AN ANALYSIS OF CLASSROOM VERBAL INTERACTION, TEACHER AND PARTICIPANT LOCATION, AND GROUP ACTIVITIES: A PILOT STUDY.

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INTRODUCTION

At a time when so much intellectual energy is being expended in discussions about educational "accountability" and the end product of the educational system, it seems appropriate to begin to focus empirically on the "input" of education in an attempt to enhance the "output". In its relatively short history, educational research in New Zealand has tended to look at the broader issues of education rather than at the specifics of classrooms. To date, very little data has been collected relating to the activities that occur in the typical New Zealand classrooms in different types of school at various levels.

The literature available provides a wealth of descriptive information, but little that could be subjected to statistical analysis. One of the earliest studies, carried out in 1957 by Ned Flanders in a number of Standard Four classrooms in the Wellington area, provides replicable date, but his findings are now less likely to be indicative of what happens in a typical New Zealand classroom when one considers the transformation that has taken place in the decade prior to, but also partly as a consequence of, implementation of the recommendations of the Currie Commission on Education in New Zealand (1962).

A more promising development, begun by Biddle and Adams in the United States in the late 1960's and currently being extended by Professor R. Adams at Massey University, has the typical classroom as its setting. To date, however, the data relates to American classrooms, and little information is available as to either the vocus or the direction of the New Zealand project. If derived directly from Adams' previous work there is little likelihood of immediate pay-off, because of the complexity of the

research design and the sophistication of the equipment required to support such a project.

Currently, also, a research team from the University of Canterbury and the Christchurch Teachers' College, under the direction of Professor G. Nuthall, is engaged in classroom oriented research, which, while providing significant information about teacher "inputs", is so specialised in the application of controlled teaching tactics as to provide only limited data about the natural course of events that are to be expected in typical learning-teaching situations.

A number of research projects are at present under way at the University of Waikato, but again, due in large part to the difficulties of classroom availability for research, much of the work being done is more laboratory-oriented than classroom focussed.

Available data are limited in terms of the classrooms studied, the activities observed, and the level of the school visited; or take such a narrow perspective that it is all but impossible to assess objectively what a classroom observer might expect to see in our schools. The field, as far as data on New Zealand classroom activities is concerned, is "an empirical desert". *

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* Footnote.

In his 1962 report on a comparison of New Zealand and Minnesota teachers, Flanders referred to New Zealand classrooms as "affectional deserts".

The writer, engaged in teaching student teachers, is motivated to engage in this project in the belief that beginning teachers can be helped to improve their teaching effectiveness if they can be made more aware of their own behaviour when teaching. As learning to teach is much like the other kinds of learning individuals engage in, it can be controlled if the learner is made aware of the important variables involved. If teaching is defined as, causing or arranging the conditions so that learners learn something for some purpose, then all the behaviours of the teacher must be scrutinised, and it would seem desirable that any course in Learning and Teaching should explore the effects of teacher behaviour in the natural setting of the classroom. Flanders (1963, P 221) suggests that "... we can no longer expose prospective teachers to some facts about individual differences, some theories of learning and child growth and development, etc, and let the entire burden of translating the knowledge into teaching action fall on the practice of teaching experience."

Teachers' Colleges must themselves begin to "arrange the conditions so that beginning teachers can teach their learners something for some purpose". To do this it is necessary to develop some data based on our own classrooms, or at least to confirm the generalisability of overseas findings to New Zealand classrooms.

The preponderant psychological bias of educational research has not proved successful in providing the basis for a cohesive and workable theory of teaching, and it seems timely that educational researchers should cast their conceptual nets wider in their search for more appropriate theoretical underpinnings.

Adams (1965) and Biddle and Adams (1967) were among the first educational researchers to break with the psychological tradition, taking sociological concepts as the theoretical framework for their research in classroom activities. Extrapolating from Durkheim's study of suicide (Durkheim, 1952) in which he adopts the notion that the incidence of suicide can be traced to the stability or instability of the social bonds or networks of relationships an individual develops, Adams (1965) conjectures that in a classroom where these social bonds are strong, children will "produce better results" and "teacher efficiency will be higher" than in one where these relationships are less stable. Little attempt, however, is made in the findings of the study to show either how or why these bonds operate in the classrooms studied except by implication. The approach does, nonetheless, give promise, in the long term, of providing a depth that has been lacking in classroom-oriented studies. It may, however, be necessary to widen the sociological perspective to include some discussion of Weber's studies of power, as it seems that role expectation may play a subtle part in the dynamics of the classroom situation.

This latter must remain outside the scope of this study but is a project the writer hopes to engage in at a later date. Because of the pilot nature of the present project, the limitations of time and resources, and the stated purpose, any broadening of the theoretical framework would at this stage tend to make the whole effort an exercise in telescopy.

It is proposed to present the material for this study in the following way. Chapter I discusses the purpose of the study, attempts to provide a conceptual framework, and sets out some of the assumptions that have prompted the research. Chapter II provides

a necessarily brief resume of the literature and the theoretical bases against which the data can be viewed. Chapter III sets out the hypotheses and the rationale that underlies them, and explicates the terms used. Chapter IV sets out details of the research methods used and describes the instruments tested in the study. Chapter V is concerned with presenting the report on the findings of the data analysis and a discussion of these, and Chapter VI is devoted to an evaluation of the research design and discusses some modifications and prospects for future research effort.

CHAPTER I

PURPOSES OF THE STUDY

As originally conceived, this project was intended to be a replication of the two major analyses of classroom interactions carried out in part by Flanders in Wellington in 1957 and Minnesota (1960, 1963), and by Adams (1965). It was hoped to ascertain whether the findings from these two studies could be applied to today's New Zealand classroom. Unfortunately, it was found that Adams' study was based on American classrooms rather than the Otago scene as had been expected. The findings of these two studies remain, however, of major importance in the discussion that follows as they give the present project both its direction and theoretical framework.

One of the main reasons for dissatisfaction with just a repeat study, was the lack of a coherent theoretical framework to provide a meaningful context for what is hoped will develop into a much more comprehensive study of New Zealand classroom phenomena, when time, facilities and personnel are more readily available. Too little empirical evidence exists about what happens in our classrooms for teacher educators to speak with any authority about them. For too long our theoretical discussion about classrooms have had to depend on data drawn from American, Australian and English studies.

In searching the literature in the field of classroom analysis, it became apparent that there is, as Campbell (1968, p.98) asserts "... a mountain of opinion, and a mere molehill of scientific evidence..." on which we can base meaningful discussions about classroom behaviours. Any help we can give beginning teachers must, it seems, continue in the meantime to

be drawn from our own intuitive experiences, rather than from more soundly based research findings that relate to our own distinctive educational settings. Apart from the lack of New Zealand studies reported in the literature, it also became obvious that there remain many unknowns - the types of activities groups of students engage in, the reasons for grouping pupils, the effects of small group interaction on affective and cognitive functioning of the members of small groups, the proximity or the distance of the teacher from the groups and the effects of these on the dynamics of behaviour, to name but a few. There remain also many unexplained aspects of classroom behaviour - the relationship of praise and acceptance of pupils' contributions in classroom interactions to the subsequent behaviour of the contributor, the type of praise used, whether verbal or non-verbal, the effect of the cognitive level generated by the teacher, on the behaviour of the pupils (both affective and cognitive behaviour). There is little data on the inter-relationships that exist among the variables that are reported on - whether group activities are related to teacher movement, to the quality of the verbal interactions, to the quantity of interaction that occurs, and to the way in which the classroom is structured to facilitate interactions. These are just a few of the many aspects of classroom behaviour we need to know about. Despite the difficulties that must be faced in gaining knowledge about classrooms and the behaviours that occur at different levels in different subjects, little can be done until appropriate data collecting devices are designed to bring in the data that will expose much more of the relevant behaviours to scientific scrutiny.

PURPOSE OF THE PRESENT STUDY

The major purpose of the research, while only a pilot study, was to test the viability of the four data-collecting instruments that have been adapted from those used by other researchers; and to begin to develop data resources about the activities that occur naturally in classrooms at different class levels in different kinds of schools in different subjects; and to ascertain whether there is a consistent and cohesive inter-relationship among the variables to be measured.

In addition to the main focus of the study it was decided to ascertain whether there were inter-teacher differences at different class levels for the different types of school, and intrateacher differences for the two subjects observed. Originally it was hoped to compare the data collected in this study with the findings Biddle and Adams (1969) reported relating to the sex and age of the teacher, but this was abandoned because of the very broad scope of the project and the degree of divergence from both these studies.

A further dimension scrutinised was the relationship of Intelligence Quotient to the frequency of pupil interaction with the teacher. The data from this was derived from the coding of Participant Location and I.Q.'s taken where available (usually on entry to an Intermediate school) and was consequently carried out only for Intermediate and Normal Intermediate classes.

THE SEARCH FOR UNDERSTANDING

Because classrooms present a wide range of behaviours from moment to moment, any observations made in the natural setting must focus selectively on those considered to be of significance to the researcher. Ideally <u>all</u> emitted behaviours

of teacher and pupils should be encapsulated in any endeavour to find patterns of behaviour or inter-relationships among behaviours that might enable some classification of teaching inputs and pupil inputs and the affects these have on the dynamics of the learning-teaching situation. Such a hope must be abandoned reluctantly in the face of present limitations of time and techniques, but this research explored four dimensions of classroom activity in an attempt to ascertain if there was a cohesive relational pattern among them. The question that loomed large throughout the study was: Is there some relationship between the verbal interactions (type, content and cognitive level) that took place, the locational patterns of the teacher and of the children when they respond to or initiate to the teacher, and the kinds of activity engaged in by the pupils, either as a class or in groups. Also of interest is the group organisation of each classroom and any structural or functional reasons for this type of classroom arrangement. Consequently the direction of the study was based on the model set out in Fig. 1.

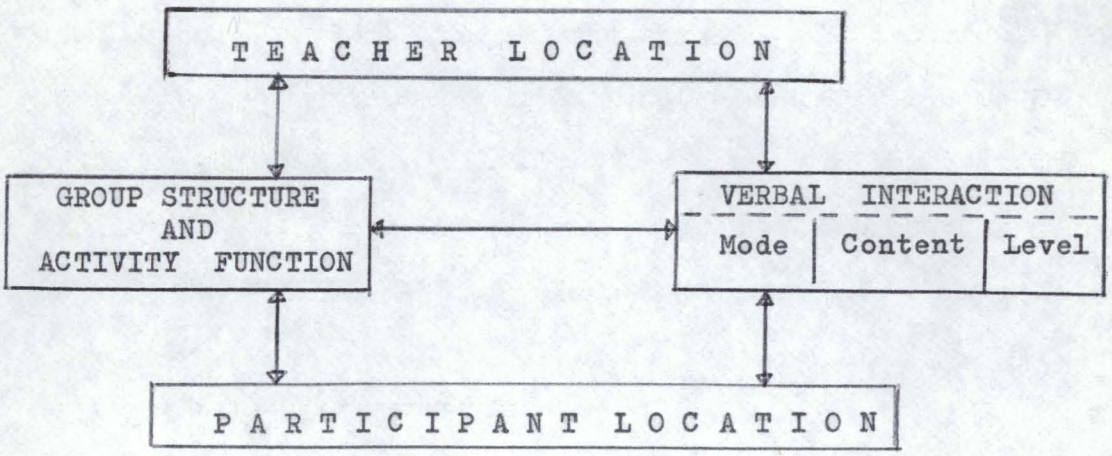

Fig. 1. Research Design:
Model for the Analysis of Classroom Interactions.

These aspects of classroom behaviour were chosen for observation in the belief that they are likely to be the most pervasive forms of activity present in all classrooms regardless of the kind of lesson, the level of the class, the type of school, the age or sex of the teacher, the ability of the pupils, and so on. It seemed likely that the teacher would adopt some preferred locational pattern that might be determined (or not) by the verbal interaction, which in turn might be influenced by the location of the classroom pupil participants, which might also affect the types of activities engaged in by teacher and pupils; each of which might determine in some subtle way the others.

If, for example, the teacher is working with a small group, it was conjectured that his location is likely to be proximate to that group (working with the class as a whole might dictate a different pattern of locational behaviour), and proximity to a group might influence type, content and level of verbal interactions during that period. It also seemed likely that working with a small group would constrain the teacher to set activities (tasks) for the remaining pupils not directly in interaction with him. (Technical limitations in this project made it impossible to record the interactions of pupils or individuals and the teacher in the small activity group situation. If, however, group work forms an integral part of the classroom activities, then complete understanding of its nature and purpose and the role it plays in the dynamics of interaction can only come by attempting to observe and record its occurrence and subject the data gained to empirical analysis. In the long term the analysis of small group interaction, whether with the teacher or without, remains a goal of the writer.) Again,

if a group of children is working on a set task, whether individually or cooperatively, and not in interaction with the teacher, it was considered highly likely that at some time during the lesson the teacher's locational movement would be determined by the location of those participant members as would the verbal interactions, engaged in with that group, both in terms of type, content and level, and participant location.

In opting to focus on these variables, a great deal of other behaviour was neglected, and the research had to proceed on the basis of certain assumptions about the nature of the behavers and their behaviours.

ASSUMPTIONS THAT UNDERLIE THE STUDY

1. Classrooms are micro-societies of the broader social setting and the participants in the educative activities that occur in them will behave in response to the same societal motivations in both settings.

It is assumed that individuals will behave in the classroom setting according to the patterns of socio-cultural conditioning that are part of their behavioural history. In other words the behaviour of participants will be determined by the attitudes, prejudices, motivations, and so on, each brings to the learning-teaching situation. Obviously the past and present learning-teaching situations each has experienced will have shaped these social ideofacts. The teacher's behaviour will be influenced by his perception of himself, and his role, and of the nature of the learner, of learning, of teaching, of education and of knowledge. Similarly, the behaviours of the pupils will be pre-determined in large part.

The nature of sociological enquiry is to seek explanat-

ions of social phenomena, and any observation of the classroom setting must inevitably focus on the sociological concommitants of the behaviour of the classroom participants. While it is not possible to identify or control the influences that affect the socio-psychological events that occur, it is necessary to view the classroom in a perspective that is broader than a strictly pedagogical one. For this reason, observations of individuals behaving in intragroup and intergroup situations must be attempted if insights into classroom functioning are to be achieved.

2. Classroom participants engage in many different behaviours, some of which are overt, observable and measurable, others being convert, unobservable, and not subject to measurement.

Learning is a covert process, occurring internally to the individual. The occurrence of this phenomenon cannot be observed or measured. The behaviours it is necessary to focus on are the performances of the participants, hence any reference to "learning" implies "learning performance", similarly "teaching" implies those overt, observable performances, including obvious teaching behaviours such as giving information, and the less obvious ones such as where the teacher locates himself, the gestures, the smiles (or frowns), etc. that he "performs".

3. Some teaching (or learning) performances are more pervasive than others, and hence can be taken as representative of a teacher's (learner's) total teaching (learning) behaviour.

The inference here is that total behaviour is at present too elusive a phenomenon to observe and record for analysis, but does not necessarily suggest that a teacher who provides a great deal of verbal reinforcement will also use non-verbal reinforce-

ment just as much. Flanders (1963a) claims that verbal behaviour, representing as it does such a large proportion of all classroom behaviours, can be taken as a representative sample, but ultimately complete understanding can come only with analysis of all the variables operating. This study attempts to extend the representativeness of the sampled behaviour, but must concede to such an approach only because the limitations of direct observation demand it.

4. The teaching performances that a teacher engages in probably follow a consistent and cohesive pattern, and together make up what might be regarded as a distinctive teaching "style".

Much has been written about different teaching "styles" and it is not proposed to add to the proliferation of such often perjorative descriptions, but undoubtedly it will be necessary to make some inferences about particular teaching stances taken by teachers in the sample. But hopefully, these will be suggestive of a particular set of observable behaviours rather than prescriptions that label a teacher. If a teacher moves frequently around the room during a lesson and engages in small group discussion, directs pupils to engage in group or individual activities, then it is apparent he is using a "style" rather different from another teacher who tends to remain at the front of the classroom and interacts only with the whole class and sets tasks which all pupils are expected to complete.

5. The distinctive pattern of behaviours teachers adopt will tend to determine the dynamics of the learning-teaching situation.

A teacher who has the expectancy of succeeding in the learning-teaching situation will tend to use a teaching strategy

that brings him into closer contacts with his pupils than one whose experience of teaching has been less successful. The teacher who has a perception of the teaching role as being the transmission of knowledge, will tend to adopt patterns of behaviour that differ from one who sees his role as being the facilitator of learning. Macdonald and Zaret (1967) in a study of classrooms, attempted to relate Rogers' (1961) concept of "openness to experience" to the interactions that occur in learning situations, by measuring teacher response to the productive ideas of students. They found that teachers whose role expectancy was classified as "open" generated more productive responses from pupils than those who were classified as "closed" (role expectancy oriented). It is conjectured that the variables explored in this study will isolate distinctive patterns of behaviour that will affect the dynamics of the learning-teaching situation. Thompson (1972) found that teachers have a very poorly defined sense of role expectancy, which may be a source of role conflict that interferes with their teaching behaviour. This area needs to be explored extensively in terms of the observed behaviour patterns teachers engage in.

6. If a teacher is aware of his particular pattern of teaching behaviours, and the inter-relationships among these, then, like all behaviour, they can be subjected to modification and control.

In terms of immediate returns from studies such as this, it is hoped that if it can be demonstrated tentatively that a relationship does exist among the variables to be observed in this research, pre-service teachers can be made increasingly sensitive to their own teaching behaviour. Understanding of

the effects of particular teaching behaviour patterns should help in the development of a more rational approach to teaching. Flanders (1963a) suggests the desirability of using a flexible "style" in teaching, but as his research focuses on verbal behaviour only, flexibility may perhaps be extended to encompass a number of other variables.

CHAPTER II

REVIEW OF RELATED LITERATURE

Since the beginning of the century when Horn (1914) began to observe classroom activities, numerous investigators have endeavoured to develop viable systems to analyse and understand the activities that occur in classrooms. At first, attempts at analysis were tentative and sporadic with very few studies up to the 1950's, but since that time efforts have been doubled and redoubled, to a point where there are hundreds of studies recently completed, being completed or in the planning stages. The "learning theory wars" of the fifties have given way to the "classroom analysis wars" of the seventies, and the "behaviourists" and "field theorists" have stepped aside (or changed their academic gowns) to make room for the "unidimensionalists" and the "multidimensionalists" who are spawning a host of new terms to bewilder the unwary classroom practitioner bent on coming to terms with improving his classroom "style". Levity aside, it is apparent to any initiate researching the literature in classroom analysis, that this is one of the major fields of concern in educational research. Many varying approaches have been and are being undertaken with varying success.

The early failure to substantiate relationships between teacher characteristics and effective learning outcomes tended to discourage the classroom researcher, and it was not until the early 1950's and the early 1960's that concerted research effort got under way. Since that time there has been a resurgence of interest in classroom phenomena, due partly, at least, to the rapid development of sophisticated electronic aids to research.

It is not the intention of the writer to engage in a lengthy review of the literature related to the field of classroom observation and interaction process analysis, as there is available an increasing number of much more scholarly, comprehensive surveys by Biddle (1967), Campbell (1968), Gage (1968), Gage and Unruh (1967), Kliebard (1966), Medley and Mitzel (1963), Nuthall (1968), Rosenshine (1970) and Withall (1960). Rather it is proposed to focus on those aspects of research that have a direct bearing and influence on the present study. This review covers, firstly, a general discussion of some of the problems associated with this field of research, secondly, a brief outline of selected studies which might be considered the progenitors of the present project, and some of the major relevant findings that may be compared with data to be presented, and finally, an attempt is made to show how the present research is related to work being done in this field.

1. GENERAL OVERVIEW OF ANALYSIS OF CLASSROOM ACTIVITIES RESEARCH.

In reviewing the literature it became apparent that there are a number of critical questions that come to the forefront when embarking on an undertaking so demanding as the analysis of the multitudinous activities likely to be encountered in a classroom. What is the nature of classroom behaviour? What problems are likely to be encountered in observing these? What difficulties will arise in explaining what has been seen? Which aspects of the classroom activities are essential to providing explanations of classroom behaviour - individuals? groups? interpersonal relations? qualities of learning (performance)? affective variables? cognitive variables? verbal activities? non-verbal activities?

To answer these questions from the research literature in this area, it seemed that there were seven elements of classroom analysis that must be reviewed - approaches to analysing classrooms, the theoretical context of the various studies, the conceptual framework of each and the concepts used (or coined), methods of collecting the information required, the units of analysis chosen, the coverage achieved, and the generalisability of the findings reported.

(i) Approaches to Classroom Analysis

Early researchers took a molar approach to the analysis of behaviours that occurred in classrooms. Attempts were made to take the total behavioural setting and the participants into account, focusing on the environment and the total behaviour repertoire of either the teacher or pupils, or both. The main focus of attention, however, tended to be on the teacher's behaviour, and any attention given to learners related to the effect teacher behaviours had on them. These behaviours were then related to a wide range of teacher characteristics - the criteria of teacher effectiveness studies, which Gage (1968, p.602) suggests:

> "misled a whole generation of researchers on teaching, embroiled them in endless and fruitless controversy, and lured them into hopefully ambitious attempts to predict teacher effectiveness over vast arrays and spans of outcomes, teacher behaviours, time intervals, and pupils' characteristics, all on the basis of predictive variables that had only the most tenuous theoretical justification in the first place".

Studies of Anderson and his associates (1939, 1945, 1946a, 1946b, 1946c), Cogan (1958), Cornell, Lindvall and Saupe (1953), Medley and Mitzel (1955, 1958) and Morsh (1956), and the seminal laboratory-type study by Lewin, Lippitt and White (1939) attempted to establish criteria for judging teacher effectiveness from the observation of global categories of teacher and pupils'

characteristics and behaviours with little pay-off. Laboratory type teaching simulations, checklists and the like, proved relatively ineffectual in providing insights that would lead to a theory of teaching.

Failure of correlational studies led to an emphasis on the more managable, discrete events that occur in classrooms, and the research of Withall (1949, 1951, 1956, 1960, and with Lewis, 1963) and Flanders (1958, 1959, 1960a, 1960b, 1960c, 1961, 1962, 1963a, 1963b) took a uni-dimensional approach, focusing on only the verbal behaviours of the classroom participants. Flanders (1961) claimed that the representativeness of this kind of behaviour was sufficient as a measure of classroom behaviour. The gross, all inclusive nature of the categories used, however, proved a weakness which was only rectified by the inclusion of additional more refined verbal behaviour categories (Amidon and Hunter, 1967, Hough, 1967).

Additional categories alone, however, did not prove the panacea to the difficulty. Nonetheless, the Withall-Flanders type category systems provided a new direction for research effort because of the basic simplicity of the design (use of numbered codings rather than abbreviations), and the removal, at least temporarily, of extraneous variables from the researcher's attention. A further innovation was the introduction of a system of sequential coding and matrix analysis of results, which provided new techniques for objectifying the previously subjective appraisal of classroom activities.

Uni-dimensional systems, oversimplifying as they did the complex nature of classrooms, failed to produce the hoped for conceptual basis for a theory of instruction and have begun to lose ground to multi-dimensional systems for observation of

classrooms. A number of attempts at a multi-variable approach have been developed out of the Flanders' Interaction Analysis System. Amidon (1967) added a cognitive level dimension (based on Aschner, Gallagher et al's 1965 study), Wallen (1966) has extended Flanders' system to include non-verbal categories such as "student hand raised", "non-verbal affiliation". Honigman (1968) has broadened the Flanders' system into a three dimensional system, adding cognitive-substantive and procedural variables. Oliver and Shaver (1966) have developed a jurisprudential model of teaching (Joyce and Weil, 1972) which, adapted to classroom analysis, has led to a similar type of system including affective-socioemotional, cognitive and procedural variables.

Other multi-variable systems have been developed that can be traced less directly to the Flanders type system. Perhaps the most ambitious and substantive of these is the Adams, (1965) Biddle and Adams (1967) Missouri study. Its focus is more extensive than any other research carried out to date, covering structural and functional aspects of classroom activities relating to the communications that occur. Verbal interaction is analysed in terms of mode and content categories, while the structural variables include: communication structure system, role structure, role allocation, position assignment (teacher), location assignment, and position location (teacher). Adams (1965) suggests the study shows a reciprocal, causal relationship between the structural and functional elements of classroom activity.

(ii) Theoretical Orientation.

Early research tended to focus on pedagogical phenomena

(Barr, 1914, Puckett, 1928, Horn, 1929, Thomas, 1929, Wrightstone, 1934), and this trend has continued up to the present with the majority of recent studies drawing their theoretical underpinnings from pedagogy. Campbell (1968) lists 25 studies of classroom, completed between 1960 and 1966, that have had the improvement of teaching as their main concern.

Psychologically-oriented classroom research has never enjoyed the popularity of other aspects of research in that discipline, possibly because of the problem of exercising control over all the variables operating. Relatively fewer studies than might be expected have drawn their justification from psychological theory. Among the first were those of Flanders (1951) and Mitzel and Rabinowitz (1953). During the period 1960 to 1966 only 8 studies are listed by Campbell. Studies tend to focus on the effects of classrooms on anxiety (Flanders, 1951), (Zimmerman, 1970), learners with special needs, (Kounin, 1963) (Gallagher and Aschner, 1963) or the effects of different types of reinforcement on learners (Kounin and Gump, 1961). Perhaps a reason for the lack of empirical support lies in the difficulties inherent in endeavouring to measure psychological phenomena with any degree of reliability in the classroom, and the suspicion that currently surrounds any attempts to gauge effectiveness.

While they have not enjoyed the support pedagogical research has, social-psychological studies have nonetheless continued to retain favour because of the undeniably socio-psychological nature of classrooms. The effects of social relationships within the context of the psychological setting of classrooms, and the social interactions that occur between pupil and teacher, pupil and pupil, are of major interest to

the classroom researcher. Role theory and its effects on intelligence (Zander and Van Egmond, 1958), social structure and mental health (Lippitt, 1959), socio-emotional studies (e.g. Withall, 1951, 1956), success and failure (Campbell, 1967), motivation and socio-economic status (Schmidt, 1963) and many others relating to peer group influence (Schmuck, 1962) have claimed the attention of researchers.

Studies by Smith (1962) and his Illinois and Canterbury associates, while having affinities with the pedagogical strand of research, probably draw more heavily on philosophy for their theoretical orientation than any other workers in the field of classroom analysis. This group attempts to classify classroom verbal interactions into conceptual units which demonstrate the relations between logic and language. The writings of the analytical philosophers Ryle, Wittgenstein and others, provide the rationale for the conceptual framework of the studies.

Finally, the last discipline to enter the classroom analysis field was sociology. Despite a slow start, educational sociologists have not been slow to make their impact felt. Early sociometric studies (Potashin, 1946, Moreno, 1944) have given way to more complex and ambitious attempts to come to grips with the society of the classroom, as sociologists seek to apply the theory of Durkheim, Weber, Parsons and others. Role theory (Deutsch, 1963, Adams, 1965) and the dynamics of group behaviour (Thelen, 1954, 1967) have figured largely in these studies. More importantly, the fundamental aspects of the structure and function of the classroom setting have found justification (Adams, 1965, Biddle and Adams, 1967) in recent classroom research.

Studies by Medley (1958), Flanders and Havumski (1960), Oliver and Shaver (1963), Spaulding (1963), and Waimon (1961), in part at least, have sociological theory as a basis. It seems likely that major classroom research effort will draw increasingly on social theory. One of the main causes of dissatisfaction with many past studies has been the failure to establish a theoretical basis from which viable principles of classroom behaviour could be derived. Too frequently any theorising basic to a study had to take a partisan viewpoint and was, consequently, open to immediate criticism from the opposing camp. For this reason many studies have had intuitive beginnings, and the findings reported were related to theory a posteriori rather than the reverse. Hopefully the theoretical differences among educational sociologists will not hamper the search for understanding in classroom studies.

(iii) Conceptual Framework and Concepts Used.

It is in this area of the research literature that there is the greatest incomprehensibility. There are those who conceptualise teaching as something worth studying in its own right, and whose main interest is in discovering the "way teaching is" (Jackson, 1966) and who make no judgments about its "goodness" or "badness". Opposite these are the researchers, who with a missionary ardour seek to find out what is happening in classrooms so that they can set about putting the wrongs to right. Gage and Unruh, (1967, p. 359) assert:

> "Protagonists of the two approaches have difficulty understanding one another. Describers see improvers tampering with humanistic values and probably failing because of their poor understanding of the human condition. Improvers consider describers to be indifferent to the inadequacies of the conventional classroom or bent merely on improving our knowledge of obsolescent forms."

The problem seems to revolve around the vexed questions

of "affectiveness" or "effectiveness", with many of the old problems still unresolved. Withall's 1951 and subsequent studies belonged to the affective variable orientation, but more recently (1961) there has been a shift towards the outcomes of teaching - the intent of communications. Flanders, too, has used his single-variable, affective conception of classroom verbal behaviour to move in the direction of behavioural output--measured changes in "attitudes and achievement" (Flanders, 1963; 1964) and has adopted a multivariate cluster coding approach (Flanders, 1970). Ryans, having failed to come up with any substantive findings about teacher characteristics and their relationship to effectiveness, has turned to the interactive variables through the medium of an information-processing model, in an attempt to demonstrate quantitative and qualitative outcomes. (Ryans, 1963).

It seems that, despite the rift between the two ways of conceptualising classroom variables, there is a greater degree of congruence than appears on the surface. Those who espouse either approach seem to be agreed that classrooms need explaining and research efforts should be wholeheartedly applied to the empirical explanation of the importants of "classrooms as they are" so that decisions can be made about "the way they should (could!) be".

A different, but related problem, centres on the scope of behaviour observations. For some (Smith et al, 1962, 1963, 1964, 1967; Nuthall and Lawrence, 1965; Taba et al, 1964; Bellack, 1966; Gallagher and Aschner, 1963) the important aspects of classroom behaviour are the quality of the cognitive interactions. Classrooms are conceptualised as places where intellectual commerce takes precedence over the

sociological or psychological events that occur. Others minimise the cognitive component (recording its occurrence but neglecting its analysis), being conceptually blinkered by the climatic conditions within which these cognitive transactions take place. Few have attempted to combine the two so that the inter-relationships between them can be ascertained.

One of the perennial problems classroom research has inherited from psychological research in general, is the suspicion that attaches to the re-use of any term that has been used by a previous researcher. It seems that there is a notion that any term coined by another operator should remain a "sacred cow". Anyone interested in classroom phenomena seems impelled to devise novel terms for describing what are frequently common behaviours. No effort will be made here to repeat the many synonyms that have been developed to give each research its own distinctive character. Ryans (1963, pp.284 - 289) provides a list of "Some 'Similar Appearing' Sets of Teacher Characteristics and Teacher Behaviour Patterns Reported by Different Researchers" and the list has grown considerably since that time with the increased interest in classrooms over the past decade. Suffice to say, it is believed that greater progress towards understanding of classrooms will come only with agreement to develop a consistent, understandable terminology that can be accepted by all those who seek classroom insights.

(iv) Methods of Data Collection.

A wide range of data collecting procedures have been employed in classroom research. Each is dealt with in turn.

(a) Non-participation Observation.

Jackson (1965) used non-participant observation as a data collecting strategy in classroom analysis. This method requires the observer to take descriptive, non-systematic records (usually in note form) of the events that occur. The method is useful only for providing information that might assist in developing intuitive insights and hypotheses rather than reliable, replicable data.

(b) Rating Systems.

