

- C Checking undesirable attainment or behaviour.

- E Encouraging desirable attainment or behaviour.

- P Responding to a child's request for permission.

- X Any other utterances.

It has been shown that teachers using cassette tape recordings, can effectively and quickly use the coding system to study their classroom talk. The simplest and most effective way of making such recordings has been found to be for the teacher to wear a small cassette recorder with a shoulder strap and a microphone fixed to the strap close to her mouth.

The simplicity of the category system has enabled participating teachers to use the code without lengthy training sessions. Some preliminary work has also been carried out in developing guidelines for teachers to evaluate their own classroom performance using this instrument. Particular emphasis has been placed on the differences between long and short interactions and the former tended to have a greater educational content.

Pointers for further study

This study has been concerned with a form of innovative research, and the development of a research instrument with a practical application. The work could be developed in several ways:

1. Extending the studies to teachers of older children;
2. Developing the evaluation guidelines further;
3. Studying the length of teachers' interactions with their children in the context of the teachers' position or movement in the classroom, and the organisation of an "informal" curriculum.
4. Studying the distribution of contacts with individual children.
5. Further analysis of the nature of long and short interactions in relation to a teacher's classroom organisation.

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