These require the observer to make a judgment about the nature of the behaviour of the teacher or the pupils, and to record the incidence of these pre-selected behaviours. Ryans (1960) used this system of data collection to build up a list of identifiable teacher characteristics. Medley and Mitzel's OScaR system (1958) also requires the use of listed ratings of pupil and teacher behaviour on a time-sampling basis according to a rigidly defined set of criteria. This system was an adaptation of the Cornell, Lindvall and Saupe (1952) system, and attempted to lessen the effect of observer judgment on the recording of classroom behaviour. These systems for observing classrooms are related to attempts to assess teacher effectiveness, rather than to the task of describing the events that occur and their inter-relationship. Rosenshine (1970) lists a number of more recently developed rating systems (Wallen and Wodtke, 1963; Wallen, 1966; Belgard, Rosenshine and Gage, 1968; Fortune, 1967; Solomon, Bezdek and Rosenberg, 1963). Rating systems tend to have some of the characteristics of the category system, e.g. broad behaviours, as in Flanders (1960) "asking question".

(c) Category Systems.

The most widely used system for observation of classroom activities, these require the observer to record, in either checklist form or as a sequence, all the behaviours that fit the particular conceptual framework of the research. Some focus on the verbal behaviours (Flanders, 1960, etc.) in affective type studies, others (Smith et al, 1962, 1963, 1964, 1967; Taba et al, 1964,) using transcripts taken from tape-recordings of lessons categorise verbal behaviours for their cognitive components, while still others endeavour to codify a much wider range of both verbal and non-verbal behaviours (Adams, 1965; Biddle and Adams, 1967).

One of the earliest category systems was that developed by Anderson and associates (1939, 1946) for the recording of the number of contacts made within the classroom. The systems of Medley and Mitzel (1958), and of Cornell, Lindvall and Saupe (1952) also have elements that necessitate their inclusion as category systems in addition to rating systems. The first system to take a single variable approach using a category system in which behaviours of a relatively gross nature were recorded by means of numbered codes was that of Withall (1951). From this have developed most of the category systems that have been and are being extensively used. Flanders (1960, 1963) extended Withall's seven teacher categories to ten and differentiated teacher and pupil behaviour, and made provision for some kinds of extraneous behaviour to be so recorded. Adams (1965) developed a multi-variate approach to analysis of classroom activities which owes its origins to these previous category systems.

(d) Behaviour Encapsulation Approaches.

The beginnings of classroom analysis were based on direct non-participant observation of live situations. Included in this type of behavioural data collection are specimen records, in which chronological recordings are made of all the observable behaviours as they occur. This type of data collecting has been used by Barker and Wright (1955) for use in anecdotal accounts of classrooms, Hughes (1959) in conjunction with the Provo Coding system, and Gump and Kounin (1960) to study the classroom ecology. The latter have also combined this technique with filmed recording of the classroom setting. (Gump, 1967, Kounin, 1963). Perhaps because of cost and processing delays, this method of recording has found little favour.

Over recent years, because of the complexity of the classroom situation and the difficulty of capturing, in a systematic way, the wide range of behaviours that occur, there has been an increased interest in making more permanent recordings of classroom phenomena. These records can be used for subsequent analysis, and also reduce the confounding effects of having "intruders" in the classroom. Tape-recordings and video-tapes are being used for this purpose.

Any attempt to analyse the cognitive nature of classroom verbal interactions has required a permanent record of these so that transcripts could be produced for coding into the various levels, and incidents. This form of analysis has been extensively used in logical analysis studies (Bellack et al, 1963, 1965, 1966; Nuthall et al, 1966, 1970; Smith et al, 1962, 1963, 1964, 1967; Taba et al, 1964). Tapes have also been used by Flanders and his associates (Amidon, Hough, Hunter) for sequential coding using the various systems

that have been developed out of Flanders' 1950's system.

A more promising medium for making permanent records of classroom activities is the video-tape recorder which captures both the auditory and visual impressions of the behaviour that occurs, for analysis. An advantage of this method is that tapes are reusable after the analysis of a particular lesson has been completed. Video recording equipment was used in the Adams and Biddle (1965, 1967) research project, and by Kounin and his associates (1966). It is likely that this method of classroom observation will play an important role in developing new approaches to researching and improving teaching and learning in classrooms. Its use for this purpose is already gaining considerable support in the laboratory-type studies in micro-teaching (Turney, 1970; and current work being carried out at the University of Waikato).

(v) Units of Analysis.

Decisions as to the unit of analysis chosen to record classroom behaviours are likely to be dictated by the particular conceptual stance the researcher takes. A range of units of analysis have been used and abused, but it is apparent that the behaviours being recorded, the methodology being used, and the technical resources of the researcher will be of significance in determining which is adopted. Barker and Wright (1955) used "episodes" as the phenomenal units in their study, a decision made possible by the nature of their methods - specimen records. This type of unit uses the natural break points in the flow of classroom activities as the boundaries of each unit. The same type of unit has been modified by Kounin and Gump and their associates, (1966, 1967) who use "segments" to delineate

incidents of behaviour. Flanders (1970) also adopts phenomenal units in extending the use of Urbach's (1966) interaction sequence graph.

A more arbitrary unit of analysis has been used by many researchers, based on some form of time interval. Flanders was the first to make extensive use of this type of unit (1960) and it has been used in many modifications (Adams, 1965),(Amidon and Hunter, 1967), (Hough, 1967), and (Medley and Mitzel, 1963). This unit has the disadvantage of requiring a great deal of experience in maintaining the correct pacing, particularly through long coding sessions. It also involves breaking the arbitrary unit to capture the naturally occurring behaviours that take place more frequently than the timed unit. Undoubtedly aids will become available to assist in the maintenance of the timed pacing during coding. Choice of the timed unit has a great deal of merit in live recording type observation studies, and where it is impractical to transcribe verbal communication to analyse behaviour. In addition,it can be adapted to most behaviours.

Checklists used in early studies of classrooms tended to favour the use of what have come to be known as naturally occurring units of behaviour. The observer was required to check off on his list of behaviours the frequency of particular types of behaviour. This type of unit has been extended. Smith and his co-workers (1963, 1964, etc.) have designated these naturally occurring units "utterances", "instances", "episodes", "moves", "strategies", etc., others, Bellack et al (1965), Taba et al (1964), have extended and "refined" the list.

As with so many aspects of classroom research, it seems desirable that some form of concensus be reached as to definition and unit orientation. Biddle and Adams (1967) have perhaps begun the process by adopting an ecclectic approach using analytical units (timed and naturally occurring) of different kinds in their study. It seems desirable that some form of unit of analysis be devised that enables the data obtained from the analysis of one variable of behaviour observation to be compared with data for each of the other variables being observed so that coincidence of behaviours can be established.

(vi) Coverage.

Despite the understandings that have been achieved to date in classroom analysis, there are many areas of concern that remain unresearched. A vast amount of literature is available about the nature and the quality of verbal behaviour, but the area of non-verbal behaviour has received only superficial treatment. The teacher's activities have come under the closest of scrutiny, but the behaviour of pupils is too often glossed over in the grossest of classifications. Too frequently what is said is the subject of the researcher's concern rather than what is being done.

Biddle (1967, pp.337-338) in a review of classroom research, suggests three major limitations of coverage and variability that affect our understanding of classroom activities. The first limitation he cites is the development of concepts, techniques and outlook, unique to the particular type of classroom investigated. Many of the cognitive

behaviour studies focus only on the verbal behaviour of secondary school classrooms (Smith and associates, Bellack and associates) and it seems that techniques must be developed that have ready application at any level of the school. Other studies have been developed to look at the learning behaviour of particular ability groups such as the gifted (Gallagher and Aschner, 1963). The second limitation is the restricted range of classroom events dealt with, and the third, related to this, is the lack of a comprehensive-enough approach to variable selection that enables interaction effects among variables to be discovered. It is these last criticisms that seem to require the most concentrated research effort. It is inevitable that broad scope studies will need to be paralleled by more searching single variable confirmation studies of type criticised in Biddle's first comment. If the research perspective is broadened to include all those behaviours envisaged as being significant to an understanding of classroom activities, it seems likely that generalisable results will come only from research that covers all learners in all types of learning situation for all learnings.

Grade levels have been included in the variables studied (Adams, 1965; Flanders, 1958; Nuthall and Lawrence, 1966)* but as yet there have been few studies that attempted to cover more than two or three grade levels. Mathematics, Social Studies and Science have received a major proportion of the research effort in subject areas (Flanders, 1960; Biddle and

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* Only a few representative researches are cited. Fuller lists are available in reviews of classroom research - Biddle (1967)

Adams, 1967; Herman, 1967; Taba et al, 1964), and there is a need for other subject areas to be explored - language, arts, music and physical education. Only one study (Adams, 1965; Biddle and Adams, 1967) has endeavoured to match teacher variables to the type of data collected. Teacher age and sex were used to match teacher groups where possible to ascertain if differences in behaviour could be accounted for by means other than characteristics such as educational attainment, training or personality traits. No study has, as far as can be ascertained from the literature, attempted to include differing types of school in the sampled classrooms (other than those of elementary, high school, kindergarten) and it seems appropriate that schools with composite age group classes (e.g., as in rural schools) be included. From the writer's point of view too, a particular interest in normal schools prompts the inclusion of these along with schools that have less contact with Teachers' Colleges.

Finally, in addition to the coverage outlined, there are many other aspects of classroom behaviour about which the literature gives little information. One of these, the nature of the group activities in which teachers engage children at various levels of the school, is of considerable importance in attempting to explore the total classroom as a social entity. In the New Zealand primary school, the arranging of pupils in small groups is almost universally practised, and it seems that this aspect of class activity should be seen in the perspective of other classroom behaviours to ascertain whether this type of organisation has anything to do with the dynamics of teacher and pupil behaviour.

(vii) Generalisability of Reported Findings.

To date few attempts have been made to collate all the research that has been completed. Campbell (1968) provides an excellent synthesis of a number of studies, but it is by no means complete in its coverage of findings. Rosenshine (1969), in a critique of a number of reported findings based on Flanders' type interaction analysis research projects, stresses the danger of unwarranted generalisation being made precipitately because of flaws which (he says)

> "include: (a) inadequate statistical analysis, (b) limits in external validity or generality, (c) omission ..., and (d) simple misinterpretations..." (* Rosenshine, 1969, p.1)

Possibly the lack of a comprehensive and comparative review of research into classroom activities is an outcome of the sporadic coverage just discussed. Another reason is the proliferation of terms that makes comparison more difficult. Whatever the reasons for a failure of reviewers to bring together a set of generalisations about classroom behaviour that could guide the practising teacher, it is important that educational feedback be provided. Perhaps the most promising recent development is the beginnings of looking at classroom through the medium of television, for not only will the results of classroom phenomena be available through journals and textbooks, but hopefully, they will be presented in more graphic form to the people who form the raw material for classroom research - the teachers.

To date most of the findings about classrooms are confined to the publications to which only other researchers have ready access, and the findings of researches in the form of practical suggestions must be increasingly brought to the attention of the classroom teacher.

2. SPECIFIC STUDIES RELATED TO THIS PROJECT

(i) Flanders (1970).

Flanders' earliest attempts at analysing classroom interaction were based on the assumption that only the verbal behaviour of classroom participants needed to be analysed. This was supported by his observations that two-thirds of all overt classroom behaviour was verbal. Using Withall's (1951) seven category system for recording teacher verbal behaviour, Flanders, during the early 1950's developed an eleven category system that coded nine categories of teacher behaviour - five being indirect influence categories, and four being direct influence, plus two categories of non-teacher influence:

A-Categories of Indirect Influence by Teacher.

1. Reacts to pupil's feelings.
2. Praises and encourages.
3. Reacts to pupil's ideas.
4. Asks a question.
5. Administrative or routine statements.

B-Categories of Direct Influence by Teacher.

6. Gives information or opinion.
7. Gives directions (requests or demands where obedience normally expected).
8. Criticising.
9. Justification of Teacher's authority.

C-Categories of Non-Teacher Influence.

X. Pupil talk.
X. No Communication.

This system was used in the Wellington area (Flanders, 1960a) in 1957 to analyse the behaviour of thirty-three Standard Four classrooms, when Flanders worked as a Fulbright Research Scholar with Dr. Connor of the University of Otago. In his American reportage of the system (1960b) modifications had already been made. Categories 1-4 remained unchanged, but category 5 was

removed from Teacher Indirect Influence and combined with category 7 to give the new category 6. Category 6 from the old system was renumbered as category 5, and categories 8 and 9 were combined as the new category 7. Pupil talk was changed from its original S coding and separated into two categories, category 8 became pupil talk in direct response to teacher questioning, and category 8 became pupil talk that was the initiation of the pupils' own ideas. Category X of the old system became category 10 and included silences, confusion, massed responses, beginning and ending of a lesson coding and the code to indicate the finish of one pupil's talk and the beginning of another's.

Flanders' system was the first to break with the check-listing method of classroom observation. Rather than listing the selected behaviours as they occurred, using a tally system of recording, an ongoing sequential coding was carried out at three second intervals for all the verbal interactions. If more than one kind of codable behaviour occurred within any three second interval, all such behaviours were required to be recorded.

The classroom was conceptualised as a dynamic environment in which the verbal behaviour constituted the most frequent and therefore the most important behaviour. A good understanding of classroom behaviour, it was assumed, could be achieved by the precise analysis of the kinds of teacher supportive or restrictive verbalisations, and the consequent student verbal behaviours. Flanders' position has not shifted in the two decades he has been researching classrooms. In his latest revision (1970) of the Interaction Analysis Coding system he has dropped the terms "Indirect" and "Direct" Teacher Influence and

replaced these by "Teacher Response" categories 1 - 3, and "Teacher Initiation" categories 5 - 7, and leaves category 4 presumably as either "responding" or "initiating" teacher talk. Pupil talk remains subdivided as in the 1960 revision with "Pupil Response Talk" and "Pupil Initiation Talk". In addition to these minor changes, Flanders has developed more sophisticated means of matrix analysis and has added the dimension of thinking level, based on Taba's (1964) thought levels, and the use of category cluster codings based on "an inventory of basic dichotomies and trichotomies" (Flanders, 1970, p.172) which enable verbal behaviour to be coded in three or four dimensional form.

Data is presented in the form of sequential analyses and matrix analyses, which provide general data about the nature of the lesson (percentages of the various types of talk, and ratios of one type to other types) and specific data derived from analysis of areas of the matrix which show the flow pattern of teaching sequences. Findings from the data obtained have been widely generalised to "direct" and "indirect" teaching style, pupil attitudes and achievement, and pre-service and in-service training.

(ii) Adams (1965), Biddle and Adams (1967)

This research, a project sponsored by the Social Psychology Laboratory, at the University of Missouri, was a pilot study that broke new methodological ground and gave classroom research a new direction and theoretical orientation.

The study is a multi-dimensional approach to classroom analysis in which all the events that occur in classrooms are of significant interest and must be subjected to analysis. The classroom is conceptualised as "an integrated social system"

within which the social events which link teachers, pupils, their tasks and the equipment they use, are important. The work of Durkheim provides theoretical justification for the research. The intraclass neworks of relationships are seen as the basis of patterns of communication. Within the communication system of the classroom activities are structural and functional elements, which hinder or enhance the behaviours that occur.

The research innovates in its methodology. Lessons were recorded by means of video-tape recordings in classrooms at three grade levels (Grades I, VI and XI) with young and old teachers of both sexes, and with Mathematics and Social Studies as subject matter. Subsequent to the recording of lessons, systems of coding and analysis of behaviour were devised, making systematic use of all the best techniques that had been developed to that time in classroom research. Naturally occurring phenomenal units and timed units are used for uni-variate and multivariate analysis, and a comprehensive series of coding systems suited to direct computer analysis were developed to handle the vast array of different data that was generated in the thirty-two lesson project.

The research is a practical step aimed at developing a set of concepts and propositions relating to educational events. The results of observations are empirically tested in an attempt to develop a scientific theory of teaching. Vague concepts are avoided, the discipline of sociology providing the categories that are used to analyse the activities observed. Germane to an understanding of classroom events are the processes of socialisation, decision making, leadership and interpersonal influence.

Structural elements of classroom activities observed are the communication structure (whether whole class, small group or individual); positions that are adopted (student or teacher); roles that the various position holders take in the communications (as emitters of the interactions, as targets for the verbal interactions, or as audience by-standers); and the location of the participants as they engage in the communications. Within this structural framework occur the functional elements of interaction. Function includes the forms of communication and what they deal with. Content orientation is explored by means of three categories: whether related to the subject matter (which may be scheduled or non-scheduled), to organisation (communications dealing with administration and maintenance behaviour), and to sociation (interactions which are the social communications that occur). Content communication forms are each further categorised into information dissemination mode, intellectualisation mode and operation mode.

A comprehensive set of findings was derived relating to each variable, but only those directly related to the present project will be summarised here. Teacher location is found to be restricted to three main areas of the classroom - across the front of the classroom, down the centre and around the perimeter. The location of pupil emitters tends to be nearest to the middle of the front of the classroom and from the centre-front in decreasing amounts, and outwards from the centre in decreasing frequency.

Of the modes of verbal interaction, the findings show that 65% of all verbal communications are the dissemination of information - 47% being about scheduled subject matter, 10% about organisation and 6% about non-scheduled subject matter.

Intellectualisation about subject matter is 19%, with only 2% intellectualisation related to the other categories. Only 2% of communications were in the operation mode. Sociation content was found to be almost neglected with less than 0.5% being observed. Differences among the structural and functional variables are reported for teachers of different age and sex, for different subject matter and for the different grade levels.

(iii) Thelen (1967)

Drawing on experiences gained in a sociological project in Chicago begun in 1949 - the Hyde Park-Kenwood Community Conference - aimed at integrating Negroes into a predominantly white neighbourhood, Thelen (1954) developed a theoretical basis for the behaviour of groups. This has now been applied to educational groups in his latest research project (1967). Thelen (p.18, 1967) asserts:

> "In all classrooms, there are at least two types of activity. One maintains the classroom group as a society and the student's role is that of a citizen or group member. ....
> The other type or aspect of activity places the student in the role of "learner" - one in which he deals with the content that is being taught. ... An activity-centred rationale assumes that the student must participate in certain activities in order to learn what is expected."

Concerned with better utilisation of human resources, both of teachers and of students, in schools, Thelen undertook a study to discover better ways to "group" students and select them into more productive classes. Fifteen groups of students assessed and grouped for "teachability" on the basis of an assessment battery devised for the purpose, were compared with fifteen control groups, grouped by the traditional means used by administrators of the schools concerned; these groups were then observed and tested over a school year. The fifteen experimental groups were matched with teachers selected on the basis of a

Q-sort, using descriptions of "the sort of student they liked best to have in class". Other than these procedures of selection and matching, no other unusual changes were made. All teachers taught using the methods they had always used.

The conclusions Thelen reports as a result of analysis of data collected over the year were:

(i) "Teachability" grouping resulted in more manageable classes and higher attainment by pupils in terms of teacher's purposes.

(ii) Such groupings also resulted in more teacher satisfaction, and greater student order, cooperation and satisfaction with activities.

(iii) Also found was changed behaviour on the teacher's part - in attitudes, enthusiasm, friendliness, and so on, for some teachers.

(Thelen, 1967, pp.266-270)

These results, while dealing with the means of grouping students for facilitating teaching and enhancing pupil learning, suggest that a great deal of information about the nature of activities in classrooms, and the ways in which classroom structure is involved, is needed. Little was done in the study to ascertain what kinds of activities seemed productive of pupil morale or seemed to enhance pupil achievement and attitudes, or the way in which activities and the types of activity affect the dynamics of classroom interaction. This field remains to be explored.

3. THE PLACE OF THE PRESENT RESEARCH

The appraach taken in the present project was a multi-dimensional one. It looked at four major dimensions of classroom activities as previously outlined - teacher and participant

location, verbal interaction mode, content and cognitive level, and group activity types. Of less immediate interest in this context, but of importance in observing group activities, was the way in which group structure was carried out and its effects on the other variables being considered.

The theoretical rationale is drawn from the work done by Flanders, Adams (and Biddle) and Thelen. Consequently the study is in the sociological tradition, from which are derived the concepts to be used. Acknowledgement must be made, to the researchers noted immediately above, for the concepts used.

The classroom is conceptualised as a dynamic social system, within which all the behaviour variables being observed are inter-related. While little was done in the present project to test this proposition empirically, it is hoped that the data derived will give support to the plausibility of such an assumption, for further more rigorous testing.

Data collection in this pilot study was done by means of both live coding in the classroom by non-participant observers (teacher and participant location, and group activity structure and function) and by the analysis of tape recordings of the lessons. In the long term the aim was to develop systems of analysis that will be usable over a greater range of behaviours for the analysis of video-tape recordings, not losing sight of its use as a means by which practicing teachers and students can analyse their own behaviour in teaching situations.

The units of analysis used were arbitrary time units for all variables which produce incidents of the behaviour being observed. Three second time units were used for the locational variables and verbal interaction, and thirty second units for the group

activities.

It was hoped that this system of unit might be used to register the coincidence, at any point in the lesson, of the behaviours occurring in each variable, but technical problems prevented this from being realised at this stage.

The project covered the variables described above, at two levels of the school, the Form II and Second Year Junior class levels, in five types of school. The subject matter selected for this pilot study, Social Studies and Mathematics, was dictated by the desire to make comparisons with data from related studies. It is hoped subsequently to cover other areas, particularly in the arts. Teachers selected randomly, cover both sexes (not at all levels for all school types) and include young teachers and older teachers.

The limited number of lessons observed places limitations on the generalisability of the findings but it is hoped they are suggestive of the need to pursue the project further.

CHAPTER III

RATIONALE AND HYPOTHESES FOR THE STUDY

Classrooms are the setting for a wide range of behaviours of both an educative and social nature, characterised by many changes during the course of a lesson. The main participants are usually a teacher and (in the classrooms visited) from 30 to 40 pupils. It is an educative setting in the sense that the participants are frequently engaged in activities that are presumed to lead to an improvement in the behavioural status of the learners at least. These educational activities may include such things as : listening to the teacher disseminate information about the subject matter of the lesson, listening to the teachers directions as to how to complete a task, listening to the teacher "disciplining" another pupil or self, manipulating some materials, constructing some project presentation, completing a teacher set written assignment, watching the teacher demonstrate some fact or principle, answering a teacher or colleague, discussing some problem with the teacher or a classmate, and so on. It is social in the sense that it comprises a group of individuals engaged in socially prescribed behaviours, the intention of which is to change the behaviour of the majority in terms of the cultural heritage of the society - understandings, skills, attitudes and values.

Classrooms as social sub-institutions have many qualities which are a reflection of the norms and values of the broader society, but are also characterised by qualities that set them aside from most other social institutions. Only in prisons, mental institutions and to a less extent the armed forces are individuals constrained to be members, and be subject to the authority of one other member, as is the case with students in classrooms. Only in classrooms are individuals required to engage in activities they

have had little say in the choice of.

It is considered that if it is possible to identify consistently the socio-psychological phenomena that give classroom distinctive characteristics, then the major task of any study of the classroom should set out to measure these phenomena in such a way as to bring understanding of the dynamics that operate. The major phenomena of classrooms are the "teaching-learning" activities that take place in single or multiple interactions, regardless of the quality of either the "teaching" or the "learning", what is the subject matter of the "teaching" or the "learning", or the particular "teaching" or "learning" strategies that are favoured. Until we know what <u>is</u> happening in the classroom it is difficult to decide what should occur, how teaching should be transacted, and how effective teaching has been in changing pupil behaviour.

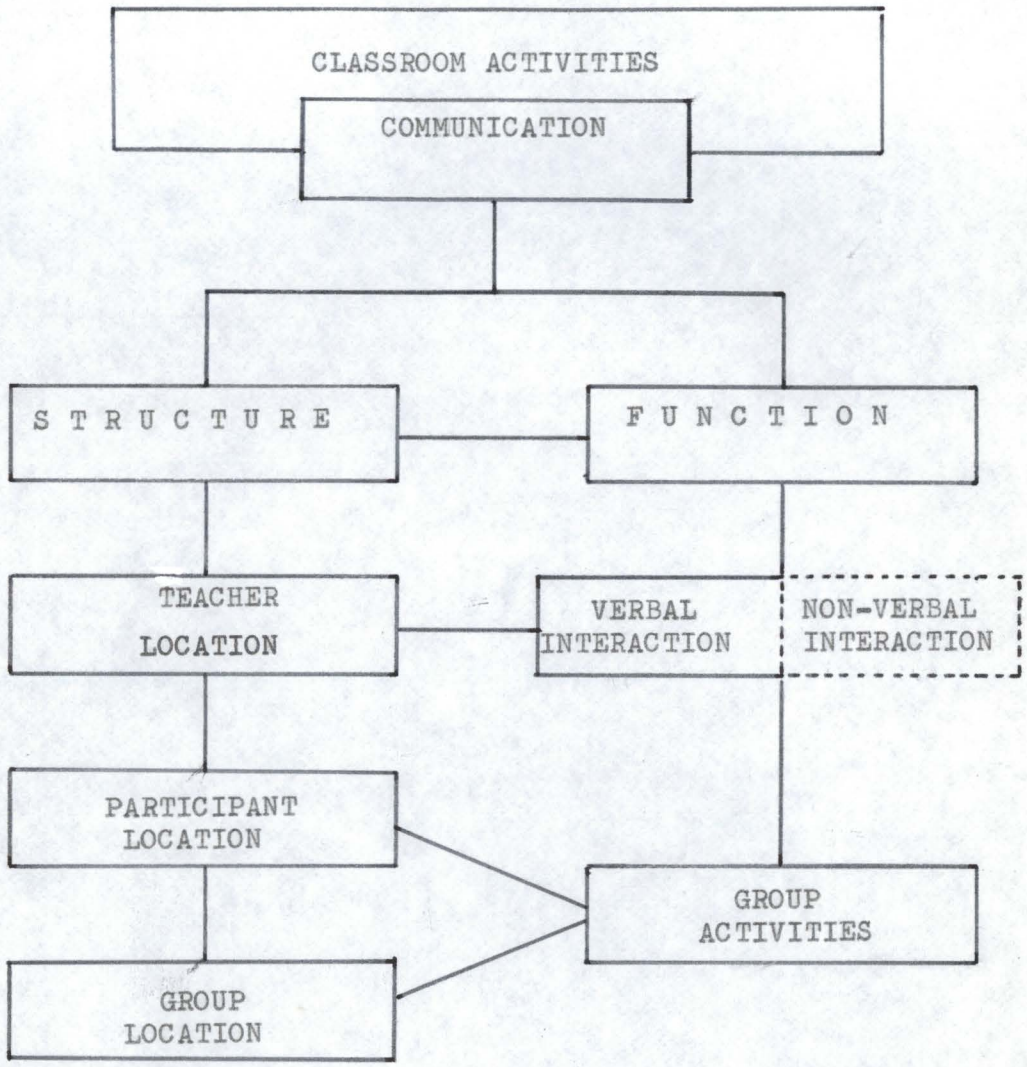
Following the theoretical framework established by Adams (1965), and Biddle and Adams (1967) it is believed the main medium that serves the "teaching-learning" process is communication. Communication in this context is considered to be <u>all the overt person to person, person to persons, and persons to person interactions that occur verbally and non-verbally, and convey cognitive or affective meaning</u>.

Classroom communication, used in this sense, subsumes all overt acts that involve one or more individuals in interaction with any other person who is a regular member of that classroom and includes, all forms of spoken communication, listening, watching, completing workbook activities, manipulating materials, gesturing, moving close to another, standing in or moving to a particular location in the room, nodding, smiling, or any of the other myriad of activities that teachers or pupils do with or to others.

Interaction then becomes any overt act or communication that results in any other person attending to that behaviour whether willingly or unwillingly.

Communication and its interaction concommitant are conceived as having two distinct but interrelated aspects. Firstly, it has a structural component, which refers to the locational arrangements that operate to facilitate communication in the classroom setting, and secondly, the functional component, which refers to the characteristic forms of activity that are carried out within the communication structure. From this it can be seen that the whole system of communication is interrelated. Figure 2 sets out in model form the nature of this inter-relationship.

FIG. 2: Classroom Communication - Structural and Functional Inter-relationships.



1. COMMUNICATION STRUCTURE

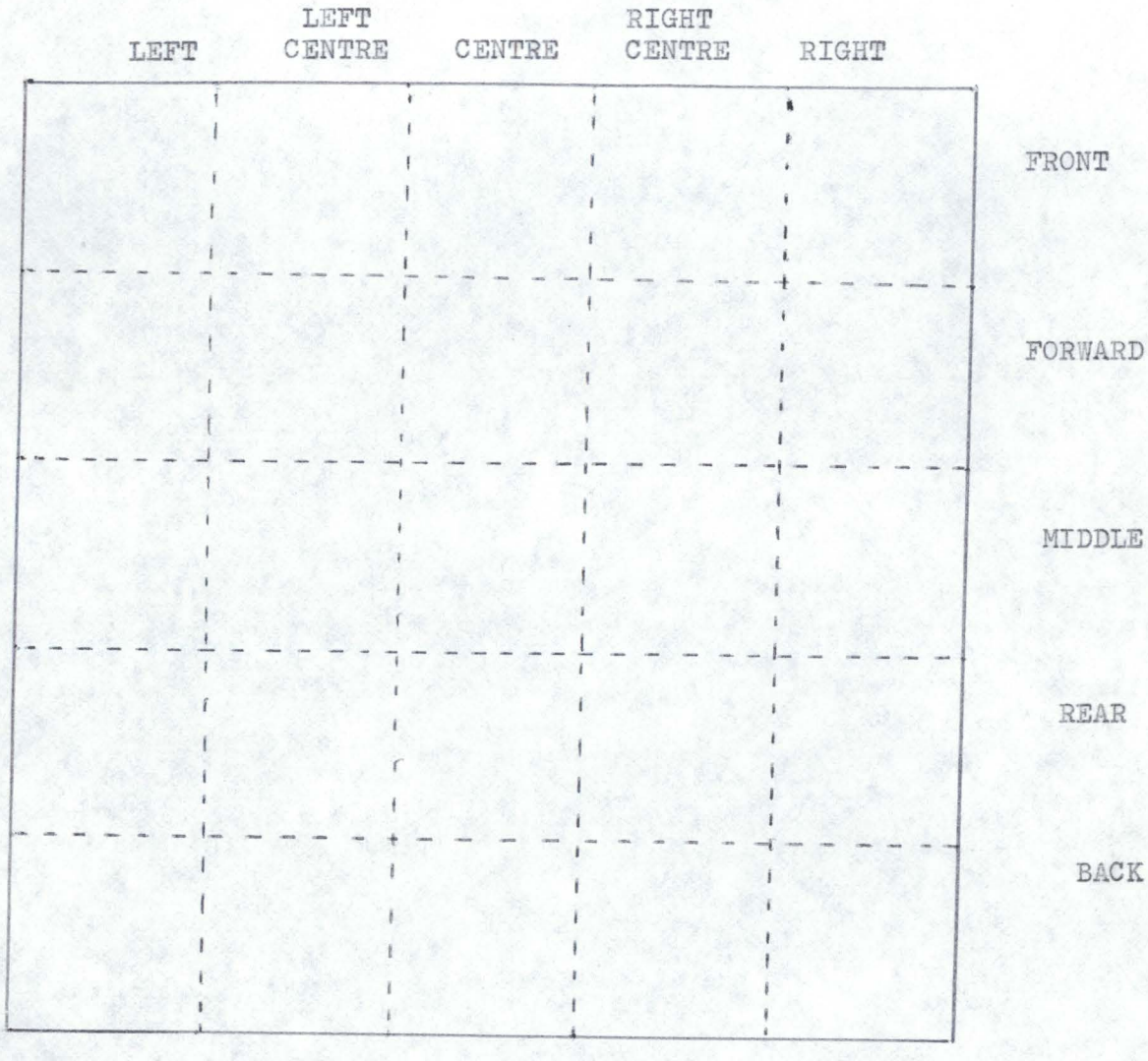
The structural aspects of classroom communication comprise teacher location, participant (pupil) location, and group location. These were the only elements of communication structure included in the study as being codable aspects of classroom activity in live coding type observation. Each will be discussed in some detail in turn.

(i) Teacher Location

The system for coding teacher location throughout the duraction of a lesson is an adaptation of the classroom location grid used in the Adams (1965) and Biddle and Adams (1967) study. Modifications were, however, necessary because of differences in observer position for coding. In the Missouri study coding was done from video-tapes for which the camera was in a fixed location. This was not always possible in using live coding.

The classroom was divided into an arbitrary 5 x 5 grid as indicated in Figure 3

Figure 3. Classroom Location Grid



As indicated in Figure (3) horizontal rows and vertical columns were given location designations. Superimposed on the coding sheets for Teacher Location were the furniture arrangements for each classrooms to assist coders in plotting the correct location of the teacher.

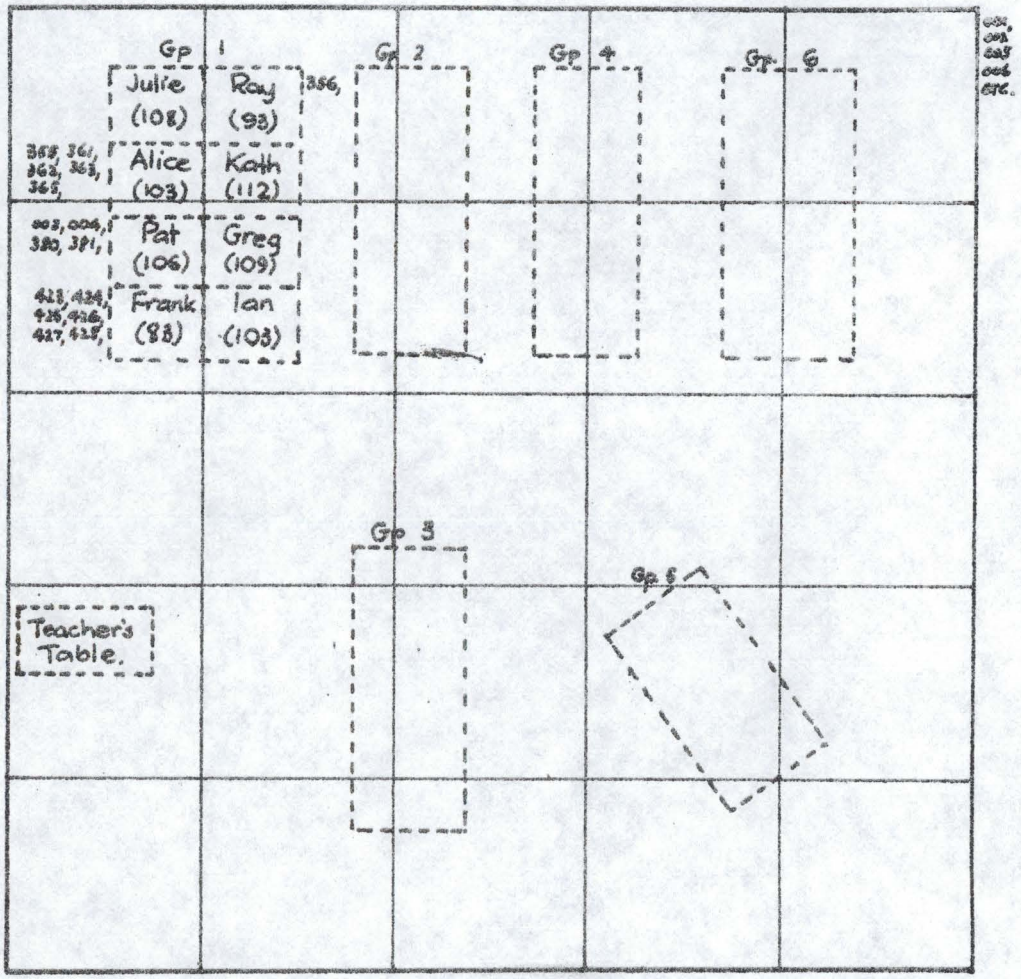
Coding Teacher location was done by using a sequential series of numbers from 001 - approx. 600 for each half hour lesson observed; a coding was made every 3 seconds or more frequently if a teacher moved cell location within any three second interval. Coding of teacher location was recorded in the appropriate location cell on the grid to ensure that an accurate flow of teacher movement could be recorded.

(ii) Participant (pupil) location.

The coding sheets for recording participant location were identical to those used for recording teacher location. Each pupil's name was recorded alongside the desk in its class location and in the case of the Form II pupils the I.Q. of each was recorded from a master list provided by the class teacher.

As for Teacher Location coding, a number sequence from 001 was used at 3 second intervals or more frequently if there was a change of behaviour within a 3 second interval. When a pupil responded to the teacher or initiated talk directed at the teacher a coding was placed alongside the pupil's name. During periods when the teacher only was talking to the whole class or to a group of pupils rather than to an individual pupil, or when there was no verbal behaviour occurring the number sequence was maintained with codings being recorded outside the grid boundaries. Figure (4) shows a grid with data entered for one group.

FIG. 4: Classroom Location Grid - Sample of Participant Location Coding.



It can be seen from Figure (4) that four of the pupils had verbal interactions with the teacher (Ray I.Q. 93, 1 x 3 sec., Alice I.Q. 103, 5 x 3 sec., Pat I.Q. 106, 4 x 3 sec., and Frank I.Q. 83, 6 x 3 sec.) and the four other pupils in the group did not respond to the teacher nor initiate any talk to the teacher. No pupil talk coding is shown to the right outside the grid.

(iii) Group Location

This dimension was included to ascertain whether group location was a matter of structural and/or functional necessity to promote communication or merely a convention. Teachers were asked the reason for the particular grouping adopted, and the basis by which the groups were arrived at.

The specific questions asked were :

(1) What is your reason for arranging your pupils in small groups?

(2) On what basis were the groups arranged as they are?

(3) For what subjects are small group activities used.

Data re group location was obtained from the Participant Location coding sheets as to the nature of the group in each classroom, and from Group Activities as to the nature of the types of activity used.

2. COMMUNICATION FUNCTION

Analysis of functional elements of the classroom setting were verbal interaction and group activities. No attempt was made at this stage to observe and record the non-verbal interaction behaviours that occurred because of limitations imposed by live coding.

(i) Verbal Interaction.

A three-dimensional system was devised for the coding of verbal behaviours. The dimensional divisions were mode, content

and level.

(a) Communication mode (FIRST DIGIT FIELD)

The title was derived from Biddle and Adams (1967) and refers to the type of verbal interaction and its source. The categories are identical with Flanders' Interaction Analysis System, but certain modifications were made. Flanders' category 10 - silence, confusion, beginning or ending a coding session, or to delineate one pupil finishing talking and another commencing (without any intervening verbal behaviours) - was changed to a zero category. This category was then subdivided as follows:

00 - Beginning or ending coding, OR to indicate the ending of one pupil's talking and another beginning to talk.

01 - Silence

02 - Diffuse (uncodable) talk

03 - Confusion.

Category 0 became the NO TALK section of communication mode. Categories 1 - 9 were the same as used by Flanders :

	Category	General Description of behaviour
Teacher Talk - Indirect influence:	1	Accepts pupil feelings and emotions.
	2	Praises or encourages pupil(s)
	3	Accepts, clarifies or uses pupil ideas
	4	Asks questions
Teacher Talk - Direct influence:	5	Lectures or gives information
	6	Gives directions
	7	Criticises or justifies authority
Pupil Talk	8	Pupil responds to teacher question
	9	Pupil initiates or uses own ideas.

(b) Communication Content (SECOND DIGIT FIELD)

Content analysis was effected by means of Biddle and Adams (1967) dimension of the same title and sub-divisions with the slight modification as shown :

0 - Non-relevant Subject Matter.

1 - Relevant Subject Matter

2 - Organisation

3 - Sociation.

Non-relevant subject matter refers to any verbal exchanges that are subject oriented, not being sociation, organisation or the particular subject that is the focus of the lesson being observed. An example of non-relevant subject matter would be an instance where a teacher in a mathematics lesson refers in an aside to some Language topic that has been dealt with, but has no bearing on the content of the Mathematics lesson. Relevant subject matter would be regarded as any reference to materials or information that increases or enhances understanding of the content of the particular lesson. Organisation encompasses any communication that relates to the administration or management of the lesson but is not subject matter oriented or disciplinary. Sociation would include any verbal interaction that carries affective undertones or as Adams (1965 p.39) suggests "clearly represents recognised social conventions".

(iii) Communication Level (THIRD DIGIT FIELD)

This sub-division of the verbal interaction coding system has four categories and was derived from Bloom et al's (1956) Taxonomy of Educational Objectives in the Cognitive Domain. Analysis and synthesis were excluded as it was considered that this level of functioning is developed by means of a series of

questions and answers rather than by a single utterance. Obviously episodic analysis could handle these categories but as the writer opted for timed sequential coding of behaviours the categories selected were :

0 - Knowledge

1 - Understanding

2 - Application

3 - Evaluation

The complete system for the analysis of the communication function is set out in Figure (5)

FIG. 5: Verbal Interaction Mode, Content and Level Categories.

CODING SYSTEM FOR ANALYSING VERBAL INTERACTION IN CLASSROOMS (COSAVIC)					
COMMUNICATION MODE (First Digit Field)		COMMUNICATION CONTENT (Second Digit Field)		COMMUNICATION LEVEL (Second Digit Field)	
Category Code	Behaviour Description	Category Code	Behaviour Description	Category Code	Behaviour Description
NO TALK CATEGORIES					
0		0	Begin/End Coding. Change of pupil.		
		1	Silence.		
		2	Diffuse.		
		3	Confusion.		
TEACHER TALK CATEGORIES					
1	Accepts feelings.	0	About Non-rel S-M.	0	At knowledge level
		1	" Rel S-M.	1	At understanding level
		2	" Organisation	2	At application level
		3	" Sociation	3	At evaluation level
2	Praises, encouages.	0		0	
		1		1	
		2		2	
		3		3	
3	Accepts, clarifies pupil ideas.	0		0	
		1		1	
		2		2	
		3		3	

FIG. 5: (cont'd)

Category Code	Behaviour Description	Category Code	Behaviour Description	Category Code	Behaviour Description
TEACHER TALK CATEGORIES (cont'd)					
4	Asks question.	0	About Non-rel S-M.	0	At knowledge level
		1	" Rel S-M.	1	At understanding level
		2	" Organisation	2	At application level
		3	" Sociation	3	At evaluation level
5	Gives information.	0		0	
		1		1	
		2		2	
		3	ditto	3	ditto
6	Gives directions.	0		0	
		1		1	
		2		2	
		3	ditto	3	ditto
7	Criticises.	0		0	
		1		1	
		2		2	
		3	ditto	3	ditto
PUPIL TALK CATEGORIES					
8	Responds directly to teacher.	0		0	
		1		1	
		2		2	
		3	ditto	3	ditto
9	Initiates own ideas.	0		0	
		1		1	
		2	ditto	2	ditto
		3		3	

Communication at the knowledge level was taken as being any verbal interaction that involved the use of previously acquired information that was recalled in response to a teacher's question, or was initiated by a pupil, e.g. T: "What is the product of 3 and 8?" P: "Twenty-four!", would represent an interaction at this level. The understanding level of communication was exemplified by - T: "Why is Wellington the Capital city of New Zealand?" P: "Wellington is the capital, because it is the city where central government enacts legislation.", or any response involving explanation, description or classification.

The application level exchanges were used when a pupil was required to use some knowledge or understanding to operate on any subject-matter oriented topic. An example at this level would be - T: "How does the distributive principle apply in this example?" P: "By separating the tens figure and the units figure in one factor to use as multipliers, and then adding the products."

Any verbal exchanges that called for the pupil to weigh up the pro's and con's of a point of view, to determine the worth of a statement, or to engage in judging the quality of an idea was classified as an evaluation level interaction. This type of interaction included exchanges such as - T: "Which of these is the better solution to the problem?" P: "the second one, because it simplifies the fraction."

FIG. 6: Sample of Verbal Interaction Mode, Content and Level Coding Sequence.

0	0		Coding begins.
6	2	0	Teacher gives directions, about organisation, at knowledge level.
5	1	1	Teacher gives information about rel S-M at understanding level.
5	1	1	"
4	1	0	Teacher asks question about rel S-M at knowledge level.
8	1	0	Pupil responds about rel S-M at knowledge level.
4	1	3	Teacher asks question about rel S-M at evaluation level.
4	1	3	"
4	1	3	"
0	1		Silence
0	1		"
9	1	3	Pupil initiates ideas about rel S-M at evaluation level.
9	1	3	"
9	1	3	"

Coding of the lesson audio-tapes was done on special sheets with one hundred three diget field spaces on each. (i.e. 5 minutes of coding time, approximately). Three second intervals were used following the Flanders' convention, but any change of behaviour within a three second interval was recorded. Ground-rules for the Flanders' system were adhered to for the coding. A sample coding is explained in Figure 6.

Originally it was proposed that for the sake of facilitating pacing during coding each digit would be coded for every timed unit, but in practice it was found that the second and third digits could be dispensed with once content and level had been established, and the second digit was changed only when a change of content occurred. Similarly the third digit was only required when a change of level occurred. The unit sequence for the example cited in Fig. (6) then became

0	0	-
6	2	0
5	1	1
5		
4	1	0
8		
4	1	3
4		
4		
0	1	-
0	1	-
9	1	3
9		
9		

This practice also simplified coding when the three-second rule was broken to enable changes of behaviour to be recorded.

(ii) Group Activities

As very little literature could be located relating to

the varied activities that could be found in group organised classrooms the presumption had to be made that very little empirical study of this classroom phenomenon had been done. It was decided to develop a group activities coding system that could possibly be used in any type of lesson. The activity categories for this reason had to be generic rather than specific. Four broad categories of classroom activity were selected as being representative of the types likely to be commonly observed in a classroom at any level of the primary school. The broad categories selected were :

(a) With-Teacher Activities

These involved any activity where a group or groups were actively engaged with the teacher in the exploration of some subject matter oriented information. This category was sub-divided into two types of activity, activity that involved either teacher or pupils or both using apparatus, and activity where no apparatus was in use.

(b) With-Group Activities

In this category, were included any activities which involved the group working cooperatively in the exploration of relevant subject matter. One criterion necessary was that there be evidence of pupils engaging in interaction for behaviour to be included in this category. Pupils working in the group but pursuing independent activity would not be included, but discussion of a teacher set topic would. Pupils doing an exercise from blackboard or textbooks would be excluded unless there was evidence of task oriented discussion, but pupils working together to solve a problem would be included. This category was also sub-divided into apparatus involved and no apparatus involved sections.

(c) Alone Activities

Included under this category were any activities where it was obvious the pupils were engaged in non-interactive type activities. Non-interactive in the sense that the task assigned required no communication with other members of the group. Pupils might be interacting in non-task oriented ways but such behaviour would not be included. A necessary criterion for inclusion was that it be prescribed explicitly or implicitly as an individual task by the teacher. Subdivisions of this category were : tasks involving the use of apparatus, individual tasks where textbooks or blackboard exercises were in use, and tasks in which pupils were occupied in individual activities which did not involve textbooks or blackboard exercises.

(d) Free Choice Activities.

This category was used for including any group activity that enabled a group or groups (either those established for regular classroom activities, or groups which come together voluntarily for the activity) to engage in self-selected activity. It could involve two or more pupils forming their own subject oriented activity, or a group where the teacher was involved with the pupils, but the selection of task was made by the pupils (not the teacher). Individual participation was not included in this category. Evidence of task related interaction (cooperative endeavour) was a necessary pre-requisite.

(e) Non-involved.

This was included to enable coding of groups where there was no subject-matter oriented activity being done by more than half of a group.

The full category system developed for coding group

activities is set out in Figure (7)

Fig. 7. Group Activities Categories

CATEGORY	BEHAVIOUR DESCRIPTION
0	Non-involved
1	With Teacher - Apparatus
2	- No apparatus
3	With Group - Apparatus
4	- No apparatus
5	Alone - Apparatus
6	- Workbook (text or Bbd)
7	- Written
8	Free choice

In coding group activities it was necessary for half or more than half the group to be occupied in the task for a coding to be done. Coding was done every thirty seconds for each of the established groups in the classroom. If any group activity changed within the thirty second interval, coding of the new activity was done for that group or groups as soon as the behaviour occurred. Within interval changes were noted on the coding sheets.

Figure (8) explains a typical section of group activities coding.

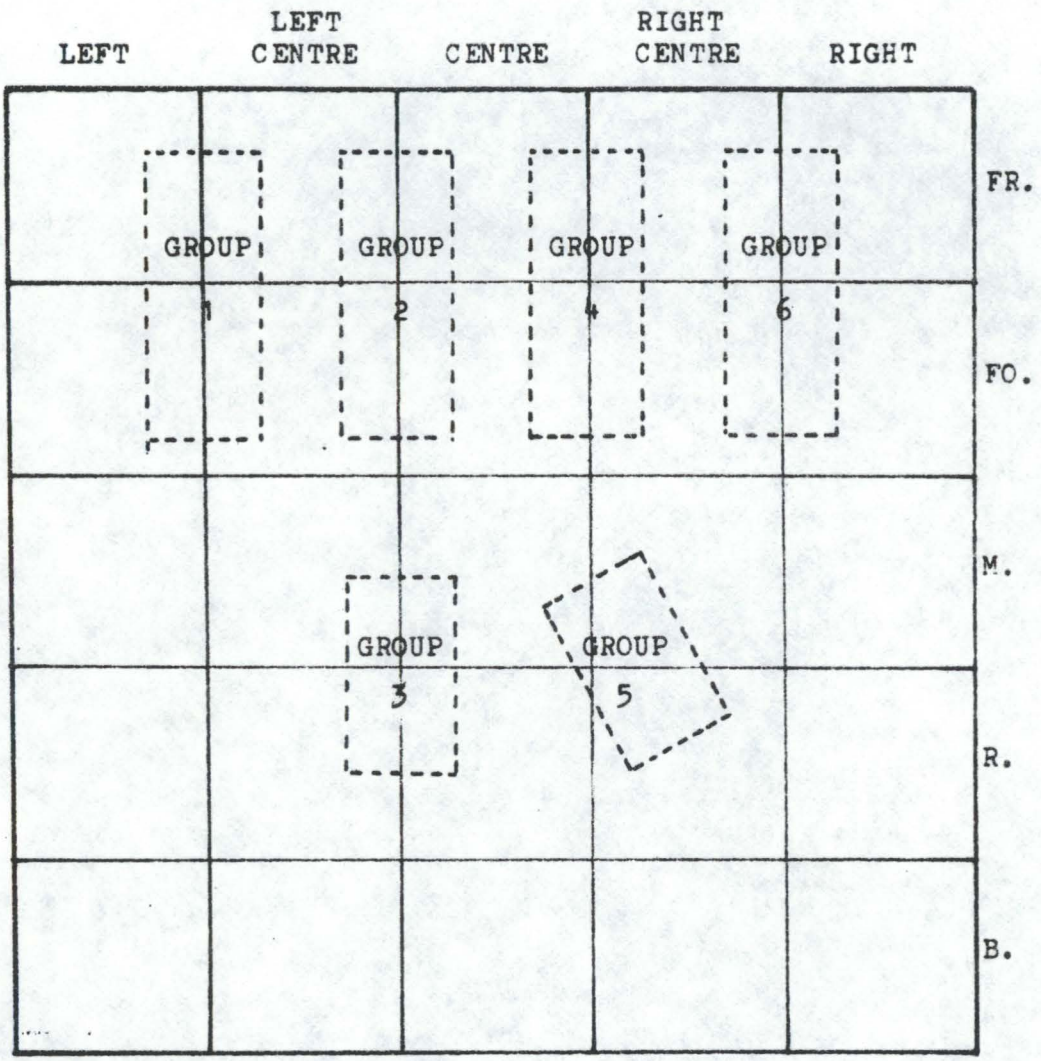
Fig. 8. Sample of Group Activities coding sequence

GROUPS							BEHAVIOUR DESCRIPTION
1	2	3	4	5	6		
2	2	2	2	2	2	(25)	All groups - with tchr - no app.
2	2	3	3	6	6	*	Gps 1 & 2 - with T - no app. Gps 3 & 4 - with Gp - app. Gps 5 & 6 - alone wkbk.
2	2	3	3	6	6		ditto
2	2	3	3	0	6		Gps 1 & 2 - with T - no app. Gps 3 & 4 - with Gp - app. Gp 5 - Non-inv. Gp.6 alone wkbk.
2	2	3	3	0	0	(15)	Gps 1 & 2 - with T no app. Gps 3 & 4 - with Gp - app. Gps 5 & 6 - Non-Inv.
3	3	3	3	2	2	*	Gps 1 - 4 - with Gp - app. Gps 5 & 6 - with T no app.
3	7	7	3	2	2	(20)	Gps 1 & 3 - with Gp - app. Gps 2 & 4 - alone written Gps 5 & 6 - with T no app.
7	7	7	2	3	3	(*	Gps 1 - 3 - alone written Gp 4 - with T no app. Gps 5 & 6 - with gp - app.

Breaking of the thirty second timed interval is indicated by the asterisk (*) being placed in the right margin alongside the new coding cells, and the time duration for the previous activity codings is placed in the right margin alongside the cells for which the time interval was shorter than the regular thirty second time interval.

Prior to the lesson commencing, the research assistant responsible for coding Group activities was given a group location grid sheet on which the group numbers and locations had been superimposed. Groups were always numbered from front-left towards the back of the classroom as indicated in Figure (9).

FIG. 9: Numbering System for Recording Group Location.



In addition to the above categories of teacher and pupil behaviour which served as the dependent variables in the project, it was also proposed to ascertain whether any differences in patterns of classroom activity could be accounted for in terms of a number of independent variables.

4. INDEPENDENT VARIABLES

(i) Type of School

Normal Intermediate, Intermediate, Normal Contributing, Contributing and Country Schools (each with two classrooms) were included in the sample from which the classrooms to be studied were selected. Three classrooms from each type of school were to have been observed, each for two lessons of differing subject-matter. This number had in fact to be limited to three classrooms in each of the Normal Intermediate and the Intermediate Schools and one classroom in each of the other types of school included. These are the main types of primary school in New Zealand, and the study endeavoured to find out if differences in classroom activity could be attributable to differing types of school

(ii) Class Level

The class levels selected to focus on were Year Two Junior (second year infant) and Form Two classes. These would be roughly equivalent to the Grade I and Grade VI classrooms included in the Adams (1965) and Biddle and Adams (1967) study, the data from which it is hoped comparisons could be made. The class level of the country school classrooms was from Standard Two to Form Two in the classroom visited. Again, the study sought to establish how far differences could be accounted for by different class levels.

(iii) Type of Subject-matter Lesson

In each of the classrooms visited a Mathematics lesson

and a Social Studies lesson were observed to find if differences in classroom activity occurred for each type of lesson. Each lesson was of approximately half an hour.

(iv) Intelligence Quotient and Participant Location.

Data on pupil intelligence was obtained for those classrooms where it was available (Intermediate Schools) to ascertain whether there was a relationship between participant location and the I.Q. of each participant.

(v) Teacher Age and Sex

No systematic attempt was made to relate differences in classroom activities to teacher age and sex at this stage. Data however have been included for these variables. Of the Form Two teachers, one was a young female teacher (under thirty years of age), two were older female teachers (over forty years of age), two were young male teachers, and one was an older male teacher. The contributing teachers were both young females and the country school teacher was a young male.

5. HYPOTHESES

Having conceptualised the variables, and devised coding systems to measure the selected behaviours, hypothesising was carried out. In doing so a long term view was taken and hypotheses were developed for the major study, and a selection was made of those to be tested in this pilot research. All hypotheses for the full study are reported with those to be tested statistically in this part of the project specified.

The general hypothesis relating to variables was: that: No significant inter-relationship would be found among the variables observed. Figure 10 sets out the sub-hypotheses for eventual testing of this hypothesis. The data from this project

FIG. 10: Hypothesised Relationships Between Structural and Functional Variables.

INCIDENCE	COINCIDENCE	
(a) The GREATER the...	(a) The GREATER the...	
(b) The LESSER the...	(b) The LESSER the...	HYPOTH. NO.
Teacher Location Movement.	Communication Mode Cat's.	
	02	01a (01b)
	1 - 4	03a (03b)
	6	05a (05b)
	9	07a (07b)
Teacher Location Movement.	Communication Content Cat's.	
	3	09a (09b)
	4	11a (11b)
Teacher Location Movement.	Communication Level Cat's.	
	3	13a (13b)
	4	15a (15b)
Teacher Location Movement.	Group Activities Cat's.	
	1	17a (17b)
	3	19a (19b)
	5	21a (21b)
	8	23a (23b)
Participant Location (No. of V.I. units)	Communication Mode Cat's.	
	02	26a (26b)
	1 - 4	28a (28b)
	6	30a (30b)
	9	32a (32b)
Participant Location (No. of V.I. units)	Communication Content Cat's.	
	3	34a (34b)
	4	36a (36b)
Participant Location (No. of V.I. units)	Communication Level Cat's.	
	3	38a (38b)
	4	40a (40b)
Participant Location (No.of V.I. units)	Group Activities Cat's.	
	1	42a (42b)
	3	44a (44b)
	5	46a (46b)
	8	48a (48b)
Group Structure (No. of changes)	Group Activities Cat's.	
	1	51a (51b)
	3	53a (53b)
	5	55a (55b)
	8	57a (57b)

FIG. 10: (cont'd)

INCIDENCE	COINCIDENCE		
(a) The GREATER the...	(a) The LESSER the...		HYPOTH. NO.
(b) The LESSER the...	(b) The GREATER the...		
Teacher Location Movement.	Communication Mode	Cat's.	
		03	02a (02b)
		5	04a (04b)
		7	06a (06b)
		8	08a (08b)
Teacher Location Movement.	Communication Content	Cat's.	
		0	10a (10b)
		1	12a (12b)
Teacher Location Movement.	Communication Level	Cat's.	
		0	14a (14b)
		1	16a (16b)
Teacher Location Movement.	Group Activities	Cat's.	
		0	18a (18b)
		2	20a (20b)
		4	22a (22b)
		6	24a (24b)
		7	26a (26b)
Participant Location (No. of V.I. units)	Communication Mode	Cat's	
		03	27a (27b)
		5	29a (29b)
		7	31a (31b)
		8	33a (33b)
Participant Location (No. of V.I. units)	Communication Content	Cat's.	
		0	35a (35b)
		1	37a (37b)
Participant Location (No. of V.I. units)	Communication Level	Cat's.	
		0	39a (39b)
		1	41a (41b)
Participant Location (No. of V.I. units)	Group Activities	Cat's.	
		0	43a (43b)
		2	45a (45b)
		4	47a (47b)
		6	49a (49b)
		7	50a (50b)
Group Structure (No. of changes)	Group Activities	Cat's.	
		0	52a (52b)
		2	54a (54b)
		4	56a (56b)
		6	58a (58b)
		7	60a (60b)

that are relevant will be discussed descriptively.

In general, only interteacher differences were tested. These are set out below, together with the inter-teacher differences hypotheses to be tested in the major study:

SPECIFIC HYPOTHESES

A. Communication Structure.

(i) Teacher Location.

HYPOTHESIS 1.1: No significant differences in patterns of teacher location will be found between teachers.

HYPOTHESIS 1.2: No significant differences in patterns of teacher location will be found between lessons for a teacher.

(ii) Participant Location

HYPOTHESIS 2.1: No significant differences in patterns of participant location will be found between teachers.

HYPOTHESIS 2.2: No significant differences in patterns of participant location will be found between lessons for a teacher.

(iii) Group Location

HYPOTHESIS 3.1: No significant differences in patterns of group location will be found between teachers.

HYPOTHESIS 3.2: No significant differences in patterns of group location will be found between lessons for a teacher.

B. COMMUNICATION FUNCTION

(i) Verbal interaction (Mode)

HYPOTHESIS 4.1: No significant differences in the

mode categories of verbal interaction will be found between teachers.

HYPOTHESIS 4.2: No significant differences in the mode categories of verbal interaction will be found between lessons for a teacher.

(ii) Verbal Interaction (Content)

HYPOTHESIS 5.1: No significant differences in the content categories of verbal interaction will be found between teachers.

HYPOTHESIS 5.2: No significant differences in the content categories of verbal interaction will be found between lessons for a teacher.

(iii) Verbal Interaction (Level)

HYPOTHESIS 6.1: No significant differences in the level categories of verbal interaction will be found between teachers.

HYPOTHESIS 6.2: No significant differences in the level categories of verbal interaction will be found between teachers.

(iv) Group Activities

HYPOTHESIS 7.1: No significant differences in the types of group activity pupils engage in will be found between teachers.

HYPOTHESIS 7.2: No significant differences in the types of group activity pupils engage in will be found between lessons for a teacher.

C. INTELLIGENCE QUOTIENT AND RATE OF PUPIL PARTICIPATION IN VERBAL INTERACTION.

HYPOTHESIS 8.1: No significant correlation between I.Q. and the amount of individual pupil participation in verbal interactions will be found in any lesson for a teacher.

6. SUMMARY OF HYPOTHESES TO BE TESTED

The following hypotheses were tested for significance in the pilot study reported here :

Hypotheses 1.2

2.2

4.2

5.2

6.2

7.2

8.1

7. COMPARISON OF DATA WITH FINDINGS FROM RELATED STUDIES.

Where data from the present study were relevant, they were compared with the findings reported in Flanders' 1957 New Zealand study (Flanders, 1960a), and with data from Adams' (1965) and Biddle and Adams' (1967) Missouri study.

No significance testing will be done in comparing data, but inferences will be drawn at the descriptive level in the discussion.

CHAPTER IV

RESEARCH PROCEDURES

(i) Selection of the classrooms.

Because of the limited nature of the research project, it was decided to make an arbitrary selection of the schools to be visited during the study. The city schools chosen were those within four miles of the Hamilton Teachers' College, and the small country schools were those closest to the city's eastern boundary, again because of their proximity to the College. The city schools cover a cross-section of the socio-economic levels of the city, ranging from schools with a high proportion of state houses to those with a low proportion in the lower income group (No state rental home areas). The small rural schools chosen were of similar size and community type.

It was decided to exclude all teachers with less than two years of permanent certificated teaching, and anyone who was in a relieving teaching position.

The schools selected include the main types of New Zealand primary school. The schools from which the teacher sample was drawn were :

Normal Intermediate:	Berkley Normal Intermediate
Intermediate Schools:	Fairfield Intermediate Peachgrove Intermediate
Normal Contributing Schools:	Hillcrest Normal School Knighton Road Normal School Silverdale Normal School
Contributing Schools:	Fairfield Primary School Hamilton West School Hamilton East School Fifth Avenue School Insoll Avenue School

Small Country Schools: Eureka School
Horsham Downs School
Puketaha School

(ii) Initial Contact with Teachers

When permission had been obtained from the District Inspector of Schools to use the selected schools for the study, letters setting out the general intent of the project, together with forms of agreement to participate (these also asked for detailed personal information about each teacher) were sent out to headteachers under a covering letter asking that teachers at the required level be asked to read the letter and make a decision about participation. At the same time letters were sent to headteachers of all the schools by the District Senior Inspector of Schools advising them that approval had been given for the project to be done and asking them to seek staff cooperation.

Following these formal contacts, informal telephone contact was made with each headteacher to arrange a personal visit to discuss the project in greater general detail with teachers who were eligible prior to their decision being made to participate. At the same time questions of a general nature were answered and copies of teachers' timetables were obtained.

(iii) Reducing Confounding Effects

In order to ensure that as little distortion of the results would occur, teachers were given no specific information as to the nature of the project, being informed that it was "an investigation of activities that take place in classrooms". Teachers were asked to do nothing special in the way of preparation for each of the lessons to be observed, and insofar as was possible to teach on the occasions of the visits as if no observation was being done.

TABLE 1: Schools in the Sample, Number of Teachers Agreeing to Participate and Number of Teachers Selected.

TYPE OF SCHOOL.	SCHOOL.	NUMBER OF CLASSROOMS AVAILABLE.	NUMBER OF TCHRS AGREEING TO PARTICIPATE.	NUMBER OF TCHRS SELECTED.
Normal Intermediate	Berkley	6	5*	3
Intermediate	Fairfield	7	5	1
	Peachgrove	7	4	2
Normal Contributing	Hillcrest	2	2*	1
	Knighton	3	3*	1
	Silverdale	5	5*	1
Contributing	Fairfield Primary	3	1*	0
	Fifth Avenue	4	3*	1
	Hamilton East	4	4*	1
	Hamilton West	3	2*	0
	Insoll Avenue	4	4*	1
Country	Eureka	1	1*	1
	Horsham Downs	1	1*	1
	Puketaha	1	1*	1

* Represents all available teachers eligible agreed to participate.

(v) Random Selection of Participating Teachers.

When all completed forms of agreement to participate had been returned by the headteachers of the schools in the sample, selection of the teachers whose classrooms were to be used was done on a random selection basis. Completed agreement forms for each type of school were placed in alphabetical order according to the surnames of the teachers and assigned a number in sequence. The Rand Table of Random numbers was then used to select the three teachers required for each set. In addition a fourth teacher was selected in case any teacher withdrew after the project got under way.

Country schools were not included in the random selection procedure.

Due to a number of circumstances beyond the control of the writer it was not possible in the time available to complete the observation of all the selected classrooms for the two lessons, and the six intermediate school classrooms, one Normal Contributing classroom, one Contributing school classroom and one Country School classroom were visited, for a total of eighteen lessons.

(vi) Preliminary Visits to Classrooms

After selection procedures had been completed, Head-teachers of the schools in the sample were notified of staff members who had been selected to take part in the project. In addition, individual notification letters were included for each teacher informing them whether they had been selected or not.

Selected teachers were asked to submit class timetables showing the times and days Social Studies and Mathematics

lessons would occur. From these timetables, a Project Visiting Schedule was drawn up for the three visits to each classroom - the preliminary familiarisation visit and the two lesson visits.

During the preliminary visit, carried out in each classroom to familiarise teacher, pupils and research assistants with the procedures to be followed, teachers were asked to draw up a seating plan of the classroom as it would be for each of the lesson visits. All equipment was set up in position to test the audio-recording equipment for optimum results. During the preliminary visits to each classroom practice coding were carried out in each of the variables being observed in ten minute segments. Participant location grids, showing the locations of individual pupils for each lesson, classroom layout, etc. were drawn up, and individual timetabling arrangements were completed with each teacher for the two formal visits.

(vii) Training of the classroom Observers

All observers used were either colleagues, with experience in teaching in the area, or senior college students who were currently engaged in a year three Professional Studies course in Pupil-Teacher Interaction, in which the Flanders Interaction Analysis System is learned, and in which student have had experience in classroom live coding sessions. Only students who had achieved a high level of intercoder reliability in this course were selected for classroom observation during the research project.

During the period when preliminary selection of classrooms was being undertaken, research assistants were each given a

copy of the coding sheets to be used in classrooms - participant location coding sheets, teacher location sheets and activity function coding sheets. Two classrooms, not included in the research project, were selected at Normal Schools and used for live coding practice. During practice all coders were engaged in coding the same behaviour in ten minute sessions during normal lessons. Coding practice was continued until a high level of intercoder reliability was achieved.

When all coders were proficient in all coding systems and had consistently high practice intercoder reliability scores, intercoder reliability for the research was established during six of the latter preliminary visits to the classrooms included in the study. (See Appendix A)

Verbal interactions in the classroom were not coded live during the visits to each of the selected classrooms. Audio-tape recordings were made of each lesson, and these were later coded from the tapes using consensus coding. The three coders were all teaching members of the college staff thoroughly familiar with the Flanders' Interaction Analysis System and practice coding was carried out on the Flanders' Practice Audio-Tapes using the coding system devised for this study.

When .9 plus intercoder reliability was achieved in the new systems using the practice tapes, intercoder reliability for the present research was established by random selection of lessons from which three five minute segments were coded. One segment was a selection from the middle of the lesson (based on total footage for that lesson) and the third, the final five minutes. During these sessions each coder coded independently of the other two coders using the three-field coding sheets. Each coder's sheets for each lesson segment were compared with those of the other

two coders for the calculation of intercoder reliability. One lesson from each class level was used to achieve reliability prior to the full coding for each lesson session. (See Appendix A)

(viii) Audio-tape Recording Equipment

For the audio-taping of each lesson, the following equipment was used:

1. Akai Stereophonic tape-recorder Model X-V
3 stands
3 Omni-directional microphones
2 Akai Cardioid Microphones (one adapted as a neck microphone for teacher use)
1 Four microphone input plug Audio-mixer Amplifier unit (Locally made)
1 set of Headphones for minitoring

The Akai Tape-recorder made it possible to record on two tracks simultaneously. One track was used for the input from the three stand microphones and the teachers neck microphone (where it was pssible to use this), the other was used for dubbing significant activity descriptions during periods when there was no verbal interaction being recorded e.g. if pupils were engaged in written work from blackboard etc. The three stand microphones were located at points near the wall around the classroom. Optimal location for these was established in practice sessions at the normal schools in practice classrooms. Cords from stand microphones were affixed with special alligator type clips around the walls above head height so as not to impede flow of traffic in the classroom. These were connected into the audio-mixer amplifier, which in turn was connected to the tape-recorder. Control equipment was screened

off from the classroom members, usually behind a mobile cabinet, so that it could not be seen. Figure (11) shows the layout for the audio-recording equipment.

When the tapes for the lessons were coded, the tape-recorder was plugged into the audio-mixer unit and three sets of stereophonic earphones were plugged into three of the four output jack plugs so that simultaneous coding could be done in coding booths.

Coding of tapes was carried out using the following procedures :

(a) The lesson was identified from the log book kept for recording essential details of each lesson and the classroom visited. The footage counter was returned to zero to coincide with the beginning of the lesson.

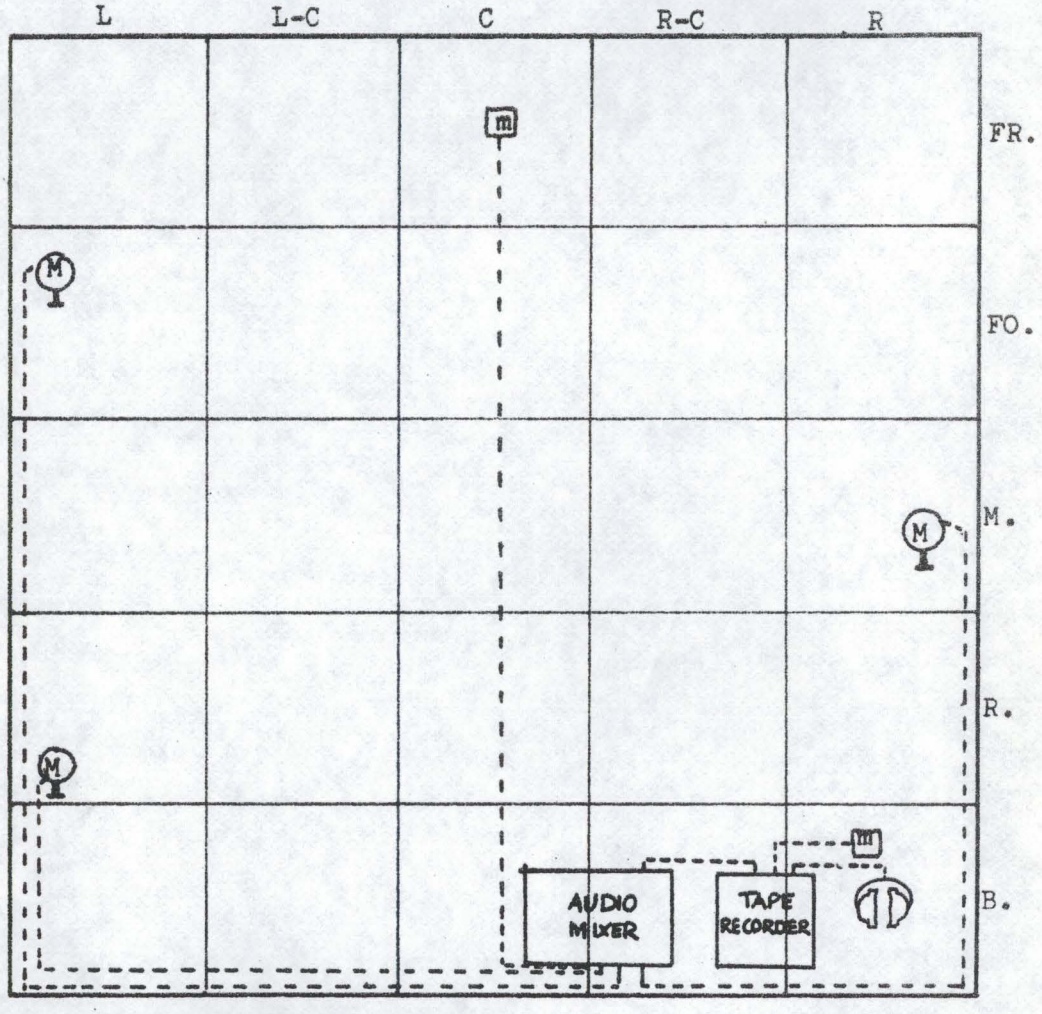
(b) The lesson was played through once to identify the flow of the lesson, and to make a preliminary evaluation of content and level of the interactions. If any difficulties were encountered in this play through a second replay was done. At the end of the new footage to mark the end of the lesson was recorded.

(c) The tape of the lesson was then coded, in all three dimensions - mode, content and level.

(d) A check re-run was then done, with any difficult segments isolated for particular attention. A foot stop control on the tape recorder facilitated this reviewing of coding.

(e) Inter-coder reliability coding runs were then done for the three five minute portions of the selected lessons.

FIG. 11: Classroom Location Grid Showing Audio-Recording Layout.



LEGEND

Omni-directional Stand Microphone.

Cardioid Neck Microphone.

Monitoring Headphones.

(ix) Classroom Visit Procedures

Prior to the children's entry to the classroom for the start of the lesson (before the commencement of morning class, or at lunch-time) the audio recording equipment was set up. Each microphone was tested separately and monitored to ensure it was functioning correctly, as were the tape-recorder and audio-mixer. The tape footage counter was logged to indicate the beginning position of the tape of that lesson.

The research assistant responsible for recording teacher location checked classroom layout against coding sheet. The participant location recorder also checked coding sheet to ensure that pupil locations were recorded, and collected the I.Q's. list (if available) for the pupils. The recorder responsible for coding group activities, drew up a grid sheet of group locations and numbered the groups as prescribed, and checked the audio-recording equipment power supply was switched on, and checked the stop-watch was set correctly.

As soon as the class was inside and seated the research assistant switched on the tape-recorder, which was the signal to all research assistants to begin recording. At the end of the lesson, or after thirty minutes, whichever was the sooner, the tape-recorder was switched off, signalling to recorders to stop coding (click clearly audible). The footage meter on the tape-recorder was logged to record the end of the lesson tape.

(x) Data Processing

(1) Lesson tapes.

The formula for obtaining intercoder reliability (for the mode categories only) was : $R = \frac{A - (\frac{1}{N-1} \cdot D)}{A+D}$. (See Append. A.)

Content and level intercoder reliability were carried out separately. The three coders conferred and only by agreement, or re-running tape segments until agreement was achieved, were the coding sequences accepted for comparison with the codings for the full lesson which had been done previously. Reliability for content and level coding was then achieved by establishing the percentage agreement between the full lesson codings and the lesson segment codings. Percentages agreements for each lesson segment are reported.

(2) Analysis of Data

All sequential data were processed manually. This was a long and tedious process, with double checks being carried out for all individual variables. For this reason many possible analyses of the data have had to be put to one side for the present, and will be carried out at a later date, for example the data processing of the group structure (the number of groups actually engaged with the teacher) relating to Adams' central group, peripheral group findings; the analysis of group activities for each individual group; the coincidental relationship between teacher position and participant responding/initiating; the production of teacher movement flow pattern diagrams for all lessons.

Because of the number of variables involved, and the sheer volume of the data generated by this relatively small study, a major emphasis was placed on the analysis of the differing patterns of behaviour of each teacher rather than on the inter-teacher differences. These latter will be reported on descriptively, but no attempt has been made to

test the significance level of differences to support or reject the hypotheses stated above, because of the small number of teachers involved.

All data will be presented in tabulated form for each teacher for all the variables observed, and where relevant, in the interests of clarity, figures will be shown. The main statistical procedures the data were subjected to were the X^2 test to establish significance for individual variables, and correlation co-efficients for grouped variables. Where 2 x 2 matrices were used the Yates' correction factor for continuity was calculated. Where larger matrices were used, the frequency expected was calculated as independence values, as suggested by Garrett (1965, pp 262-264).

All calculations were done using a Sony Sobax Micro-Computer.

CHAPTER V

RESULTS AND DISCUSSION OF FINDINGS

In presenting the data for the lessons observed it is proposed to give, firstly a general description of the findings, then detailed specific findings about the variables observed for each lesson for each teacher, and relate these to the hypotheses stated above, and to findings reported in other similar researches. This is followed by an outline of some of the descriptive findings about differences between teachers, and finally, a concluding statement is made about the findings and possible avenues for future research that emerge from this project.

Only one lesson is reported for Teacher E. When this classroom was visited for the first lesson, it became apparent that the teacher was under considerable strain in the teaching situation (with non-participant observers present) and it was decided not only to cut the observation visit short, but not to make the proposed visit to observe the Social Studies lesson. This decision was made in consultation with the teacher concerned. Data for the part of the lesson observed has been presented as it can usefully be used for descriptive purposes.

For Teacher H also, the data is incomplete for the Mathematics lesson. This teacher was reluctant to wear the neck microphone with the trailing cord as it was felt it would restrict ability to "move from group to group". As the lesson was conducted in small groups (with each using task cards and apparatus) and the teacher had a very quiet voice, the tape of this lesson had to be coded throughout its full length as Verbal Interaction Mode No Talk category 02 - diffuse, as the

teacher's voice is at no time audible. Data is presented for all other variables, for this teacher.

(i) General Findings.

One of the striking features of the lessons observed was the high content orientation. (see Tables 13 and 14). Only a fractional amount of time (0.3%) was devoted to non-relevant subject matter and sociation behaviours. Relevant subject matter (85.4% for all lessons) and organisation related directly to the subject matter (13.6%) loomed large in every lesson. Surprisingly, all the sociation (0.8%) incidents were in mathematics lessons. One relatively long encounter between teacher and one pupil was social chit-chat and the others when pupils became distressed about some aspect of the work being done.

Not surprisingly, the level of communication interactions was, with one exception, predominantly at the knowledge (49.6%) and understanding levels (36.1%). In one classroom, in which the I.Q's of the students ranged from 121 to 145 plus, the students began to initiate discussion at the evaluation level but were often cut short by a teacher question at the understanding level.

Group activities, involving the use of apparatus in general seemed to be non-existent in the Form II classes visited (Table 16), again with the exception of one Intermediate classroom and two lessons observed at the country school. Groups discussions were the main medium of communication in Social Studies in Form II classrooms, but in the Infant classes the teacher in both cases had the whole class at her feet. In one Infant lesson the high level of "information giving", (46.3%)

of the incidents that was coded for verbal interaction mode was because of the story reading that occurred (by far the highest incidence of Category 5 for all lessons). It seems clear even from this small sample, that by the time Intermediate levels are reached activities which require the use of apparatus are dispensed with regardless of the level of ability of the students.

Observations made in this study indicate that teacher movement (Table 2) during lessons varies considerably. The number of locational moves made ranged from three in one lesson to one hundred and eighty-two in another case, with the average number of locational moves being sixty-eight for all lessons. The most mobile teacher (Teacher G) shifted location one hundred and fifteen times during the Social Studies lesson and one hundred and thirty-one times during the Mathematics lesson (Fig. 12). The least moves made by any teacher, three moves during the Social Studies lesson and fifty-two during Mathematics, occurred in a Junior class. Movement seems unrelated to the subject matter being taken. No apparent single location was preferred by the teachers sampled. While the front was magnetic to some, for others it was avoided almost completely. Most teachers tended to be front-oriented (particularly the Form II teachers) but there was considerable variation, with one favouring a middle of the room pattern, another favouring the rear left side (at his desk), while another spent almost the entire lesson at the middle right hand side of the room, because of the larger space there for the children to sit at her feet.

As with teacher location, participant location (Table 6)

seemed to follow a variable pattern. In some lessons, those closest to the middle forward and front areas came in for much of the action, in others those nearest to the sides or the back and rear parts of the room were "favoured" by the teacher. Data for participant location in Table 8, means for all lessons, show that the most used location is the centre of the middle row of the location grid. The next most used area is the back-left area. What did seem important was where the teacher was located at the time of the communication. Great variation was observed in the volume of participant interaction from classroom to classroom. The number of interaction units ranged from fifty-four during one lesson to three hundred and two in another. In most classrooms there was plenty of opportunity for pupils to communicate their ideas. Teachers asked many questions (average of one hundred and one for all lessons) to prompt pupil participation in interaction.

Of the specific verbal behaviours of teachers (Tables 10-14) and their students, praise and encouragement were observed as being much more important than criticism. Over all lessons, praise and acceptance of pupil ideas were used almost six times as much as criticism. There was, however, considerable variation both in the amount of each of these behaviours and in its timing. In Mathematics praise was used more frequently than it was in Social Studies , but so too was criticism, being almost twice as much used. Another noticeable aspect of the verbal interaction mode behaviours was the difference between the two lesson types in the amount of pupil initiated talk and the amount of talk that was

response to teacher questions. In Social Studies, by far the major proportion of all talk in all classrooms was pupil initiated, whereas in Mathematics a larger amount of direct response to teacher questions was apparent. Over all lessons, pupil initiated talk was more used, on the average, than direct response.

Of the No Talk categories of behaviour, diffuse (usually small group discussion) uncodable talk was dominant in Social Studies lessons, while silences were much more frequent in Mathematics lessons. An exception being the Junior classrooms during Mathematics lessons when small group activities occurred in both instances.

(ii) Specific Findings.

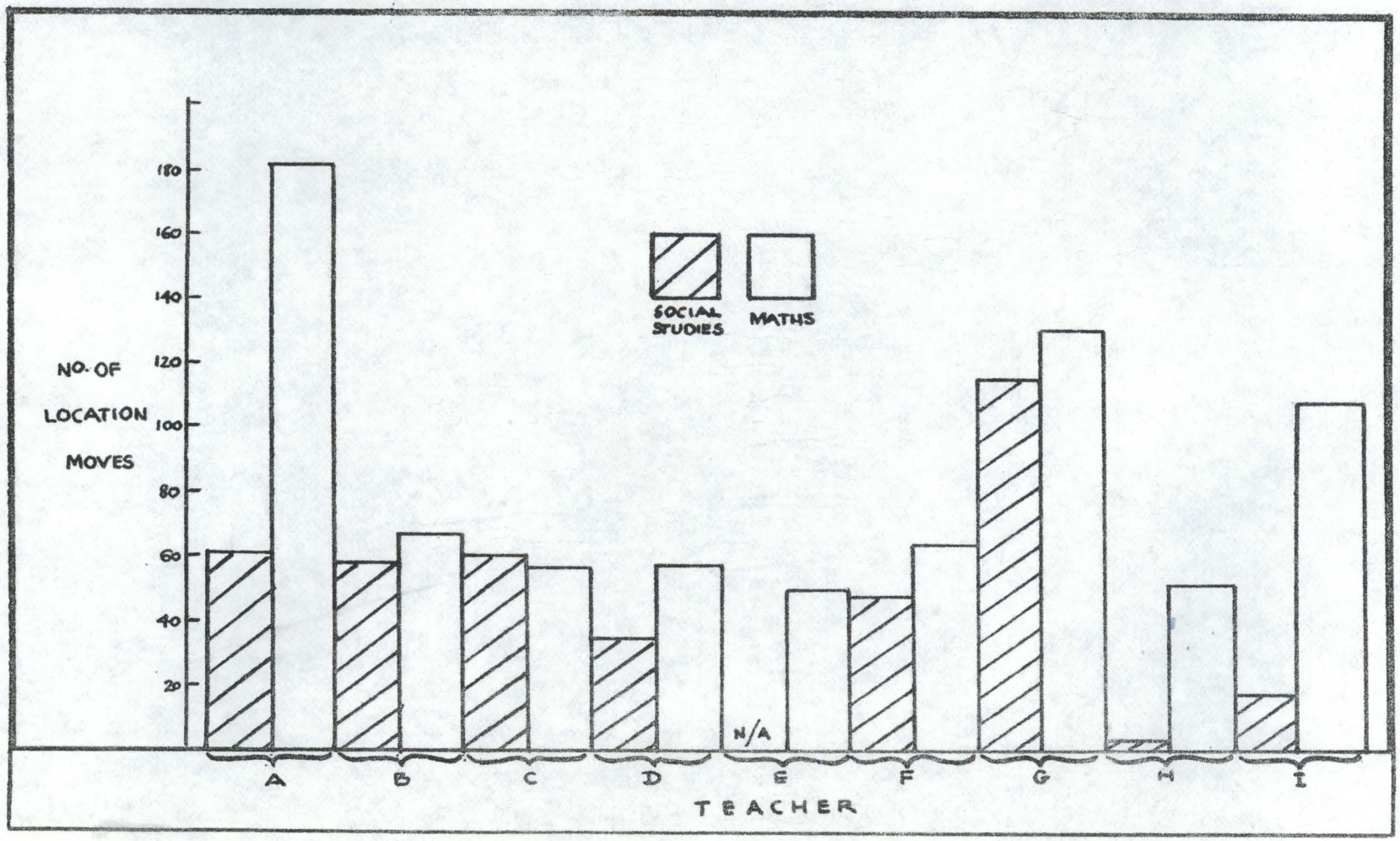
A. COMMUNICATION STRUCTURE

(a) Teacher Location

Teacher Movement

In the lessons observed, there was marked variation in the number of location moves made by teachers. Figure 12 shows the number of location moves made by each teacher for each of the two lessons. Teacher A had the greatest number of moves during the Mathematics lesson and Teacher H the least for the Social Studies. Teacher G was the most mobile over the two lessons with 115 and 131 moves. Movement for the other teachers tends to be about the average for all lessons, other than Teacher I who was very mobile in Mathematics but moved little in Social Studies. Data suggest that teachers move more frequently during Mathematics lessons (mean number of 85) than for Social Studies (mean of 49 moves for all lessons.

FIG. 12: Number of Teacher Location Moves for Each Lesson.



Location Patterns

The number of location moves and duration units for each lesson for each teacher are shown in Table 2. Percentages, rounded to the nearest whole number, are indicated for each cell in brackets. Inspection of the table indicates considerable variation both in the number of location moves made and in the duration of location, and there is also marked differences in the amount of classroom space used. Teachers A, C, E and F show front oriented patterns of movement and duration in location but there are marked differences in the parts of the classroom used. Teacher A uses almost every area in both the Mathematics and Social Studies lessons, but Teacher C ventures outside the front/forward areas on only two occasions during either lesson. Teacher E in the only lesson observed, Mathematics, uses a "T" shaped orientation - across the front and down the centre - not unlike the pattern of movement reported by Adams in his 1965 Missouri study of American teachers. Teacher F by comparison, favours left-centre to right-centre across the front and up and down the left-centre and right-centre, in both lessons observed, with right-centre front at the teacher's table as a preferred location in duration count.

Teachers B, D, and G data show a preference for the front of the classroom for Mathematics, but for Social Studies the most used locations in both moves and duration tended to be the middle and rear locations. Teacher G in both lessons moved up and down the left-centre and right-centre areas, with a marked pattern of back of the room location moves and duration in Social Studies. This pattern seems to be

	L	L-C	C	R-C	R
Fr		3 (5)	9 (15)	7 (12)	6 (10)
Fo	2 (3)	3 (5)	2 (3)	2 (3)	5 (8)
M	4 (7)	1 (2)	1 (2)	3 (5)	
R	3 (5)	2 (3)	2 (3)	3 (5)	2 (3)
B	1 (2)				
TOTAL 61					

TEACHER

A

(Social Studies)

L	L-C	C	R-C	R	
	8 (1)	12 (2)	19 (3)	315 (54)	Fr.
11 (2)	4 (1)	21 (4)	2 (-)	62 (12)	Fo.
34 (7)	1 (-)	1 (-)	10 (2)		M
20 (3)	13 (2)	19 (3)	7 (1)	12 (2)	R
1 (-)					B
				TOTAL 572	

Tab.2. Incidence of Location moves and Duration Units for each Lesson.

	L	L-C	C	R-C	R
Fr	15 (8)	31 (17)	29 (16)	14 (8)	7 (4)
Fo	18 (10)	5 (3)		9 (5)	2 (1)
M	10 (5)	4 (2)	1 (-)	10 (6)	1 (-)
R	9 (5)	3 (2)		5 (3)	1 (-)
B	5 (3)	2 (1)			

TOTAL 182

TEACHER

A

(Mathematics)

L	L-C	C	R-C	R	
48 (8)	151 (26)	122 (21)	48 (8)	44 (8)	Fr.
48 (8)	7 (1)		29 (5)	2 (-)	Fo.
20 (3)	4 (1)	1 (-)	11 (2)	3 (1)	M
13 (2)	4 (1)		15 (3)	12 (2)	R
15 (3)	2 (-)				B

TOTAL 599

Table 2.

	L	L-C	C	R-C	R
Fr					
Fo		3 (4)	3 (6)	1 (2)	3 (6)
M		5 (9)	10 (17)	6 (10)	6 (10)
R		1 (2)	7 (12)	7 (12)	2 (3)
B		1 (2)	1 (2)	1 (2)	1 (2)

TOTAL 58

TEACHER

B

(Social Studies)

L	L-C	C	R-C	R	
					Fr.
	82 (14)	38 (6)	1 (-)	34 (6)	Fo.
	94 (16)	39 (7)	39 (7)	31 (5)	M
	4 (1)	52 (9)	20 (3)	98 (17)	R
	5 (1)	36 (6)	2 (-)	11 (2)	B

TOTAL 586

Table 2.

	L	L-C	C	R-C	R
Fr	8 (12)	16 (24)	8 (12)	7 (10)	7 (10)
Fo	7 (10)	4 (6)	2 (3)	1 (1)	4 (6)
M					1 (1)
R			1 (1)	1 (1)	
B					

TOTAL 67

TEACHER

B

(Mathematics)

	L	L-C	C	R-C	R
Fr.	61 (10)	151 (26)	63 (11)	56 (9)	72 (12)
Fo.	96 (16)	17 (3)	2 (-)	11 (2)	16 (3)
M					33 (6)
R			13 (2)	1 (-)	
B					

TOTAL 592

Table 2.

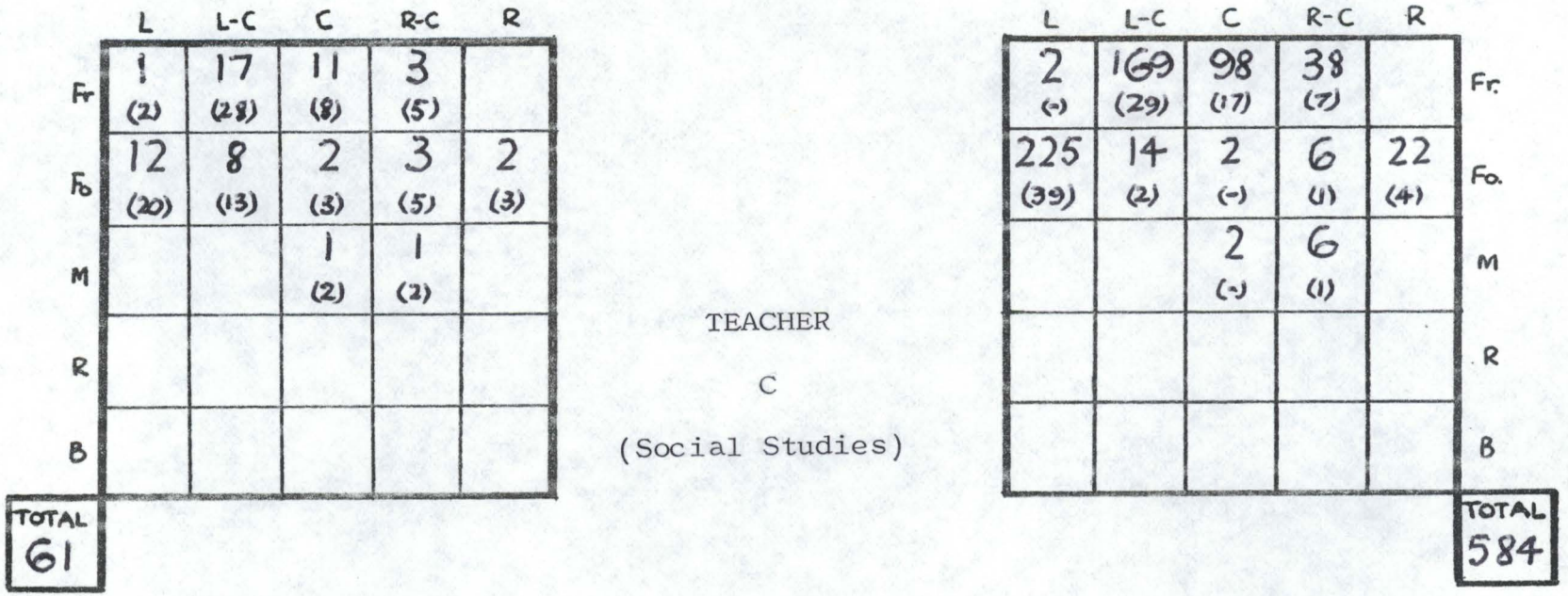

L
L-C
C
R-C
R
Fr
Fo
M
R
B
TOTAL
61
1 (2)
17 (28)
11 (8)
3 (5)
12 (20)
8 (13)
2 (3)
3 (5)
2 (3)
1 (2)
1 (2)
TEACHER
C
(Social Studies)
L
L-C
C
R-C
R
Fr.
Fo.
M
R
B
TOTAL
584
2 (-)
169 (29)
98 (17)
38 (7)
225 (39)
14 (2)
2 (-)
6 (1)
22 (4)
2 (-)
6 (1)

Table 2.

	L	L-C	C	R-C	R
Fr		14 (25)	15 (26)	7 (12)	3 (5)
Fo	3 (5)	5 (9)	5 (9)	4 (7)	1 (2)
M					
R					
B					

TOTAL 57

TEACHER

C

(Mathematics)

	L	L-C	C	R-C	R
Fr.		194 (34)	95 (16)	14 (2)	35 (6)
Fo.	35 (6)	28 (5)	20 (3)	113 (20)	42 (7)
M					
R					
B					

TOTAL 576

Table 2.

	L	L-C	C	R-C	R
Fr	1 (3)	2 (6)	5 (14)	4 (12)	1 (3)
Fo	1 (3)	1 (3)	3 (9)	1 (3)	
M	1 (3)	2 (6)	4 (12)	1 (3)	2 (6)
R	2 (6)			2 (6)	2 (6)
B					
TOTAL 35					

TEACHER

D

(Social Studies)

	L	L-C	C	R-C	R
Fr.	3 (1)	49 (8)	16 (3)	7 (1)	53 (9)
Fo.	27 (5)	1 (-)	6 (1)	1 (-)	
M	2 (-)	2 (-)	45 (8)	73 (13)	25 (4)
R	238 (41)			4 (1)	32 (5)
B					
TOTAL 584					

Table 2.

	L	L-C	C	R-C	R
Fr	4 (7)	9 (16)	14 (24)	11 (19)	5 (9)
Fo	2 (3)	2 (3)	2 (3)		1 2
M		2 (3)		3 (5)	
R		1 (2)		1 (2)	
B	1 (2)				

TOTAL 58

TEACHER

D

(Mathematics)

	L	L-C	C	R-C	R
Fr.	35 (6)	67 (11)	164 (28)	133 (23)	51 (9)
Fo.	20 (3)	4 (1)	3 (1)		45 (8)
M		4 (1)		22 (4)	
R		1 (-)		2 (-)	
B	40 (7)				

TOTAL 591

Table 2.

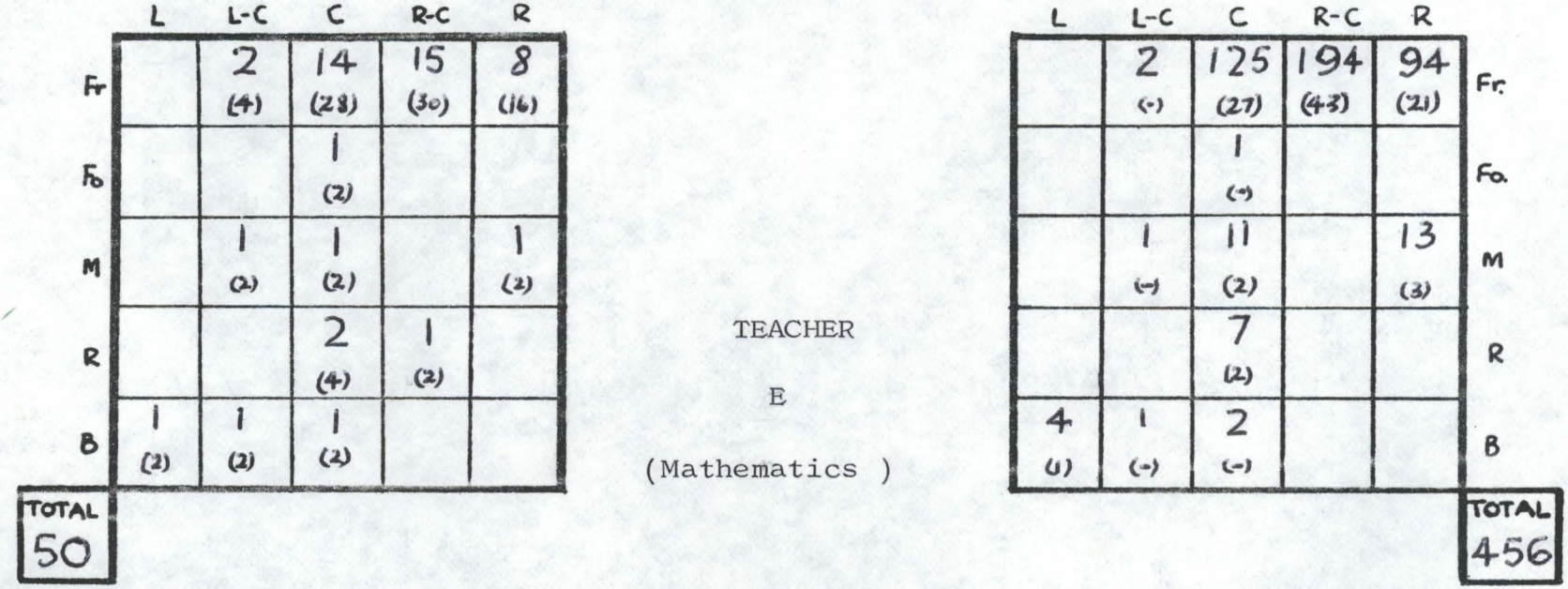

L
L-C
C
R-C
R
Fr
Fo
M
R
B
TOTAL
50
TEACHER
E
(Mathematics)
L
L-C
C
R-C
R
Fr.
Fo.
M
R
B
TOTAL
456

Table 2.

	L	L-C	C	R-C	R
Fr		1 (2)	3 (6)	4 (8)	
Fo	2 (4)	3 (6)		5 (10)	1 (2)
M	4 (8)	4 (8)		4 (8)	1 (2)
R	4 (8)			2 (4)	2 (4)
B	3 (6)	3 (6)	1 (2)	1 (2)	

TOTAL 48

TEACHER

F

(Social Studies)

	L	L-C	C	R-C	R
Fr.		6 (1)	53 (9)	246 40	
Fo.	18 (3)	51 (8)		50 (8)	4 (1)
M	10 (2)	18 (3)		18 (3)	2 (-)
R	19 (3)			35 (6)	6 (1)
B	32 (5)	42 (7)	9 (1)	2 (-)	

TOTAL 621

Table 2.

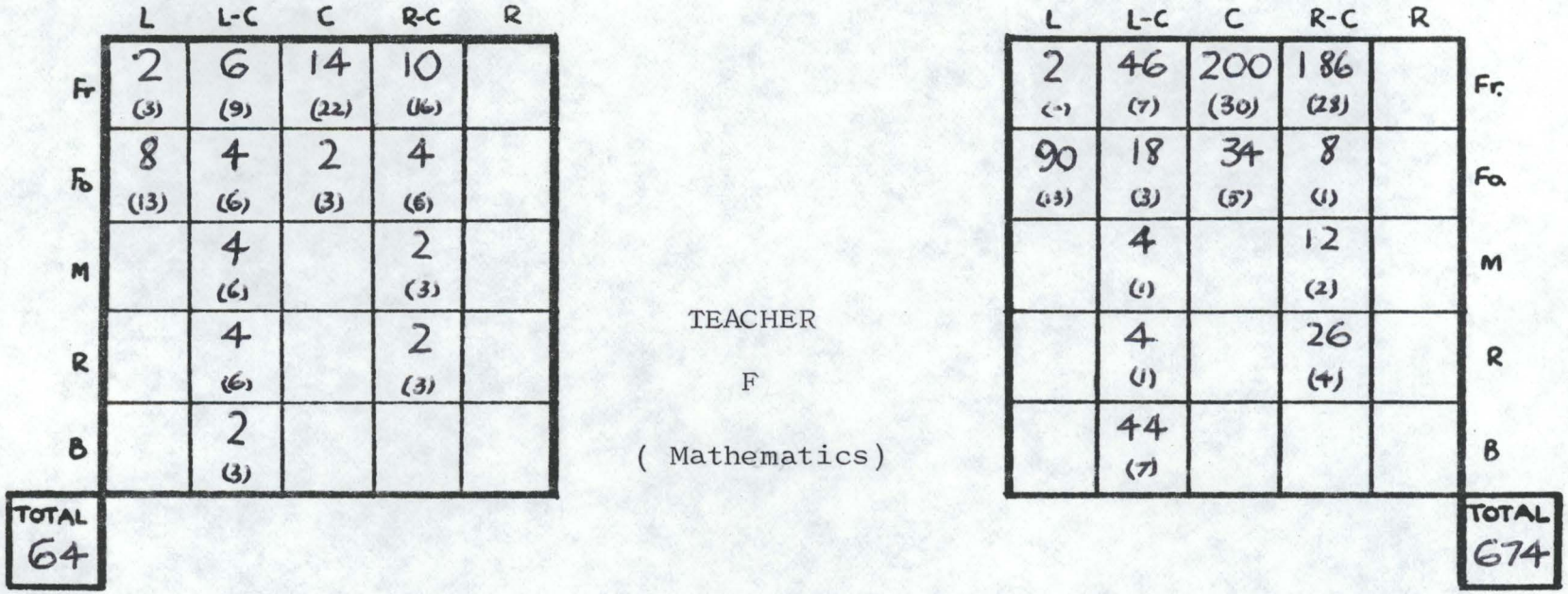
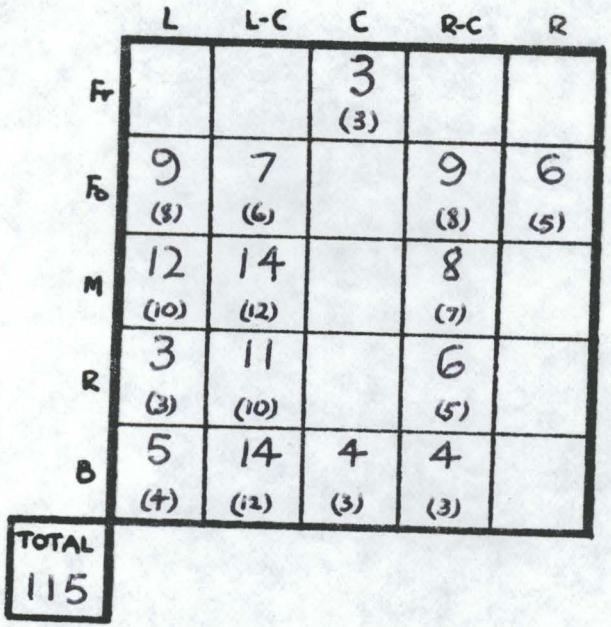

L
L-C
C
R-C
R
Fr
Fo
M
R
B
TOTAL
64
2 (3)
6 (9)
14 (22)
10 (16)
8 (13)
4 (6)
2 (3)
4 (6)
4 (6)
2 (3)
4 (6)
2 (3)
2 (3)
TEACHER
F
(Mathematics)
L
L-C
C
R-C
R
Fr.
Fo.
M
R
B
TOTAL
674
2 (-1)
46 (7)
200 (30)
186 (28)
90 (13)
18 (3)
34 (5)
8 (1)
4 (1)
12 (2)
4 (1)
26 (4)
44 (7)

Table 2.



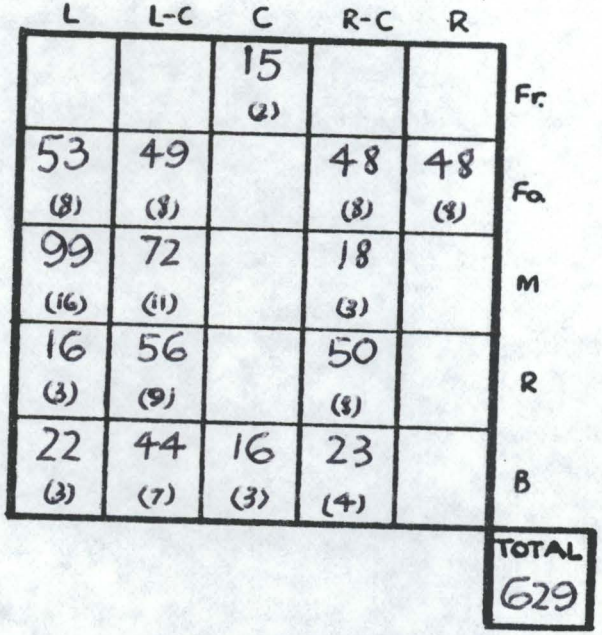
	L	L-C	C	R-C	R
Fr			3 (3)		
Fo	9 (8)	7 (6)		9 (8)	6 (5)
M	12 (10)	14 (12)		8 (7)	
R	3 (3)	11 (10)		6 (5)	
B	5 (4)	14 (12)	4 (3)	4 (3)	

TOTAL 115

TEACHER

G

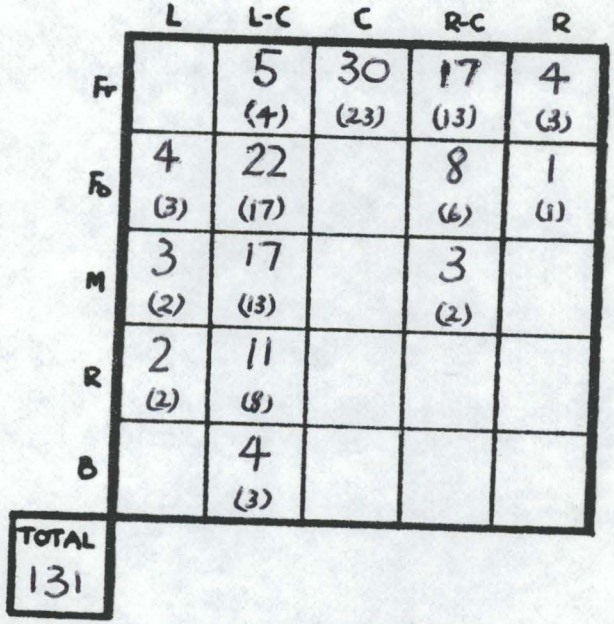
(Social Studies)



L	L-C	C	R-C	R	
		15 (2)			Fr.
53 (8)	49 (8)		48 (8)	48 (8)	Fo.
99 (16)	72 (11)		18 (3)		M
16 (3)	56 (9)		50 (8)		R
22 (3)	44 (7)	16 (3)	23 (4)		B

TOTAL 629

Table 2



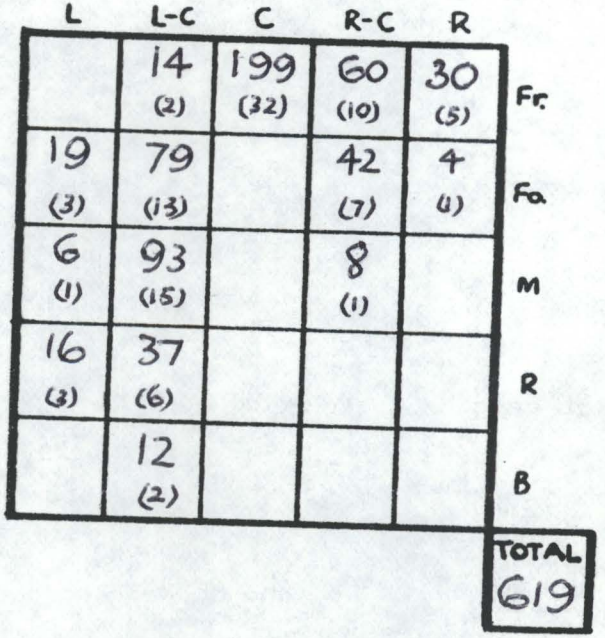
	L	L-C	C	R-C	R
Fr		5 (4)	30 (23)	17 (13)	4 (3)
Fb	4 (3)	22 (17)		8 (6)	1 (1)
M	3 (2)	17 (13)		3 (2)	
R	2 (2)	11 (8)			
B		4 (3)			

TOTAL 131

TEACHER

G

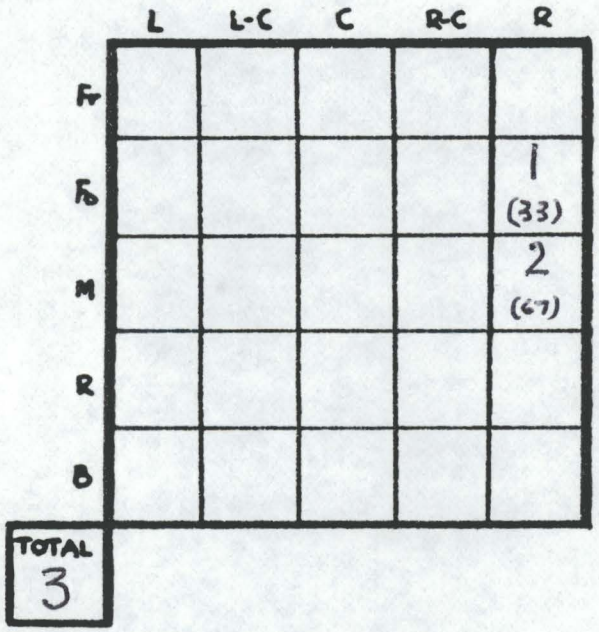
(Mathematics)



	L	L-C	C	R-C	R
Fr.		14 (2)	199 (32)	60 (10)	30 (5)
Fa	19 (3)	79 (13)		42 (7)	4 (1)
M	6 (1)	93 (15)		8 (1)	
R	16 (3)	37 (6)			
B		12 (2)			

TOTAL 619

Table 2



TEACHER

H

(Social Studies)

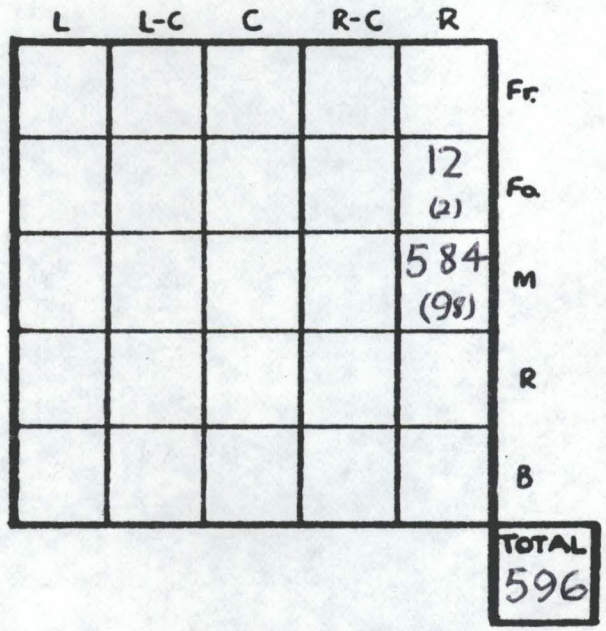


Table 2.

	L	L-C	C	R-C	R
Fr		1 (2)	1 (2)	4 (8)	4 (8)
Fa	2 (4)			1 (2)	4 (8)
M	4 (8)	3 (6)	6 (12)	7 (14)	2 (4)
R	2 (4)	1 (2)	1 (2)	1 (2)	4 (8)
B	2 (4)				2 (4)

TOTAL 52

TEACHER

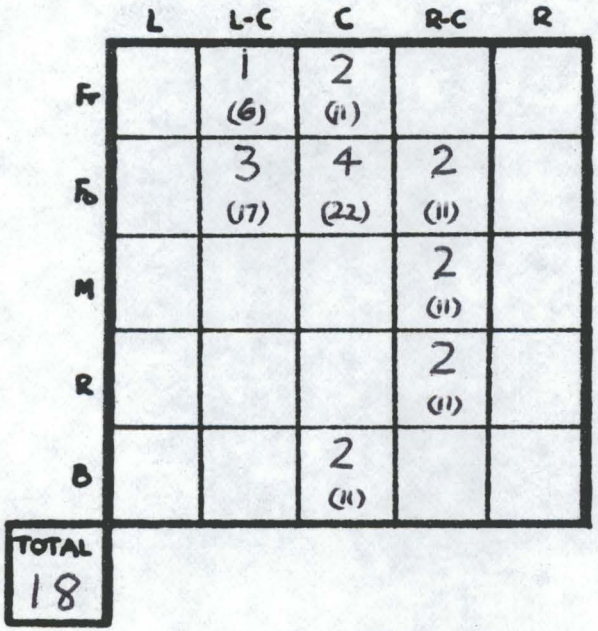
H

(Mathematics)

	L	L-C	C	R-C	R
Fr.		3 (-)	5 (1)	60 (9)	120 (19)
Fa.	15 (2)			5 (1)	28 (4)
M	44 (7)	10 (2)	33 (5)	43 (7)	2 (-)
R	70 (11)	4 (1)	8 (1)	1 (-)	126 (20)
B	14 (2)				41 (6)

TOTAL 632

Table 2.



TEACHER

I

(Social Studies)

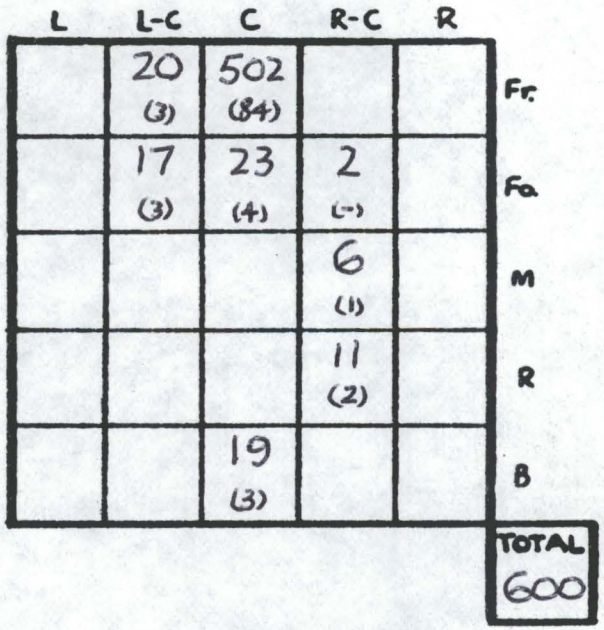


Table 2.

	L	L-C	C	R-C	R
Fr			3 (3)	5 (5)	
Fo		9 (8)		5 (5)	
M	9 (8)		18 (17)		
R	12 (11)		15 (14)		
B	6 (6)	10 (9)	10 (9)	6 (6)	

TOTAL 108

TEACHER

I

(Mathematics)

	L	L-C	C	R-C	R
Fr.			24 (4)	15 (2)	
Fo.		11 (2)		13 (2)	
M	16 (3)		197 (32)		
R	27 (4)		160 (26)		
B	18 (3)	22 (4)	84 (14)	28 (5)	

TOTAL 615

Table 2.

determined by the location of the group that is the focus of teacher interactions, and represents the areas between long desk grouping arrangements. Similarly, Teacher H's movement and location-duration patterns seem to be determined by class group locations. In Social Studies, the pupils were all brought to the only large free space area in the room (obviously set aside for the purpose) and sat at the teacher's feet. Location throughout the entire duration of this lesson is determined by the nature of the lesson and the group structure being used. In the Mathematics lesson for the same teacher, however, there is much more movement, but again the patterns of movement and location are determined by the lesson and the group structure, and in addition by the group activities. Each group was working on task card activities using apparatus, and discussing findings under leader control. The teacher's movement and duration of stay at locations, reflect the supervisory nature of her role during the lesson. The location patterns for Teacher I are very similar to those of Teacher H for the same reasons. The class was at the same level, and in Mathematics was engaged in similar activities. In Social Studies, instead of a middle-right fixed location, a centre-front location was preferred because of the available large free space to seat all the pupils close to the teacher. Towards the end of the lesson, pupils went off to group locations to engage in free choice (Art and Craft type) activities related to the topic explored during time with the teacher.

Figure 13 shows the movement flow patterns of four

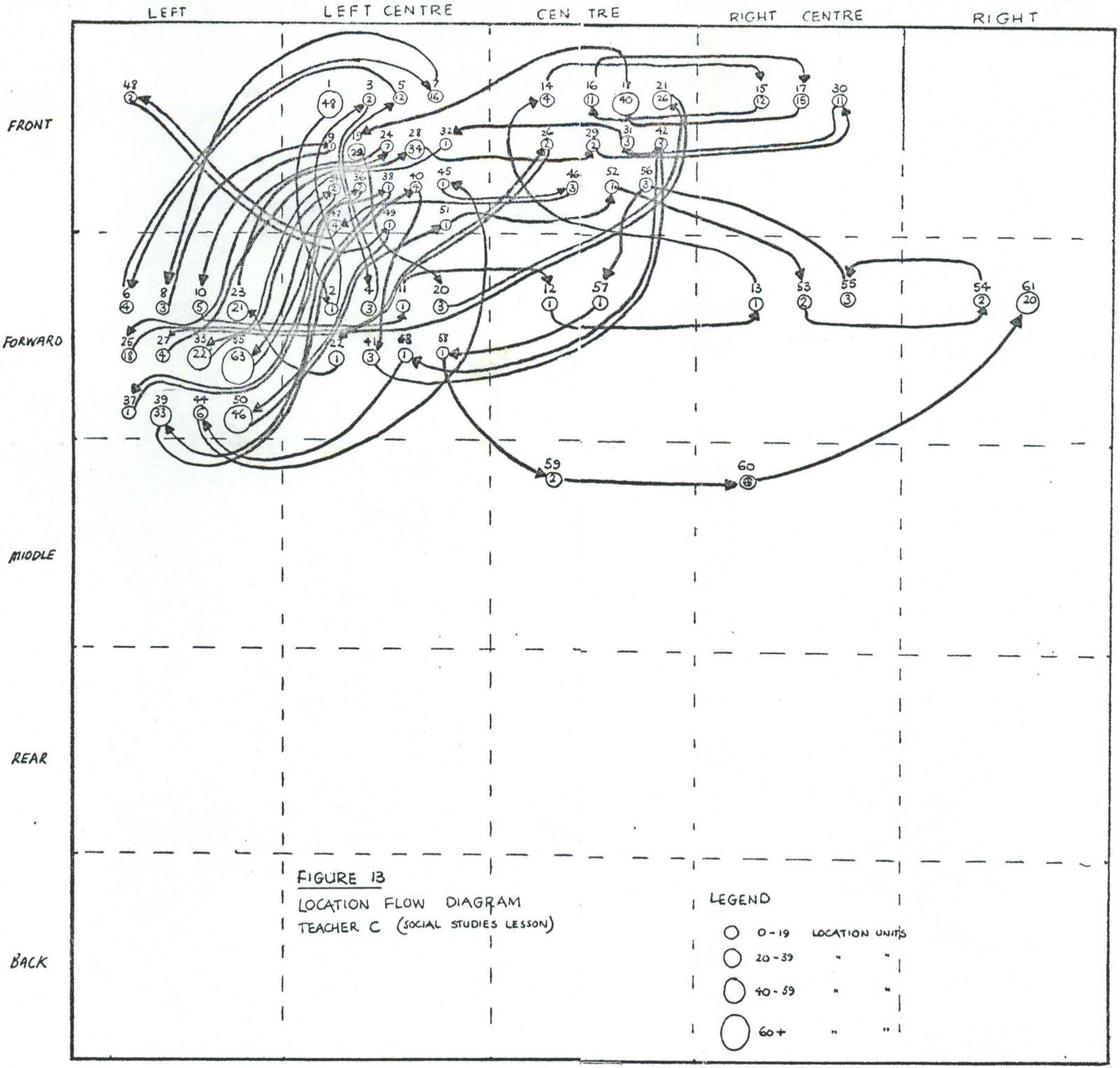
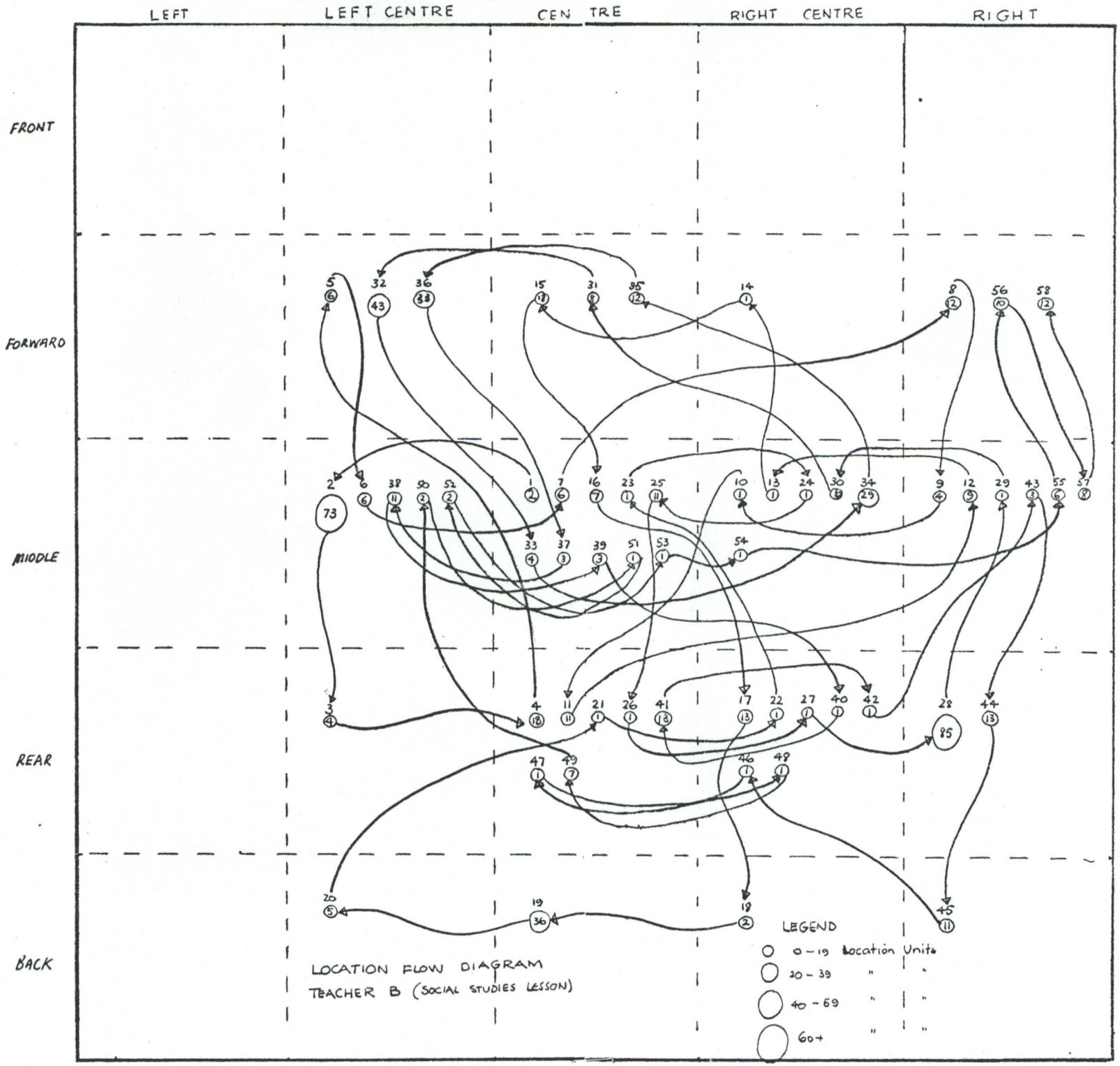


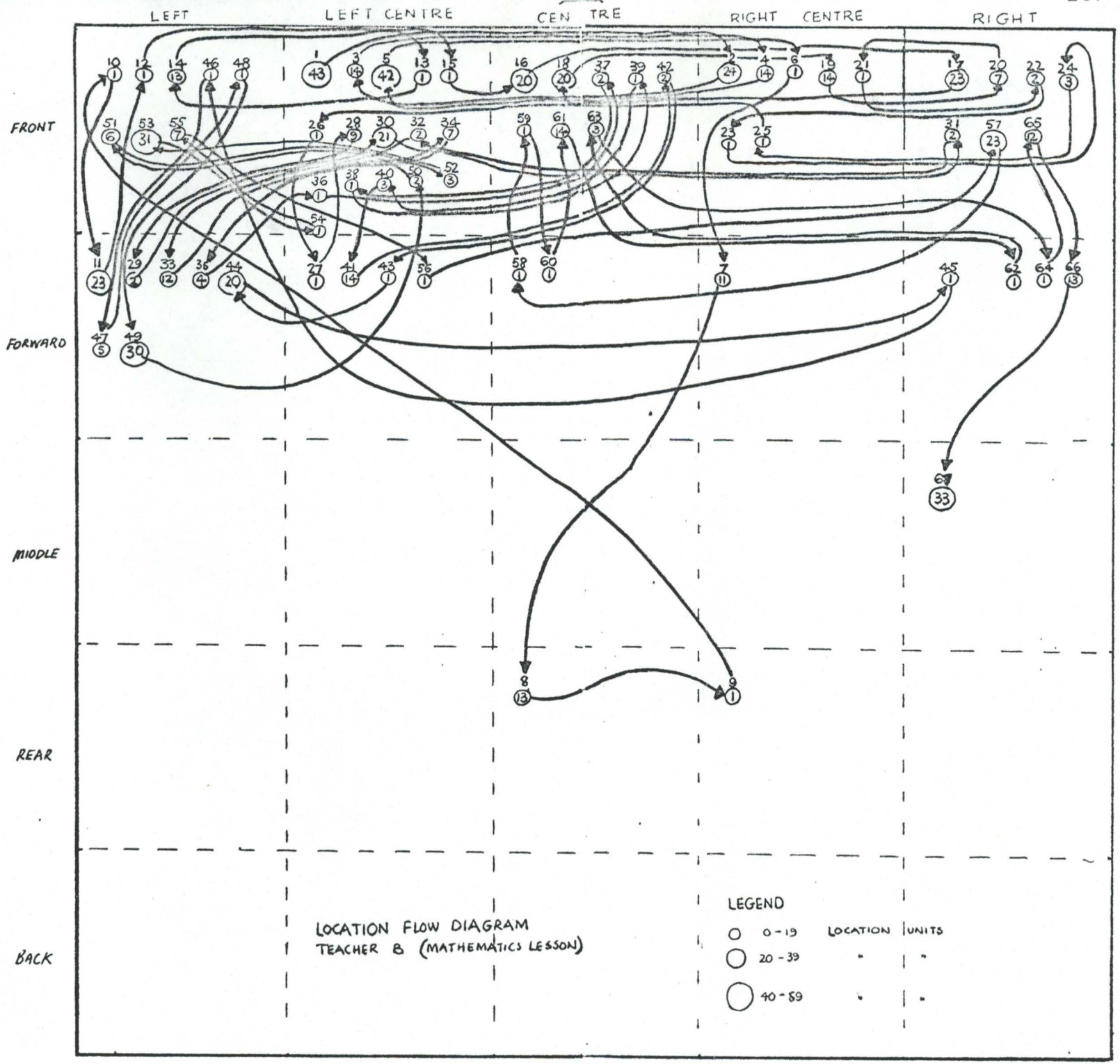
FIGURE 13

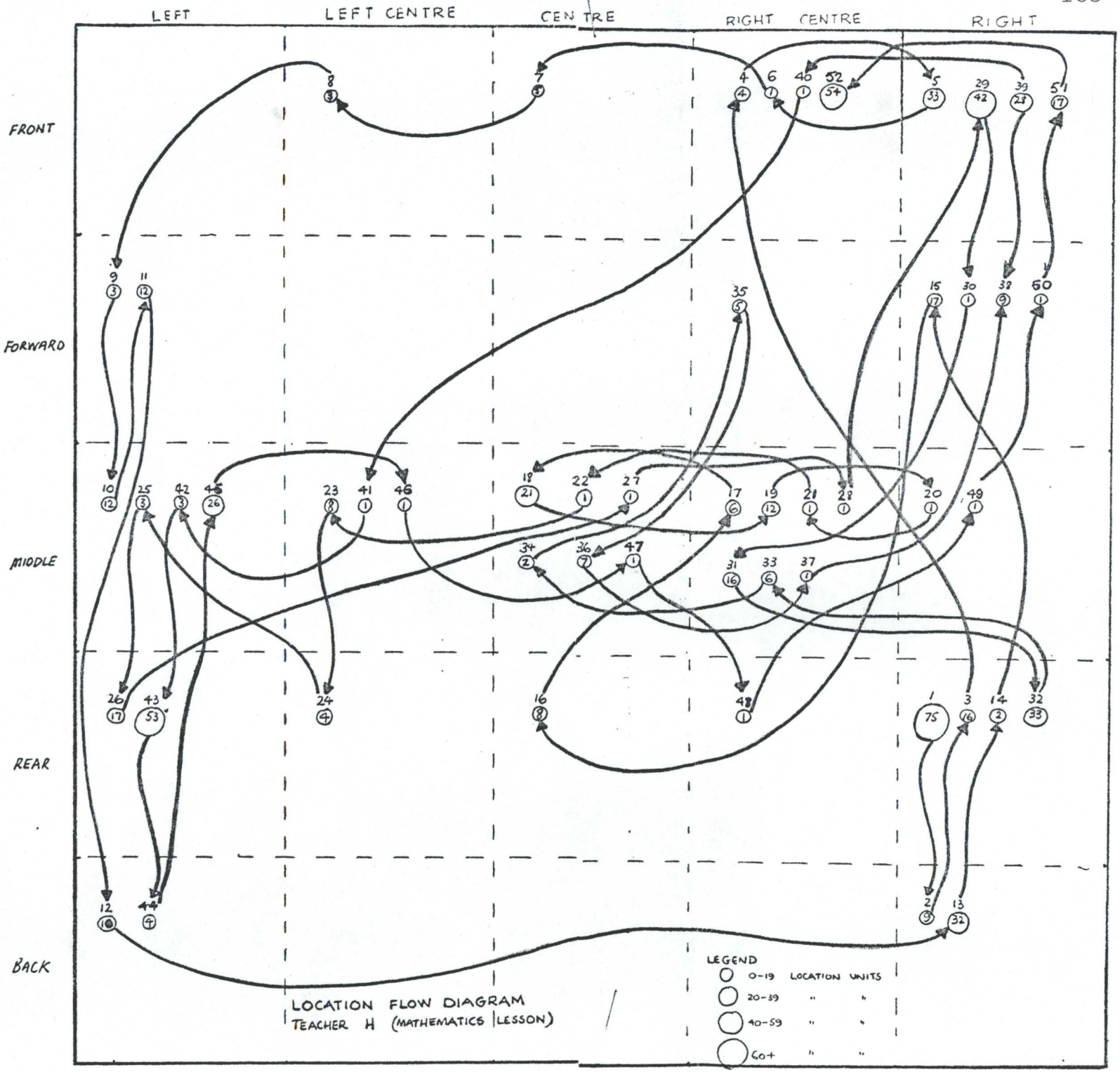
LOCATION FLOW DIAGRAM

TEACHER C (SOCIAL STUDIES LESSON)



LOCATION FLOW DIAGRAM
TEACHER B (SOCIAL STUDIES LESSON)


LEFT
LEFT CENTRE
CENTRE
RIGHT CENTRE
RIGHT
FRONT
FORWARD
MIDDLE
REAR
BACK
LOCATION FLOW DIAGRAM
TEACHER B (MATHEMATICS LESSON)
LEGEND
0 - 19 LOCATION UNITS
20 - 39 " "
40 - 59 " "



LOCATION FLOW DIAGRAM
TEACHER H (MATHEMATICS LESSON)

lessons for selected teachers to demonstrate the way a teacher can be tracked during a lesson, both in movement and duration of location. Both Mathematics and a Social Studies lessons have been included to highlight differences. Numbers inside the circles indicate the number of duration units during that location and the numbers inset in the flow lines indicate the sequence of moves made by the teacher. The first flow diagram shows movement patterns for a front oriented social studies teacher, the second, a middle oriented Social Studies teacher and the third a front oriented Mathematics teacher, and the last represents the movement patterns of a middle of the room oriented Mathematics lesson.

The flowgram of Teacher C's Social Studies lesson while front oriented shows a regular pattern of movement from the forward-left area to the front left-centre area. Teacher B's Social Studies lesson flow diagram indicates a pattern of movement backward and forward across the middle column cells and the rear centre and rear right centre with the occasional "grand tour" (Adams, 1965). Teacher B's Mathematics lesson, while having a pattern of forward left to front left centre like Teacher C's Social Studies lesson has a much greater volume of movement across all the front cells. The flow diagram for Teacher H's Mathematics lesson like Teacher B's Social Studies diagram in middle row movement also shows a pattern of moves up and down both the left area cells and the right area cells.

Table 3 shows the mean number of moves and duration

	L	L-C	C	R-C	R
Fr	0·3 (1)	2·5 (5)	4·1 (8)	2·4 (5)	0·8 (2)
Fo	3·3 (7)	3·5 (7)	1·8 (4)	2·9 (6)	2·3 (5)
M	2·6 (5)	3·3 (7)	1·5 (3)	3·0 (6)	1·4 (3)
R	1·5 (3)	1·8 (4)	1·1 (2)	2·8 (6)	1·0 (2)
B	1·1 (2)	2·3 (5)	1·0 (2)	0·8 (2)	0·1 (-)

TOTAL 49·2

Social Studies

LOCATION MOVES

L	L-C	C	R-C	R	
3·2 (4)	9·3 (11)	14·2 (19)	10·0 (12)	4·2 (5)	Fr.
4·9 (6)	5·7 (7)	1·3 (2)	3·6 (4)	1·4 (2)	Fo.
2·9 (3)	3·4 (4)	2·9 (3)	2·9 (3)	0·3 (-)	M
2·8 (3)	2·2 (2)	2·1 (2)	1·2 (2)	0·6 (1)	R
1·7 (2)	2·1 (2)	1·2 (2)	0·7 (1)	0·2 (-)	B

Mathematics

TOTAL 85·0

Table 3. Mean Number of Location Moves and Duration Units for Social Studies and Mathematics Lessons and Combined Lessons.

	L	L-C	C	R-C	R
Fr	0·2 (-)	10·1 (5)	27·9 (15)	12·4 (7)	14·7 (8)
Fo	13·4 (7)	8·7 (5)	3·6 (2)	4·4 (2)	6·5 (3)
M	5·8 (3)	7·5 (4)	3·5 (2)	6·8 (3)	25·7 (13)
R	11·7 (6)	2·9 (1)	2·8 (1)	5·1 (3)	5·9 (3)
B	2·2 (1)	3·6 (2)	3·2 (2)	1·1 (1)	0·5 (-)

TOTAL 190·2

Social Studies

LOCATION DURATION UNITS

L	L-C	C	R-C	R	
5·9 (3)	25·1 (11)	35·9 (16)	31·0 (14)	17·9 (8)	Fr.
12·9 (6)	6·8 (3)	2·8 (1)	8·8 (4)	5·5 (3)	Fo.
3·4 (2)	4·6 (2)	9·7 (5)	3·9 (2)	2·0 (1)	M
4·0 (2)	2·0 (1)	7·5 (4)	1·8 (1)	5·5 (3)	R
3·6 (2)	3·2 (1)	3·4 (2)	1·1 (1)	1·6 (1)	B

Mathematics

TOTAL 219·9

Table 3. (Contd)

	L	L-C	C	R-C	R
Fr	1·8 (3)	5·9 (10)	9·2 (16)	6·2 (11)	2·5 (4)
Fo	4·1 (7)	4·6 (8)	1·6 (3)	3·3 (6)	1·9 (3)
M	2·8 (5)	3·4 (6)	2·2 (4)	3·0 (5)	0·9 (2)
R	2·2 (4)	2·0 (3)	1·6 (3)	2·0 (3)	0·8 (1)
B	1·4 (2)	2·2 (4)	1·1 (2)	0·8 (1)	0·2 (-)

TOTAL 57·7

Location Moves

ALL LESSONS

	L	L-C	C	R-C	R
Fr.	3·1 (2)	17·6 (9)	31·9 (16)	21·7 (11)	16·3 (8)
Fo.	13·2 (7)	7·6 (4)	3·2 (2)	6·6 (3)	6·0 (3)
M	4·6 (2)	6·1 (3)	6·6 (3)	5·4 (3)	13·9 (7)
R	6·9 (3)	2·5 (1)	5·2 (3)	3·5 (2)	5·7 (3)
B	2·9 (1)	3·4 (2)	3·3 (2)	1·1 (1)	1·1 (1)

Location Duration Units

TOTAL 199.4

Table 3 (Contd.)

units for separate teachers and for all lessons. While a slight front orientation is evident, all areas of the classroom are used by teachers. The front movement orientation for Social Studies lessons is less marked (only 21%) than for Mathematics lessons (51%) while duration in Social Studies lesson is 35% compared with 52% for Mathematics. For all lessons front location accounts for 44% of moves and 46% of duration.

Means and standard deviation data for individual teachers, separate lessons and all lessons are presented in Table 4 to indicate the variability of movement and duration in teacher location for the sample observed. Numbers in brackets in the column showing No. of Location Moves represent the number of cell locations used by the teacher for that lesson.

Data from both lessons for each teacher were correlated, for both the number of location moves and location durations, and correlation coefficients for teacher movement are shown in Table 5. Five are significant at greater than the .01 level, only one teacher of the seven for whom data are shown, Teacher C, indicates a consistent pattern of location and location movement. It seems from these data that teachers differ in patterns of location for different types of lessons and at different levels of the school, but more data are needed to confirm this tendency.

TABLE 4: Mean and Standard Deviation for Teacher Location Moves and Teacher Location Duration Units for Each Lesson.

TEACHER	SUBJECT	NUMBER OF LOCATION MOVES	MEAN AND STANDARD DEVIATION		NUMBER OF DURATION UNITS	MEAN AND STANDARD DEVIATION	
A	SOCIAL STUDIES	61 (19)	$\bar{x}$	3·21	572	$\bar{x}$	30·11
			S.D.	2·04		S.D.	68·59
	MATHEMATICS	182 (20)	$\bar{x}$	9·10	599	$\bar{x}$	29·95
			S.D.	8·41		S.D.	39·25
B	SOCIAL STUDIES	58 (16)	$\bar{x}$	3·63	586	$\bar{x}$	36·63
			S.D.	2·76		S.D.	30·48
	MATHEMATICS	67 (13)	$\bar{x}$	5·15	592	$\bar{x}$	45·54
			S.D.	4·17		S.D.	42·06
C	SOCIAL STUDIES	61 (11)	$\bar{x}$	5·55	584	$\bar{x}$	54·00
			S.D.	5·29		S.D.	73·52
	MATHEMATICS	57 (9)	$\bar{x}$	6·33	576	$\bar{x}$	64·00
			S.D.	4·64		S.D.	55·94
D	SOCIAL STUDIES	35 (17)	$\bar{x}$	2·06	584	$\bar{x}$	34·35
			S.D.	1·21		S.D.	55·25
	MATHEMATICS	58 (14)	$\bar{x}$	4·14	591	$\bar{x}$	42·21
			S.D.	4·03		S.D.	48·19

TABLE 4: (cont'd)

TEACHER	SUBJECT	NUMBER OF LOCATION MOVES	MEAN AND STANDARD DEVIATION		NUMBER OF DURATION UNITS	MEAN AND STANDARD DEVIATION.	
E	SOCIAL STUDIES	N/A	$\bar{x}$	3·85		$\bar{x}$	
			S.D.			S.D.	
	MATHEMATICS	50 (13)	$\bar{x}$	3·85	456	$\bar{x}$	35·08
			S.D.	4·90		S.D.	59·79
F	SOCIAL STUDIES	48 (18)	$\bar{x}$	2·67	621	$\bar{x}$	34·50
			S.D.	1·29		S.D.	54·07
	MATHEMATICS	64 (13)	$\bar{x}$	4·92	674	$\bar{x}$	51·85
			S.D.	3·56		S.D.	65·07
G	SOCIAL STUDIES	115 (15)	$\bar{x}$	7·67	629	$\bar{x}$	41·93
			S.D.	3·63		S.D.	23·20
	MATHEMATICS	131 (14)	$\bar{x}$	9·36	619	$\bar{x}$	44·21
			S.D.	8·52		S.D.	50·59
H	SOCIAL STUDIES	3 (2)	$\bar{x}$	1·50	596	$\bar{x}$	298·00
			S.D.	0·50		S.D.	286·00
	MATHEMATICS	52 (19)	$\bar{x}$	2·68	632	$\bar{x}$	33·26
			S.D.	1·78		S.D.	36·82
I	SOCIAL STUDIES	18 (8)	$\bar{x}$	2·25	600	$\bar{x}$	75·00
			S.D.	0·83		S.D.	161·53
	MATHEMATICS	108 (12)	$\bar{x}$	9·00	615	$\bar{x}$	51·25
			S.D	4·22		S.D	60·29
ALL	ALL		$\bar{x}$	68·71		$\bar{x}$	595·65
			S.D.	42·00		S.D.	42·71

TABLE 5: Correlation Co-efficients for Teacher Location Moves and Teacher Location Duration Units for the Two Lessons of Each Teacher.

TEACHER	NUMBER OF LOCATION MOVES	LEVEL OF SIGNIFICANCE	NUMBER OF DURATION UNITS	LEVEL OF SIGNIFICANCE
A	$r_{ss.m} = .55$	$p < .01$	$r_{ss.m} = .10$	N.S.
B	$r_{ss.m} = .38$	N.S.	$r_{ss.m} = .36$	N.S.
C	$r_{ss.m} = .84$	$p < .01$	$r_{ss.m} = .62$	$p < .01$
D	$r_{ss.m} = .63$	$p < .01$	$r_{ss.m} = .04$	N.S.
F	$r_{ss.m} = .33$	N.S.	$r_{ss.m} = .71$	$p < .01$
G	$r_{ss.m} = .26$	N.S.	$r_{ss.m} = .16$	N.S.
I	$r_{ss.m} = .10$	N.S.	$r_{ss.m} = .01$	N.S.
		(df = 23)		(df = 23)

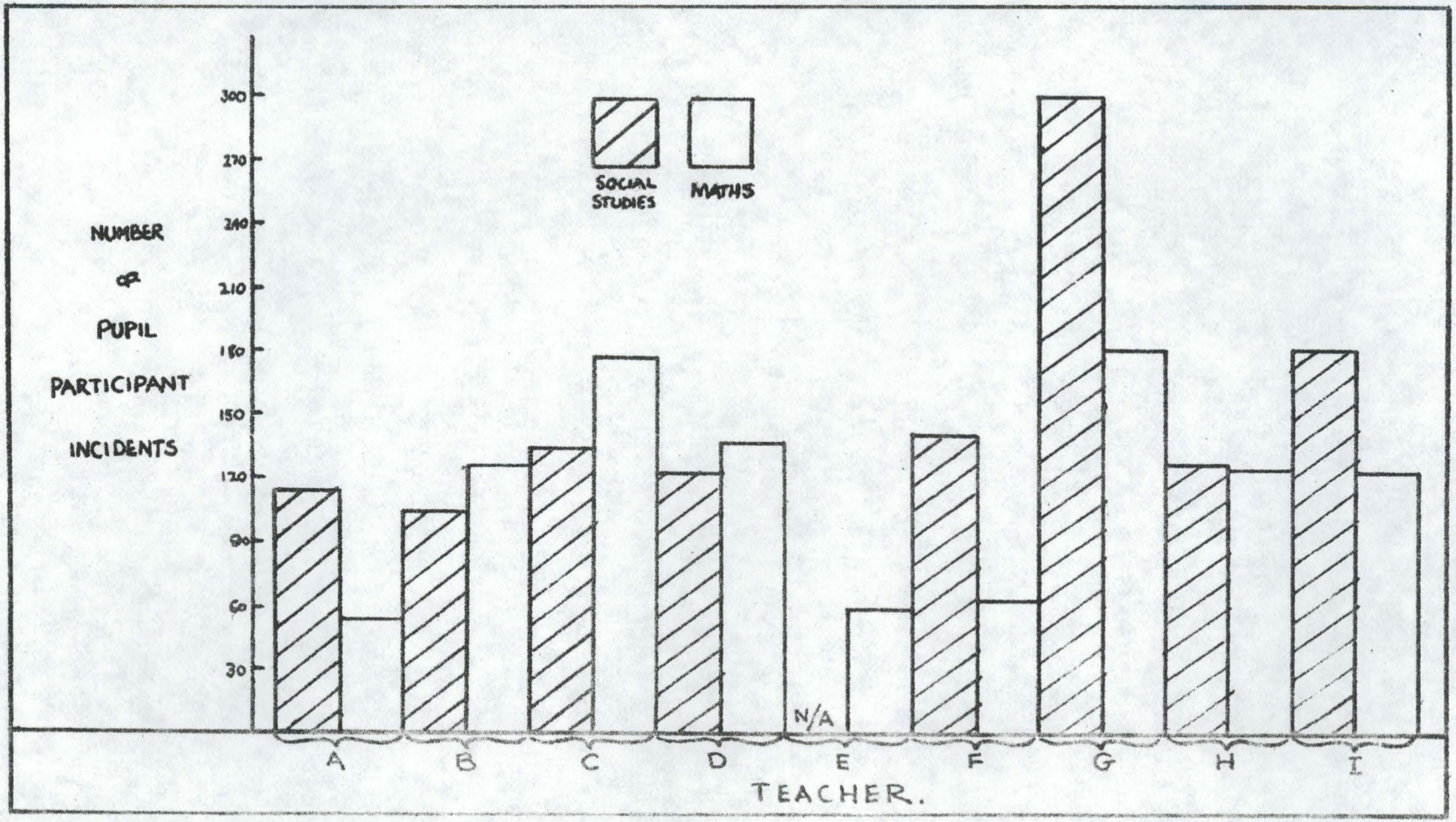
(b) Participant Location.

As with the data reported for teacher location, no dominant location pattern emerged for participant location, from the observations made in this sample. Pupil responses to the teacher, and their initiation of talk to the teacher appeared to be less related to seating location than to the location of the teacher. Unlike Adams' (1965) reported findings, where the action centre for pupils was the front of the classroom location, and the centre of the front, the pattern of participant location in the classrooms studied was varied.

In three of the Mathematics lessons the level of pupil verbal participation was considerably below the mean for all lessons, being less than half. In all other lessons there was a high level of pupil verbal behaviour. The range was from 54 - 182 for Mathematics lessons, and 104 - 302 in Social Studies lessons. For five teachers (A, F, G, H, and I) more pupil participant verbal behaviour occurred during Social Studies lessons, while in the lessons of Teachers B, C, and D pupils were involved in verbal behaviour more during the Mathematics lessons. Figure 14 shows the pupil participant verbal interaction unit incidences for all lessons observed.

The pupils of Teacher G (the most mobile teacher) were more frequently engaged in verbal interactions with the teacher than any other class. The pupils of Teacher A, who made more moves in any single lesson, were the least engaged. Teachers A, E, and F had very low pupil participation levels for verbal interaction in Mathematics lessons, but this was probably due to the long periods pupils were engaged in written

FIG. 14: Number of Units of Pupil Participant Verbal Interaction for Each Lesson.



textbook and blackboard activities. Table 6 sets out data for each teacher showing the locational patterns for pupil verbal participation for each lesson.

Participant location in both Teacher A's lessons was well spread but there was a tendency for those on the left side of the room to be more involved than those on the right, but the highest single area of participant location in the Mathematics lesson is the rear-right locational area, and pupils in the middle and rear account for most of the participant verbal interaction in both lessons. In Teacher B's Social Studies lesson, most of the action is across the rear of the room with interaction increasing as pupils are located further from the centre. In Mathematics for the same teacher, however, the locational pattern shows more spread and the main involvement centred from the middle area forward to the front.

The pattern of participant location in Teacher C's lessons reflects the front orientation of this teacher. Participation is well spread in Social Studies but most pupil involvement is in the forward area. Two grid locations in the back row, however, receive a considerable amount of the action. This can be accounted for partly at least to the presence in these two locations of the two pupils with the highest I.Q's in the class, and the correlation between I.Q. and level of pupil response in this lesson for Teacher C. In Mathematics, this teacher had a small remedial group seated in the three groups of desks located in the middle and forward area of the room, but even in this lesson the front-centre orientation Adams (1965) found for American teachers is more evident than in any other lesson in this study.

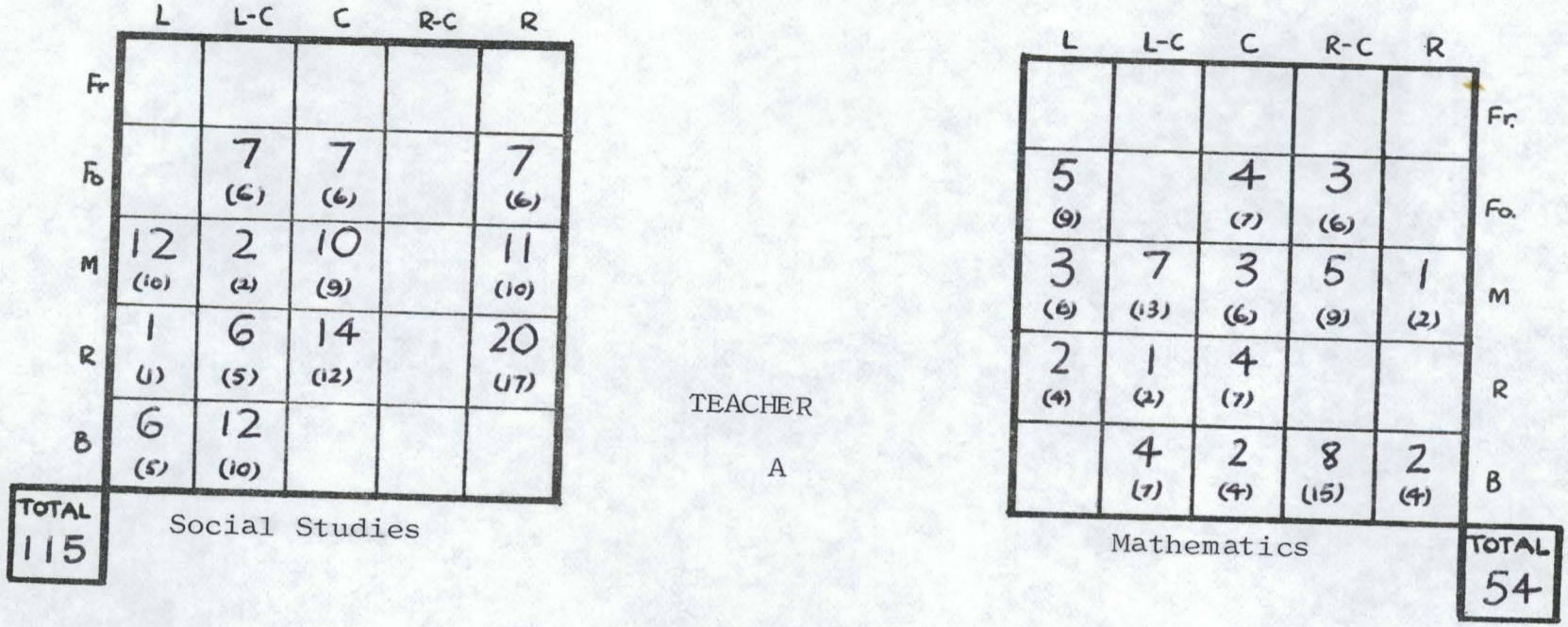
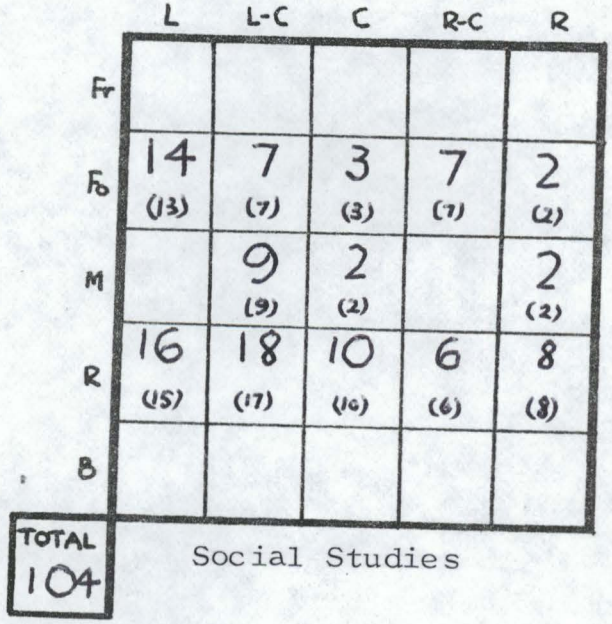
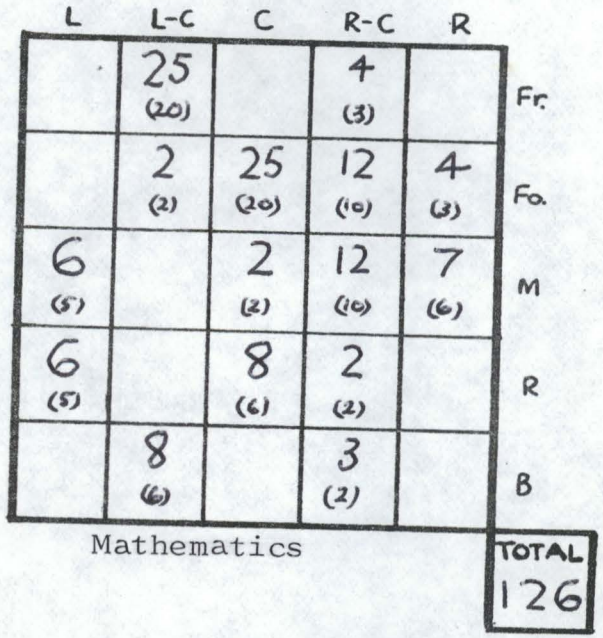


Table 6. Participant Location : No. of Verbal Interaction Units by Location



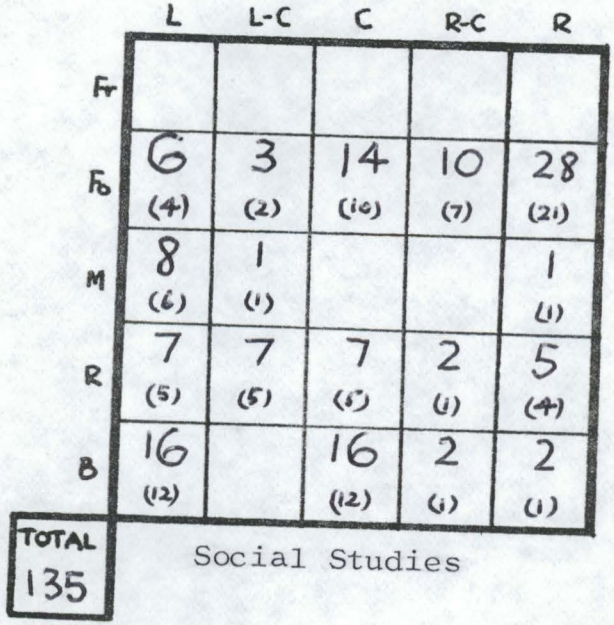
Social Studies

TEACHER B



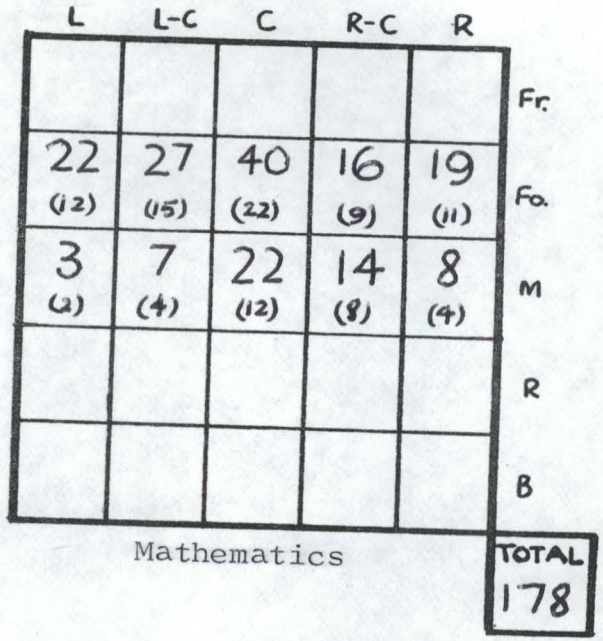
Mathematics

Table.6. (Contd.)



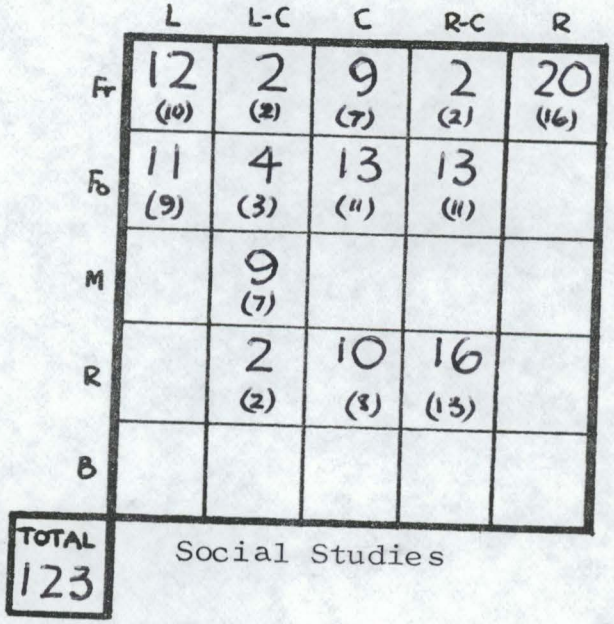
Social Studies

TEACHER C



Mathematics

Table 6. (Contd.)



TEACHER D

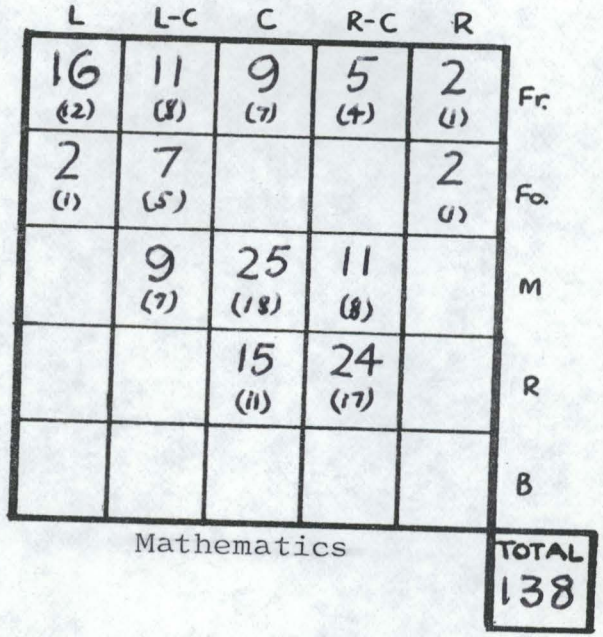
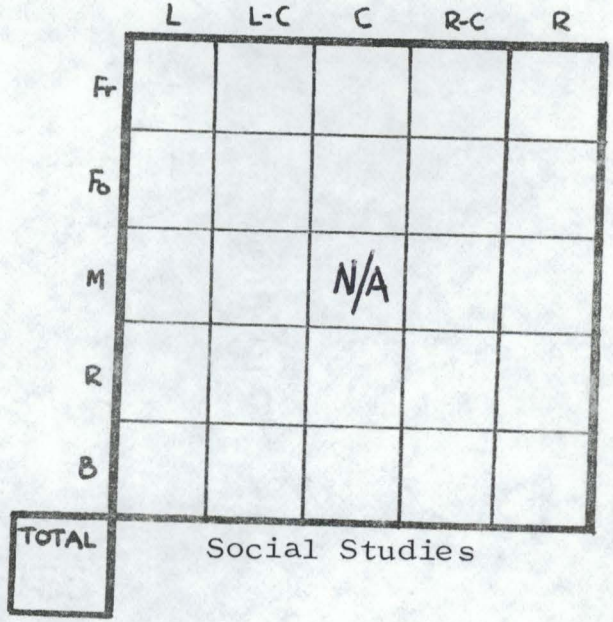


Table 6. (Contd.)



Social Studies

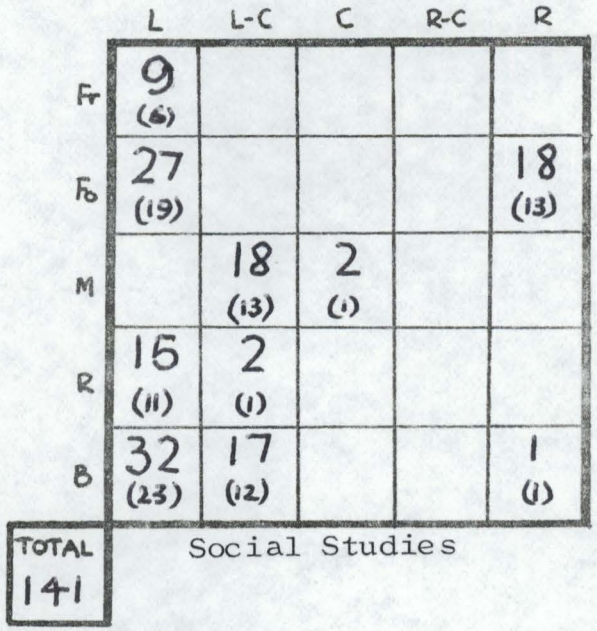
TEACHER E

L	L-C	C	R-C	R	
8 (14)			1 (2)		Fr.
5 (8)	3 (5)		3 (5)		Fo.
	1 (2)	2 (3)		3 (5)	M
8 (14)	14 (24)	5 (8)	1 (2)		R
4 (7)		1 (2)			B

Mathematics

TOTAL 59

Table 6 (Contd.)



TEACHER F

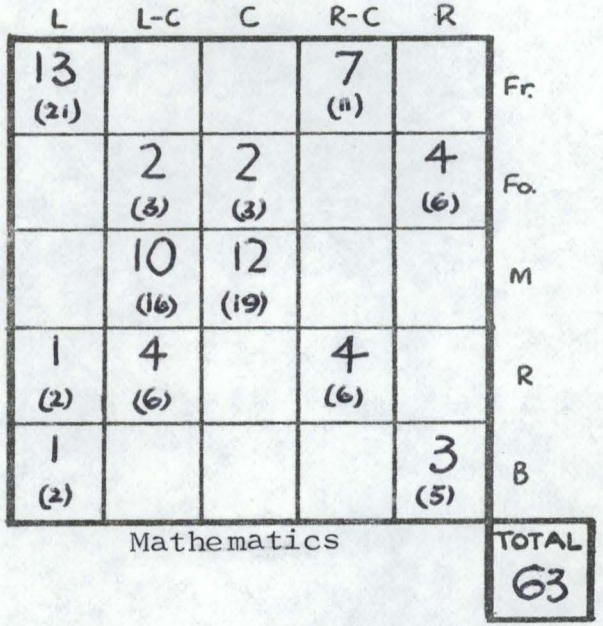
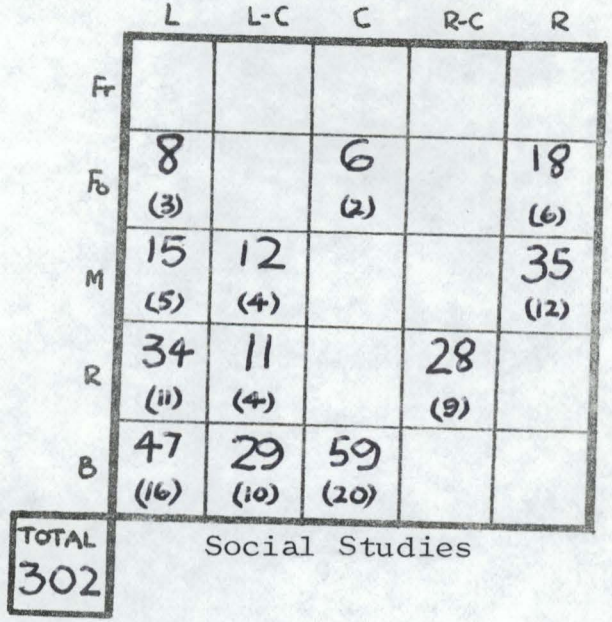
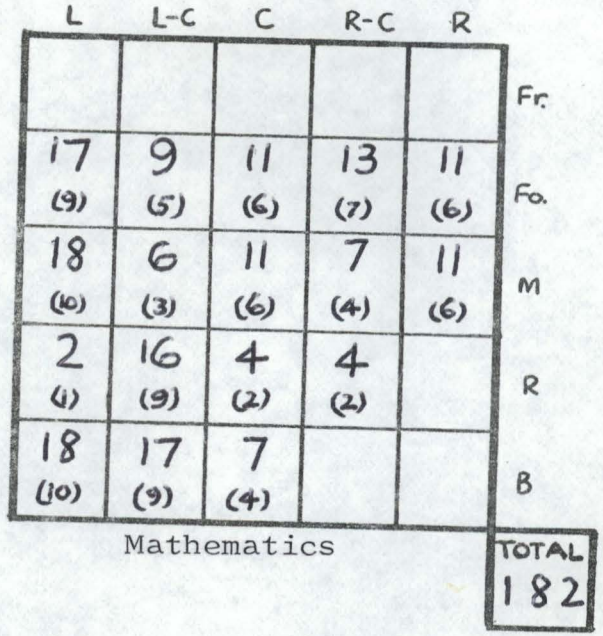


Table 6 (Contd.)



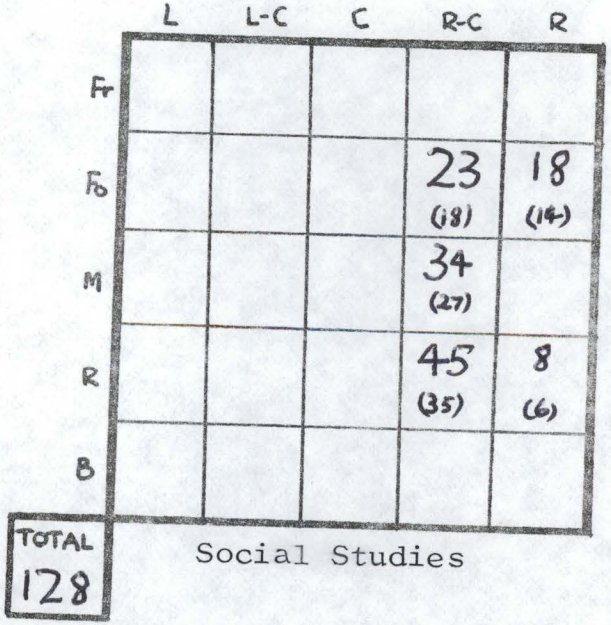
Social Studies

TEACHER G



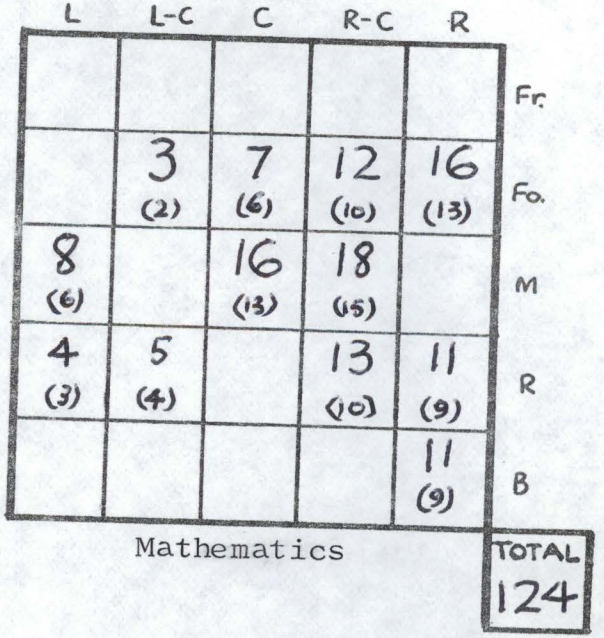
Mathematics

Table 6 (Contd.)



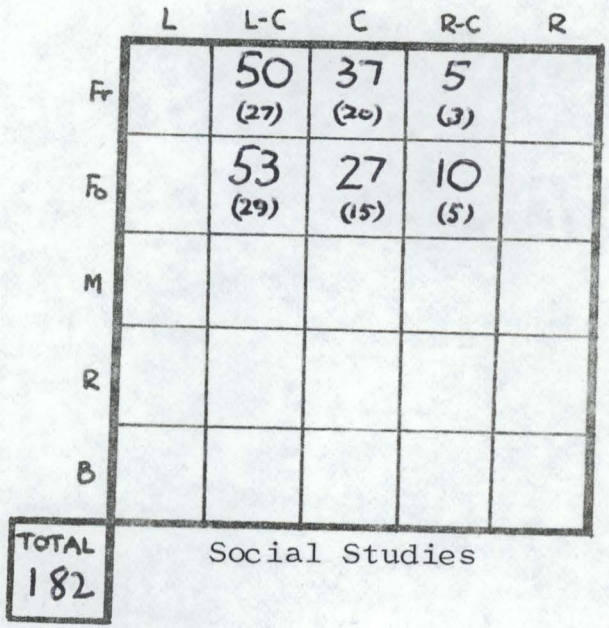
Social Studies

TEACHER H



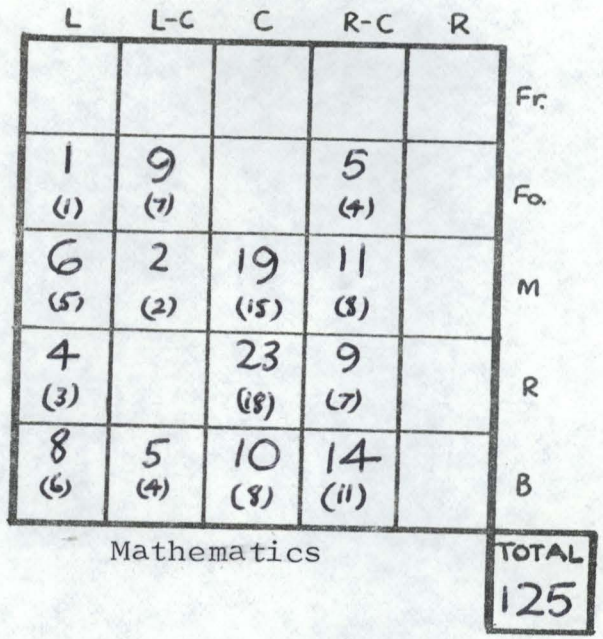
Mathematics

Table 6 (Contd.)



Social Studies

TEACHER I



Mathematics

Table 6 (Contd.)

Teacher D's lessons tend to produce a front oriented focus of participant verbal behaviour but in both lessons there is a persistent centre of activity around the middle-rear centre and right centre which is again related to pupil I.Q.

In the Mathematics lesson observed in Teacher E's classroom the centre of participant location was the rear of the room, where the children with the higher I.Q's were located. Teacher F data for participant location indicates higher levels of involvement in the left and left-centre areas for both lessons, despite the front locational preference of the teacher. For Teacher G there is a similar left and left-centre locus, but this is probably more related to the teachers involvement with groups located in these areas during both lessons (the Form I and II pupils in the top half of a two-Teacher country school). In the Mathematics lesson for this teacher pupil verbal participation is evenly spread over the whole classroom where pupils were located.

Patterns of participant response for Teachers H and I are similar because of the similarity of the lessons observed. In Social Studies lessons, because of the pupils location in each case at the teacher's feet no distinct pattern can be determined. In both lessons the level of participation was high. In the Mathematics lessons, Teacher H's pupils engaged in interaction with the teacher tended to be on the right hand side of the classroom, while those most in interaction with Teacher I were located in the centre and right centre from the middle to the back, but teacher movement throughout the lesson generated participant response with pupils located

on the left hand side as well.

Table 7 gives details of the mean number and standard deviations of verbal interaction units for each teacher and each lesson, and Table 8 shows the means for each location area for the two types of lesson for all classrooms. In Social Studies lessons the main centres of action are the rear and back areas while in Mathematics lessons the main participant location areas were forward and middle. In Social Studies the left column cells account for 32% of the participant verbal interaction units, but it is the centre column cells (27% in Mathematics) where most participants are located.

Correlation coefficients for each teacher for Social Studies and Mathematics lessons shown in Table 9 indicate that none of the correlations for participant verbal interaction patterns by location reach an acceptable level of significance. Patterns of pupil response tend to be different for each lesson taken by a teacher in this sample. This tends to confirm the data for both kinds of lesson shown in Table 8 where the locus of participation for pupils tends to be markedly different.

(c) Group Structure

Results of analysis of the responses to the three questions asked can be summarised as follows:

QUESTION 1 What is your reason for arranging your pupils in small group ?

RESPONSES To help pupils develop socially, to work co-operatively. (ALL teachers)

to enable small group activities of

TABLE 7: Mean Number of Units of Pupil Participant Verbal Interaction for the Number of Pupils Participating, and for the Whole Class, and Mean and Standard Deviation for Each Lesson.

TEACHER	SUBJECT	NUMBER OF PUPIL PARTICIPANT VERBAL INTERACTION UNITS	MEAN AND STANDARD DEVIATION		NUMBER OF PUPILS RESPONDING	NUMBER OF PUPILS IN CLASS	MEAN FOR WHOLE CLASS
A	SOCIAL STUDIES	115	$\bar{x}$	8·85	22	36	3·19
			S.D.	4·90			
	MATHEMATICS	54	$\bar{x}$	3·60	22	36	1·50
			S.D.	1·96			
B	SOCIAL STUDIES	104	$\bar{x}$	8.00	16	37	2·81
			S.D.	5·14			
	MATHEMATICS	126	$\bar{x}$	8·40	32	37	3·40
			S.D.	7·22			
C	SOCIAL STUDIES	135	$\bar{x}$	7·94	32	36	3·75
			S.D.	6·92			
	MATHEMATICS	178	$\bar{x}$	17·80	18	18	8·89
			S.D.	10·31			
D	SOCIAL STUDIES	123	$\bar{x}$	9.46	21	39	3·15
			S.D.	5·44			
	MATHEMATICS	138	$\bar{x}$	10·62	27	39	3·54
			S.D	7·38			

TABLE 7: (cont'd)

E	SOCIAL STUDIES	N/A.		-	-	-	-
	MATHEMATICS	59	x	4·21	24	41	1·44
			S.D.	3·55			
F	SOCIAL STUDIES	141	x	14·10	26	39	3·62
			S.D	10·08			
	MATHEMATICS	63	x	5·25	16	39	1·62
			S.D	4·06			
G	SOCIAL STUDIES	302	x	25·17	22	32	9.44
			S.D.	15·84			
	MATHEMATICS	182	x	10·71	22	33	5.52
			S.D.	5·07			
H	SOCIAL STUDIES	128	x	25·60	23	32	4·00
			S.D.	12·82			
	MATHEMATICS	124	x	3·88	29	32	3·88
			S.D	3·37			
I	SOCIAL STUDIES	182	x	30·33	15	31	5·87
			S.D.	19·31			
	MATHEMATICS	125	x	10·36	23	32	3·91
			S.D.	6·77			
ALL	ALL		x	134·69			
			S.D	57·80			

	L	L-C	C	R-C	R
Fr	3·5 (2)	0·2 (-)	1·5 (1)	0·3 (-)	3·3 (2)
Fo	10·8 (7)	3·5 (2)	7·2 (5)	5·0 (3)	12·2 (8)
M	5·8 (4)	8·5 (6)	2·3 (1)	0·0 (-)	8·2 (5)
R	12·2 (8)	7·7 (5)	6·8 (4)	8·7 (6)	5·5 (4)
B	16·8 (11)	9·8 (6)	12·5 (8)	0·3 (-)	0·5 (-)

TOTAL 153·1

Social Studies

	L	L-C	C	R-C	R
Fr.	5·2 (4)	4·0 (3)	1·0 (1)	1·9 (2)	0·2 (-)
Fo.	5·8 (5)	6·6 (5)	9·1 (8)	7·1 (6)	6·2 (5)
M	4·9 (4)	4·7 (4)	13·7 (11)	9·3 (8)	3·3 (3)
R	4·1 (3)	4·4 (4)	6·6 (5)	6·9 (6)	1·2 (1)
B	3·4 (3)	3·8 (3)	2·8 (2)	3·2 (3)	1·8 (1)

Mathematics

TOTAL 121·2

Table 8. Mean number of Participant Verbal Interaction Units for Social Studies Lessons, Mathematics Lessons and all Lessons.

	L	L-C	C	R-C	R
Fr	4·5 (3)	2·5 (2)	1·2 (1)	1·3 (1)	1·5 (1)
Fo	7·8 (6)	5·3 (4)	8·3 (6)	6·3 (5)	8·6 (6)
M	5·4 (4)	6·2 (5)	10·9 (8)	5·6 (4)	7·0 (5)
R	7·3 (5)	5·7 (4)	6·7 (5)	7·6 (6)	2·9 (2)
B	8·9 (6)	6·1 (4)	6·7 (5)	2·1 (2)	1·3 (1)
TOTAL					

All Lessons

L	L-C	C	R-C	R	
					Fr.
					Fo.
					M
					R
					B
					TOTAL

Table 8 (Contd.)

TABLE 9: Correlation Co-efficients for the Number of Units of Pupil Participation by Location for the Two Lessons of Each Teacher.

TEACHER	PARTICIPANT LOCATION V. I. INCIDENCE v LOCN.	LEVEL OF SIGNIFICANCE
A	$r_{ss.m} = .05$	N. S.
B	$r_{ss.m} = .14$	N. S.
C	$r_{ss.m} = .29$	N. S.
D	$r_{ss.m} = .29$	N. S.
F	$r_{ss.m} = .11$	N. S.
G	$r_{ss.m} = .38$	N. S.
I	$r_{ss.m} = .19$	N. S.
	(df = 23)	

different kinds to be used. (FOUR teachers)

To give opportunities for discussion of common problems. (FOUR teachers)

To enable teacher to give special help to pupils who need it. (SEVEN teachers)

QUESTION 2 What is the basis for the grouping arrangements in your classroom ?

RESPONSES Social in all except one classroom. In this classroom the basis was differing class levels, but within these groups, seating based on social choice.

QUESTION 3 In what kinds of lesson are small group activities used ?

RESPONSE All subjects listed, but particularly language, mathematics, science and social studies.

In all classrooms visited, desks were arranged in small groups, but only in the Junior classrooms,the country school and in one Social Studies lesson in one intermediate classroom was there evidence of both structural and functional use of this kind of grouping. In the other intermediate level lessons, while group discussions were used, a major part of the lesson time was spent with all pupils attending to the teacher for discussion as a whole group. Group structure appears to be more a convention than a practical means of facilitating learning in these classrooms. Much more observation however is needed at different class levels and for other types of lesson to establish more definitive findings about the nature and function of classroom grouping.

B. COMMUNICATION FUNCTION

(i) Verbal Interaction.

(a) Mode Categories

Data for Social Studies and Mathematics lessons set out in Table 10 show the incidence of verbal interaction mode categories, together with means and standard deviations for each category. The high standard deviations for a number of categories indicates the considerable variance teacher to teacher in the incidence of the different categories. The Social Studies lessons data for most teachers show a number of similarities. All teachers, except Teacher H, have similar patterns in the No Talk categories, with 02 - diffuse talk, occurring as the most frequent category. Group discussions had to be coded using this category, and while most of the codings for these lessons can be accounted for in this way, some massed responses are probably included in the 02 code. (It should be noted that there is not agreement in the number of participant location units reported earlier and the number of pupil talk categories discussed in this section. Some of the individual interactions coded live in collecting participant location data have been lost as diffuse talk in recording verbal interactions from the tape recordings of the lesson, but in general the discrepancy is not large for any lesson). The 02 categories recorded for Teacher I were the coding of a number of songs and musical instrument numbers that occurred during the Social Studies lesson for that teacher.

The high incidence of category 03 reported for Teacher H

TABLE 10: Incidence of Units of Verbal Interaction Mode Categories for Each Lesson, and Means and Standard Deviations.

		NO TALK				T. INDIRECT TALK				T. DIRECT TALK			PUPIL TALK		
TEACHER	LESSON	00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL
A	SOCIAL STUDIES	2	3	207	3	1	33	28	160	35	62	3	0	79	616
B	"	5	12	96	0	0	8	4	59	142	61	17	4	98	506
C	"	1	1	100	0	1	64	26	113	141	22	1	11	127	608
D	"	5	4	337	0	2	4	8	41	11	42	0	6	124	584
F	"	1	8	274	0	0	8	2	73	52	38	3	42	111	612
G	"	7	18	56	0	8	38	48	59	62	15	0	34	279	624
H	"	15	9	21	20	2	33	2	74	263	59	1	7	127	633
I	"	1	23	242	3	1	53	8	87	76	74	0	20	127	715
MEAN	MEAN	4·63	9·75	166·63	3·25	1·88	30·13	15·75	83·25	97·75	46·63	3·13	15·50	134·00	612·25
S.D.	S.D.	4·47	7·14	106·50	6·46	2·42	20·65	15·54	35·25	76·19	19·52	5·37	14·23	57·14	53·90

TABLE 10: (cont'd)

		NO TALK				T. INDIRECT TALK				T. DIRECT TALK			PUPIL TALK		
TEACHER	LESSON	00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL
A	MATHEMATICS	1	206	10	0	2	37	17	107	55	58	19	51	28	591
B	"	3	125	29	30	0	36	10	144	37	45	24	136	4	623
C	"	5	94	64	1	6	53	8	137	90	33	6	75	101	673
D	"	1	98	0	5	15	29	8	172	22	66	13	59	81	569
E	"	1	73	8	94	1	12	1	96	31	34	40	41	13	445
F	"	1	124	239	0	0	13	0	88	91	24	7	52	11	650
G	"	1	55	85	0	1	68	22	151	54	106	0	18	144	705
I	"	1	6	262	48	6	48	15	57	39	58	3	28	63	634
MEAN	MATHEMATICS	1·75	97·63	87·13	22·25	3·89	37·00	10·13	119·00	52·38	53·00	14·00	57·50	55·63	611·25
S.D.	"	1·39	54·80	98·34	31·83	4·78	18·04	7·13	35·81	24·27	24·22	12·40	33·99	47·18	74·66
MEAN	ALL	3·69	53·69	126·88	12·75	2·88	33·56	12·94	101·13	75·06	49·81	8·56	36·50	94·81	611·75
S.D.	"	4·31	58·80	109·94	24·85	3·92	19·69	12·41	39·78	60·93	22·23	10·99	33·47	65·43	65·12

was laughter during the reading of the story which was the basis for discussion. The incidence of a relatively high number of OO codings for the same teacher indicates the number of times one pupil took up another's ideas and spoke without any other behaviours intervening.

Of the Indirect Influence Teacher Talk categories, Teachers B, D, and F have very low tallies for categories 1, 2 and 3 by comparison with the other teachers observed. Teachers B and D also asked fewer questions than the other teachers and considerably fewer than the mean for all Social Studies lessons. Teachers A and C asked far more questions than other teachers. The incidence of questioning for Teacher A was greater than the total incidence of pupil talk!

Of the Direct Influence Teacher Talk categories recorded Teachers B, C, and H have very high incidences of category 5 - giving information - by comparison with the other teachers. All codings in this category for Teacher H were the result of story reading, and in the case of Teacher B more than two-thirds of these were related to organisation discussions of pupil projects that were being carried out during this lesson. The high incidence of category 7 for the same teacher also was concerned with organisation problems - a non-involved group. Teacher C has the highest incidence of information giving behaviour, but has also the highest scores for categories 2 and 3 and scores towards the indirect "style" for both I.D ratio and Revised I.D. ratio (see below).

Pupil talk shows a heavy emphasis on pupil initiated behaviour. In every case category 9 behaviour is considerably more frequent than category 8 - direct response to teacher questioning.

Mathematics lessons show a great deal more variability than Social Studies lessons in pattern of verbal interaction mode categories. Of the No Talk categories, category 01 - silence dominates in most lessons, except for Teacher I's lesson. Category 02 also varies from teacher to teacher with a range from 0 - 239 and with a high mean. Confusion - category 03 is high for the lessons of Teachers B and E.

Categories 1 - 4 show less variation than the same categories for Social Studies. The high number of category 1 behaviour for Teacher D (the highest of any lesson) was unusual but related to an incident that began as a subject-matter oriented topic but developed into an amusing bantering of one pupil who was having difficulty in demonstrating an example at the blackboard. Praise is much more consistently used in Mathematics, showing a higher incidence for all teachers and much less variation teacher to teacher than is the case in the Social Studies lessons. Data show that teachers question more in Mathematics lessons than in Social Studies and there is a tendency for these to be at a lower level than in Social Studies. Category 4 shows a high incidence for all teachers, the two lowest being Teachers E and F. In the lessons of both these teachers, less than half the lesson time was given to verbal interaction.

Categories 5, 6 and 7 also show less variation than data for these categories in the Social Studies lessons. Less information is given, but direction giving is more frequent. A notable feature of the Mathematics lessons is the high level of criticism that occurred, being almost twice as high

as in Social Studies lessons.

Pupil talk in Mathematics lessons for four teachers shows a reversal of the pattern found in Social Studies for the same teachers. In the lessons of these teachers, pupil talk is in response rather than the initiation of their own ideas, but for two of these teachers there is still a comparatively high incidence of category 9 pupil talk. In the lessons of the other four teachers, pupils operate in the Pupil initiated talk mode more frequently as was the case in the Social Studies lessons.

Figure 15 shows the verbal interaction mode patterns for each lesson, compared with the other lesson for each teacher to indicate similarities and differences.

Table 11 shows Correlation coefficients for mode categories of Verbal Interaction. Only seven are significant and only in two cases are correlations for all categories and categories 1 - 9 significant.

I.D. and Revised I.D. ratios for each teacher, for each lesson observed, are reported in Table 12, and in the majority of cases indicate a fairly direct "style" of teaching, if Flanders' interpretation of this type of statistic is followed. Direction giving has, in most lessons caused a depressing of the I.D. ratios and Revised I.D. ratios, and in view of the nature of the lessons observed it is considered doubtful if Flanders' rationale for including category 6 in the "vicious circle" can be adopted.*

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* Footnote : In his earliest category system, used in the Wellington study in 1957, Flanders had two categories, 5 and 7, for coding "Direction Giving" teacher behaviour. The two were combined as Cat. 6 in the system from 1960 on. Category 5 was also in the 1957 study as an indirect influence category and category 7 as direct influence.

FIGURE 15: Percentages of all Verbal Interaction Mode Categories for Each Lesson.

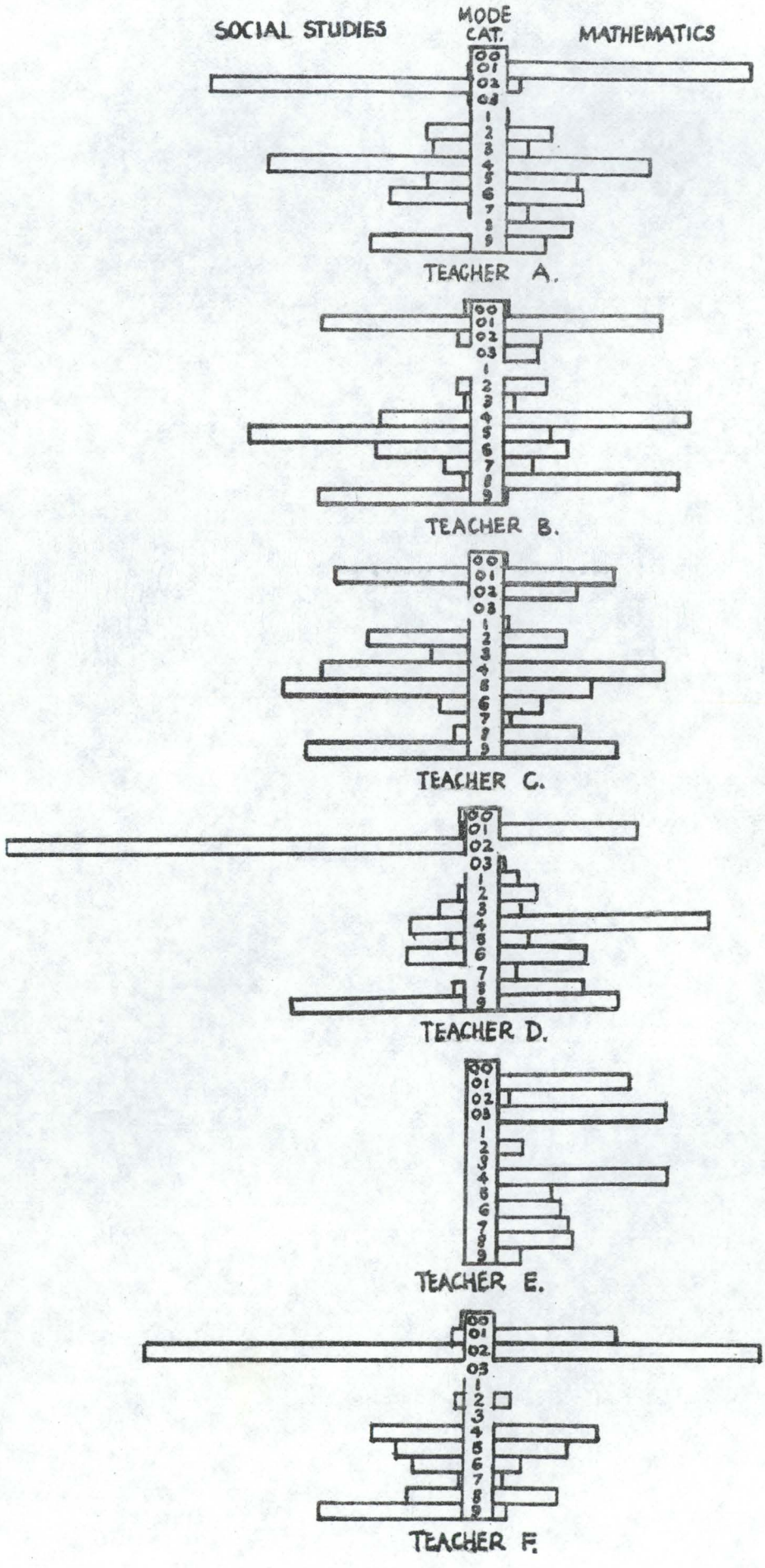


FIGURE 15: (cont'd)

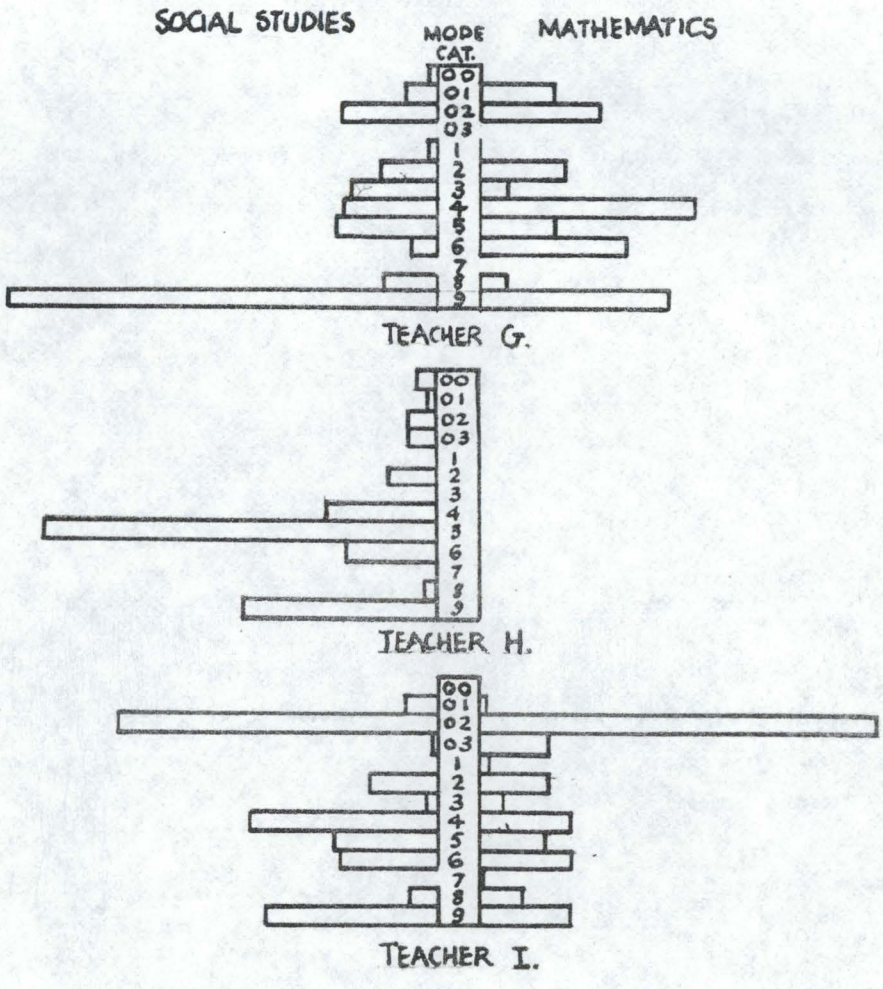


TABLE 11: Correlation Co-efficients for All Categories and Categories 1 - 9 of Verbal Interaction Mode for the Two Lessons of Each Teacher.

TEACHER	VERBAL INTERACTION (ALL CATEGORIES)	LEVEL OF SIGNIFICANCE	VERBAL INTERACTION (CATEGORIES 1-9)	LEVEL OF SIGNIFICANCE
A	$r_{ss.m} = \cdot 03$	N.S.	$r_{ss.m} = \cdot 78$	$p < \cdot 05$
B	$r_{ss.m} = \cdot 06$	N.S.	$r_{ss.m} = \cdot 04$	N.S.
C	$r_{ss.m} = \cdot 81$	$p < \cdot 01$	$r_{ss.m} = \cdot 81$	$p < \cdot 01$
D	$r_{ss.m} = \cdot 08$	N.S.	$r_{ss.m} = \cdot 50$	N.S.
F	$r_{ss.m} = \cdot 80$	$p < \cdot 01$	$r_{ss.m} = \cdot 46$	N.S.
G	$r_{ss.m} = \cdot 64$	$p < \cdot 05$	$r_{ss.m} = \cdot 60$	N.S.
I	$r_{ss.m} = \cdot 92$	$p < \cdot 01$	$r_{ss.m} = \cdot 93$	$p < \cdot 01$
	(df = 11)		(df = 7)	

TABLE 12: I/D Ratio and Revised I/D Ratio for Each Lesson, and Adjusted Revised I/D Ratio, for Each Lesson.

TEACHER	SOCIAL STUDIES		MATHEMATICS		ADJUSTED REVISED I/D RATIO	
	I/D RATIO	REV. I/D RATIO	I/D RATIO	REV. I/D RATIO	SOCIAL STUDIES	MATHEMATICS
A	·69	·49	·55	·42	·91	·68
B	·24	·13	·64	·40	·20	·56
C	·55	·81	·61	·63	·93	·73
D	·51	·25	·69	·40	·27	·76
E	N/A	-	·51	·16	-	·22
F	·47	·20	·45	·30	·37	·59
G	·67	·86	·60	·46	·94	·93
H	·26	·38	N/A	-	·55	-
I	·50	·46	·35	·53	·56	·85

It seems more likely that if direction is related to subject-matter rather than to classroom organisation and behaviour maintenance, as is the case in most data reported in this study, it should be excluded from the calculation of the Revised I.D. ratio along with the categories 4 and 5 incidents. Column 3 of Table 12 shows Adjusted Revised I.D. ratios for all lessons observed (all incidents of Category 6 mode for organisation and sociation excluded). The new ratios, it is felt, are a more objective measure of teacher influence.

(b) Content

Analyses of content and level data are show in Table 13. It can be seen that there is a heavy emphasis on subject matter in all Social Studies lessons (80%). Little non-relevant subject matter was observed in any lesson (0.5%). In the lesson for Teacher H (a story about Ali Baba) one little pupil insisted on talking about the characteristics of his barber! In the Social Studies lessons, it can be seen that organisation is at a high level for Teachers B (58%) and G (50%). In both cases, pupils were engaged in project type activities, while for Teacher D the organisation coding was all from the beginning of the lesson, when the teacher was appointing group leaders and reporters prior to the groups engaging in discussion of themes related to the topic. For all Social Studies lesson the average was 19.5%. No sociation content was recorded for any lesson.

In the Mathematics lessons, subject-matter was again, understandably, the main content handled (90.8%).

TABLE 13: Total, Percentage, Mean and Standard Deviation of Units of Verbal Interaction Content and Level Categories for Each Lesson.

		CONTENT CATEGORIES					LEVEL CATEGORIES				
TEACHER	LESSON	0	1	2	3	TOTAL	0	1	2	3	TOTAL
A	SOCIAL STUDIES	0	395	6	0	401	89	216	72	24	401
B	"	1	209	183	0	393	300	81	12	0	393
C	"	1	498	7	0	506	209	257	17	23	506
D	"	0	196	42	0	238	45	39	27	127	238
F	"	0	298	31	0	329	70	156	56	47	329
G	"	2	268	273	0	543	56	302	133	52	543
H	"	9	526	33	0	568	181	387	0	0	568
I	"	2	383	61	0	446	194	251	0	1	446
TOTAL		15	2773	636	0	3424	1144	1689	317	274	3424
PERCENTAGE OF TOTAL		0·4	80·9	18·7	0		33·4	49·3	9·3	8·0	
MEAN		1·88	346·63	79·50	0	428·00	143·00	211·13	39·63	34·00	428·00
S.D.		2·80	116·69	90·19	0	104·34	85·49	107·53	42·73	39·87	104·34

TABLE 13: (cont'd)

		CONTENT CATEGORIES					LEVEL CATEGORIES				
TEACHER	LESSON	0	1	2	3	TOTAL	0	1	2	3	TOTAL
A	MATHEMATICS	0	344	30	0	374	209	165	0	0	374
B	"	4	404	28	0	436	414	19	3	0	436
C	"	3	435	70	1	509	368	136	5	0	509
D	"	0	423	11	31	465	237	176	37	15	465
E	"	0	224	37	8	269	247	9	13	0	269
F	"	0	283	3	0	286	219	67	0	0	286
G	"	0	557	7	0	564	72	290	193	9	564
I	"	0	268	45	4	317	228	58	31	0	317
TOTAL		7	2938	231	44	3220	1994	920	282	24	3220
PERCENTAGE OF TOTAL		0·2	91·3	7·2	1·3		62·0	28·6	8·7	0·7	
MEAN		4·63	367·25	28·88	5·50	402·50	249·25	115·00	35·25	3·00	402·50
S.D.		9·71	101·90	20·88	10·00	101·23	97·34	88·95	61·08	5·41	101·23

Organisation is less than half as frequent as in Social Studies (7.4%). Non-relevant subject-matter is minimal (0.2%) and except in the case of Teacher D, already referred to above, sociation received little teacher time, but is more frequent than in Social Studies (1.6%).

The highest individual incidences of the differing categories of verbal interaction content in Social Studies lessons were 1.6% of non-relevant subject matter (Teacher H), 98.5% relevant subject matter (Teacher A), 57.9% organisation (Teacher B), with no sociation in any lesson. Comparative incidences for Mathematics lessons were, 1.0% non-relevant subject matter (Teacher B), 99% relevant subject matter (Teacher F), 14.2% organisation (Teacher I) and 6.7% sociation (Teacher D).

Individual teacher data, showing the relationship of level and content to the verbal interaction mode incidence for each lesson, are presented in Table 14.

(c) Level

Reference to Table 14, also shows the frequence of differing levels for verbal communications for all lessons. It can be seen that there is considerable variation in the cognitive level at which classroom interactions are handled. Understandably, the level in the Junior classes is at the knowledge and understanding levels entirely, but in the Form II classes (Teachers A - G) the incidence of lower level cognitive functioning is evident in most Social Studies lessons, for most interactions. It seems that the dominance of interaction focused on organisation may account for this in the lessons of Teachers B and G.

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
A SOC. ST.	MODE	No. OF INCIDENTS	2	3	207	3	1	33	28	160	35	62	3	0	79	616	
		PERCENTAGE OF TOTAL	0·3	0·5	33·4	0·5	0·2	5·4	4·6	25·8	5·8	10·1	0·5	0	12·9	100	
		PERCENTAGE CAT'S 1 - 9					0·3	8·2	7·0	39·8	8·7	15·5	0·8	0	19·7	100	%
	CONTENT	CATEGORY 0														0	0
		1					1	33	28	160	35	59	-	-	79	395	98·5
		2										3	3			6	1·5
		3														0	0
		TOTAL					1	33	28	160	35	62	3	0	79	401	%
	LEVEL	CATEGORY 0						2	4	13	2	51	3	-	14	89	22·2
		1					1	17	18	99	25	11	-	-	45	216	53·9
		2						9	5	40	3	-	-	-	15	72	17·9
		3						5	1	8	5	-	-	-	5	24	6·0
		TOTAL					1	33	28	160	35	62	3	0	79	401	

Table 14. Verbal Interaction mode, Content and Level : Incidence and Percentage for Each Lesson.

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
A MATHS	MODE	No. OF INCIDENTS	1	206	10	0	2	37	17	107	55	58	19	51	28	591	
		PERCENTAGE OF TOTAL	0·1	34·8	1·7	0	0·3	6·3	2·9	18·0	9·3	9·8	3·2	8·6	4·9	100	
		PERCENTAGE CAT'S 1 - 9					0·5	9·9	4·5	28·5	14·7	15·8	5·0	13·6	7·5	100	%
	CONTENT	CATEGORY 0															
		1					2	37	17	106	36	51	16	51	28	344	92·0
		2								1	19	7	3			30	8·0
		3															
		TOTAL					2	37	17	107	55	58	19	51	28	374	%
	LEVEL	CATEGORY 0					1	15	3	51	25	58	19	32	5	209	55·9
		1					1	22	14	56	30	-	-	19	23	165	44·1
		2															
		3															
		TOTAL					2	37	17	107	55	58	19	51	28	374	

Table 14. (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
B SOCIAL STUDIES	MODE	No. OF INCIDENTS	5	96	12	0	0	8	4	59	142	61	17	4	98	616	
		PERCENTAGE OF TOTAL	0·8	19·0	2·3	0	0	1·6	0·7	11·8	28·2	12·0	3·3	0·7	19·6		
		PERCENTAGE CAT'S 1 - 9					0	2·0	1·0	15·0	36·2	15·5	4·3	1·0	25·0		%
	CONTENT	CATEGORY 0													1	1	0·2
		1						4	4	28	49	31	1	1	47	165	41·9
		2						4		31	93	30	16	3	50	227	57·9
		3															
		TOTAL						8	4	59	142	61	17	4	98	393	%
	LEVEL	CATEGORY 0						5	4	50	90	47	17	3	84	300	76·3
		1						3		9	40	14		1	14	81	20·6
		2									12					12	3·1
		3															
		TOTAL						8	4	59	142	61	17	4	98	393	

Table 14. (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
B MATHS	MODE	No. OF INCIDENTS	3	125	29	30	0	36	10	144	37	45	24	136	4	623	
		PERCENTAGE OF TOTAL	0·5	20·1	4·7	4·8	0	5·8	1·6	23·1	5·9	7·2	3·9	21·8	0·6		
		PERCENTAGE CAT'S 1 - 9					0	8·3	2·3	33·0	8·5	10·3	5·5	31·2	0·9		%
	CONTENT	CATEGORY 0								2				2		4	1·0
		1						36	10	142	37	31	10	134	4	404	93·8
		2										14	14			28	5·2
		3															
		TOTAL						36	10	144	37	45	24	136	4	436	%
	LEVEL	CATEGORY 0						32	10	134	36	44	24	130	4	414	95·0
		1						3		9	1	1		5		19	4·0
		2						1		1				1		3	1·0
		3															
		TOTAL						36	10	144	37	45	24	136	4	436	

Table 14. (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
C SOCIAL STUDIES	MODE	No. OF INCIDENTS	1	100	1	0	1	64	26	113	141	22	1	11	127	608	
		PERCENTAGE OF TOTAL	0·2	16·4	0·2	0	0·2	10·5	4·3	18·6	23·2	3·6	0·2	1·8	20·8		
		PERCENTAGE CAT'S 1 - 9					0·2	12·5	5·1	22·4	27·9	4·3	0·2	2·2	25·2		%
	CONTENT	CATEGORY 0													1	1	0·2
		1					1	64	26	113	141	16		11	126	498	98·4
		2										6	1			7	1·4
		3															
		TOTAL					1	64	26	113	141	22	1	11	127	506	%
	LEVEL	CATEGORY 0						27	8	42	60	21	1	10	40	209	41·3
		1					1	32	16	60	75	1		1	71	257	50·9
		2						3	1	3					10	17	3·2
		3						2	1	8	6				6	23	4·6
		TOTAL					1	64	26	113	141	22	1	11	127	506	

Table 14 (Contd.)

TCHR.	VARIABLE			VERBAL INTERACTION CATEGORIES														
				NO TALK				INDIRECT				DIRECT			PUPIL			
				00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
C MATHS	MODE	No. OF INCIDENTS		5	94	64	1	6	53	8	137	90	33	6	75	101	673	
		PERCENTAGE OF TOTAL		0·7	14·0	9·5	0·1	0·9	7·9	1·2	20·4	13·4	4·9	0·9	11·1	15·0		
		PERCENTAGE CATS 1 - 9						1·2	10·6	1·6	26·9	17·7	6·5	1·2	14·6	19·8		%
	CONTENT	CATEGORY	0					1					1	1		1	3	0·6
			1					3	53	8	135	55	16	3	75	87	435	85·5
			2					1			2	35	17	2		13	70	13·7
			3					1								1	1	0·2
		TOTAL						6	53	8	137	90	33	6	75	101	509	%
	LEVEL	CATEGORY	0						34	4	89	79	32	6	64	60	368	72·3
			1					6	18	3	46	11	1		11	40	136	26·7
			2						1	1	2					1	5	1·0
			3															
		TOTAL						6	53	8	137	90	33	6	75	101	509	

Table 14. (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
D SOCIAL STUDIES	MODE	No OF INCIDENTS	5	4	337	0	2	4	8	41	11	42	0	6	124	584	
		PERCENTAGE OF TOTAL	0·9	0·7	57·7	0	0·3	0·7	1·4	7·1	1·9	7·3	0	1·0	21·0		
		PERCENTAGE CATS 1 - 9					0·8	1·7	3·4	17·2	4·6	17·6	0	2·5	52·2		%
	CONTENT	CATEGORY 0														0	
		1					2	3	8	40	10	5		4	124	196	82·4
		2						1		1	1	37		2		42	17·6
		3															
		TOTAL					2	4	8	41	11	42	0	6	124	238	%
	LEVEL	CATEGORY 0						1		10	1	27		5	1	45	18·9
		1								3	1	15		1	19	39	16·4
		2					1			7	7				12	27	11·3
		3					1	3	8	21	2				92	127	53·4
		TOTAL					2	4	8	41	11	42	0	6	124	238	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
D MATHS	MODE	No. OF INCIDENTS	1	98	0	5	15	29	8	172	22	66	13	59	81	569	
		PERCENTAGE OF TOTAL	0·2	17·3	0	0·9	2·6	5·1	1·4	30·3	3·9	11·6	2·1	10·4	14·2		
		PERCENTAGE CAT'S 1 - 9					3·2	6·2	1·6	37·0	4·8	14·2	2·8	12·8	17·4		%
	CONTENT	CATEGORY 0															
		1					7	28	8	164	19	55	7	56	79	423	90·9
		2								2		8	1			11	2·4
		3					8	1		6	3	3	5	3	2	31	6·7
		TOTAL														465	%
	LEVEL	CATEGORY 0					7	7	2	75	18	64	7	47	10	237	50·9
		1					8	20	3	80	4	2	6	11	42	176	37·9
		2							3	6				1	27	37	7·9
		3						2		11					2	15	3·3
		TOTAL					15	29	8	172	22	66	13	59	81	465	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
E MATHS.	MODE	No. OF INCIDENTS	1	73	8	94	1	12	1	96	31	34	40	41	13	445	
		PERCENTAGE OF TOTAL	0·2	16·3	1·8	21·2	0·2	2·7	0·2	21·7	6·9	7·7	9·0	9·2	2·9		
		PERCENTAGE CAT'S 1 - 9					0·4	4·4	0·4	35·7	11·5	12·6	14·9	15·3	4·8		%
	CONTENT	CATEGORY 0															
		1					1	10	1	88	31	18	23	40	12	224	83·3
		2						2		6		16	12	1		37	13·8
		3								2			5		1	8	2·9
		TOTAL					1	12	1	96	31	34	40	41	13	269	%
	LEVEL	CATEGORY 0					1	10	1	89	28	34	35	39	10	247	91·9
		1						1		1	1		5		1	9	3·3
		2						1		6	2			2	2	13	4·8
		3															
		TOTAL					1	12	1	96	31	34	40	41	13	269	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
F SOCIAL STUDIES	MODE	No. OF INCIDENTS	1	8	274	0	0	8	2	73	52	38	3	42	111	612	
		PERCENTAGE OF TOTAL	0·2	1·3	44·8	0	0	1·3	0·3	11·9	8·5	6·2	0·5	6·9	18·1		
		PERCENTAGE CAT'S 1 - 9					0	2·4	0·6	22·2	15·9	11·5	0·9	12·8	33·7		%
	CONTENT	CATEGORY 0														0	
		1						7	2	70	45	24	1	41	108	298	90·6
		2						1		3	7	14	2	1	3	31	9·4
		3															
		TOTAL					0	8	2	73	52	38	3	42	111	329	%
	LEVEL	CATEGORY 0								15	2	25	1	21	6	70	21·3
		1						1		46	28	13	2	10	56	156	47·4
		2						2		4	10			11	29	56	17·0
		3						5	2	8	12				20	47	14·3
		TOTAL						8	2	73	52	38	3	42	111	329	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
F MATHS	MODE	No. OF INCIDENTS	1	124	239	0	0	13	0	88	91	24	7	52	11	650	
		PERCENTAGE OF TOTAL	0·2	19·0	36·8	0	0	2·0	0	13·6	14·0	3·7	1·0	8·0	1·7		
		PERCENTAGE CAT'S 1 - 9					0	4·6	0	30·8	31·8	8·4	2·4	18·2	3·8		%
	CONTENT	CATEGORY 0														0	
		1						13		88	91	22	6	52	11	253	99·0
		2										2	1			3	1·0
		3															
		TOTAL						13		88	91	24	7	52	11	286	%
	LEVEL	CATEGORY 0						10		75	61	24	5	42	2	219	76·6
		1						3		13	30		2	10	9	67	23·4
		2															
		3															
		TOTAL						13		88	91	24	7	52	11	286	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
G SOCIAL STUDIES	MODE	No. OF INCIDENTS	7	18	56	0	8	38	48	59	62	15	0	34	279	624	
		PERCENTAGE OF TOTAL	1.1	2.9	8.9	0	1.3	6.1	7.7	9.5	9.9	2.4	0	5.5	44.7		
		PERCENTAGE CAT'S 1 - 9					1.4	7.0	8.8	10.9	11.4	2.8	0	6.3	51.4		%
	CONTENT	CATEGORY 0													2	2	0.4
		1					1	9	26	21	6	9		33	163	268	49.4
		2					7	29	22	38	56	6		1	116	273	50.2
		3															
		TOTAL					8	38	48	59	62	15	0	34	279	543	%
	LEVEL	CATEGORY 0					2			6	10				38	56	10.3
		1					6	20	12	34	28	11		32	159	302	55.6
		2						12	29	11	12	4		2	63	133	24.5
		3						6	7	8	12				19	52	9.6
		TOTAL					8	38	48	59	62	15	0	34	279	543	

Table 14 (Contd.)

TCHR.	VARIABLE			VERBAL INTERACTION CATEGORIES														
				NO TALK				INDIRECT				DIRECT			PUPIL			
				00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
G MATHS	MODE	No. OF INCIDENTS		1	55	85	0	1	68	22	151	54	106	0	18	144	705	
		PERCENTAGE OF TOTAL		0·1	7·9	12·0	0	0·1	9·6	3·1	21·7	7·6	15·0	0	2·5	20·4		
		PERCENTAGE CAT'S 1 - 9						0·2	12·1	3·9	26·8	9·5	18·8	0	3·2	25·5		%
	CONTENT	CATEGORY	0															
			1					1	68	22	151	54	99	0	18	144	557	98·8
			2										7				7	
			3															
		TOTAL						1	68	22	151	54	106	0	18	144	564	%
	LEVEL	CATEGORY	0						6	1	12	3	31		5	14	72	12·8
			1						37	13	83	35	39		9	74	290	51·4
			2					1	24	8	52	16	36		4	52	193	34·2
			3						1		4					4	9	1·6
		TOTAL						1	68	22	151	54	106	0	18	144	564	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
H SOCIAL STUDIES	MODE	No. OF INCIDENTS	15	9	21	20	2	33	2	74	263	59	1	7	127	633	
		PERCENTAGE OF TOTAL	2.4	1.4	3.3	3.2	0.3	5.2	0.3	11.7	41.6	9.3	0.1	1.1	20.1		
		PERCENTAGE CAT'S 1 - 9					0.4	5.8	0.4	13.0	46.3	10.4	0.2	1.2	22.3		%
	CONTENT	CATEGORY 0					2								7	9	1.6
		1						33	2	73	263	29		7	119	526	92.6
		2								1		30	1		1	33	5.8
		3															
		TOTAL					2	33	2	74	263	59	1	7	127	568	%
	LEVEL	CATEGORY 0					2	14		28	16	56	1	7	57	181	31.9
		1						19	2	46	247	3			70	387	68.1
		2															
		3															
		TOTAL					2	33	2	74	263	59	1	7	127	568	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
I SOCIAL STUDIES	MODE	No. OF INCIDENTS	1	23	242	3	1	53	8	87	76	74	0	20	127	715	
		PERCENTAGE OF TOTAL	0.1	3.2	33.9	0.4	0.1	7.4	1.1	12.2	10.6	10.3	0	2.8	17.9		
		PERCENTAGE CAT'S 1 - 9					0.2	11.9	1.8	19.5	17.0	16.6	0	4.5	28.5		%
	CONTENT	CATEGORY 0					1	1							4	6	1.3
		1						52	8	80	74	26		18	121	379	85.0
		2								7	2	48		2	2	61	13.7
		3															
		TOTAL					1	53	8	87	76	74		20	127	446	%
	LEVEL	CATEGORY 0					1	24		31	35	70		18	15	194	43.5
		1						29	8	55	41	4		2	112	251	56.3
		2															
		3								1						1	0.2
		TOTAL					1	53	8	87	76	74		20	127	446	

Table 14 (Contd.)

TCHR.	VARIABLE		VERBAL INTERACTION CATEGORIES														
			NO TALK				INDIRECT				DIRECT			PUPIL			
			00	01	02	03	1	2	3	4	5	6	7	8	9	TOTAL	
I MATHS.	MODE	No OF INCIDENTS	1	6	262	48	6	48	15	57	39	58	3	28	63	634	
		PERCENTAGE OF TOTAL	0·1	0·9	41·3	7·6	0·9	7·6	2·4	9·0	6·2	9·1	0·5	4·4	9·9		
		PERCENTAGE CAT'S 1 - 9					1·9	15·1	4·7	18·0	12·3	18·3	0·9	8·8	19·9		%
	CONTENT	CATEGORY 0															
		1						39	12	53	24	49		28	58	263	83·0
		2					4	7	3	4	15	9	3			45	14·2
		3					2	2							5	9	2·8
		TOTAL					6	48	15	57	39	58	3	28	63	317	%
	LEVEL	CATEGORY 0					5	31	2	48	23	37	2	24	51	228	71·9
		1					1	8	10	7	8	12	1	3	8	58	18·3
		2						9	3	2	3	9		1	4	31	9·8
		3															
		TOTAL					6	48	15	57	39	58	3	28	63	317	

Table 14 (Contd.)

FIG. 16: Percentages of Verbal Interaction Content and Level Categories for Each Lesson.

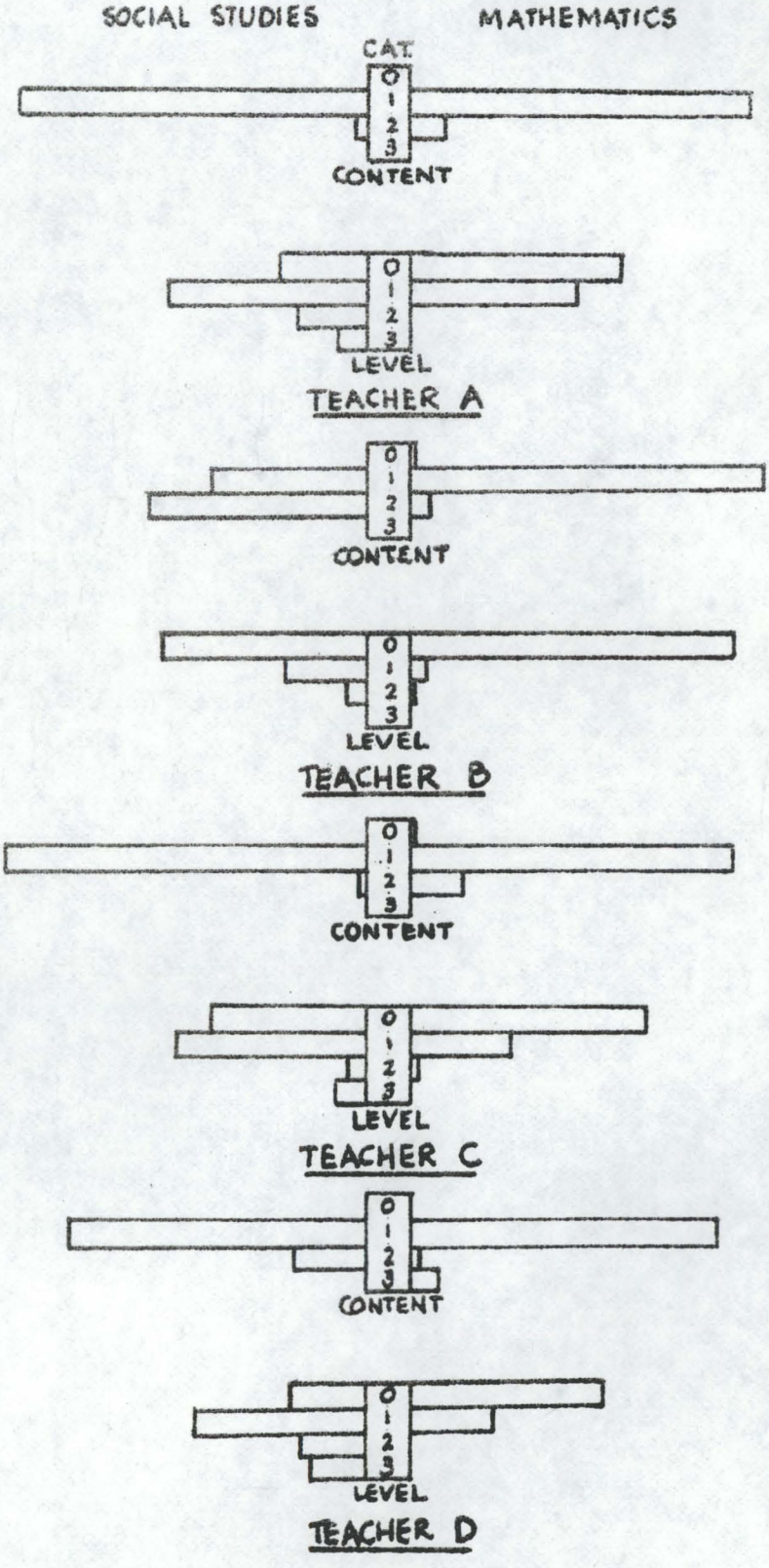
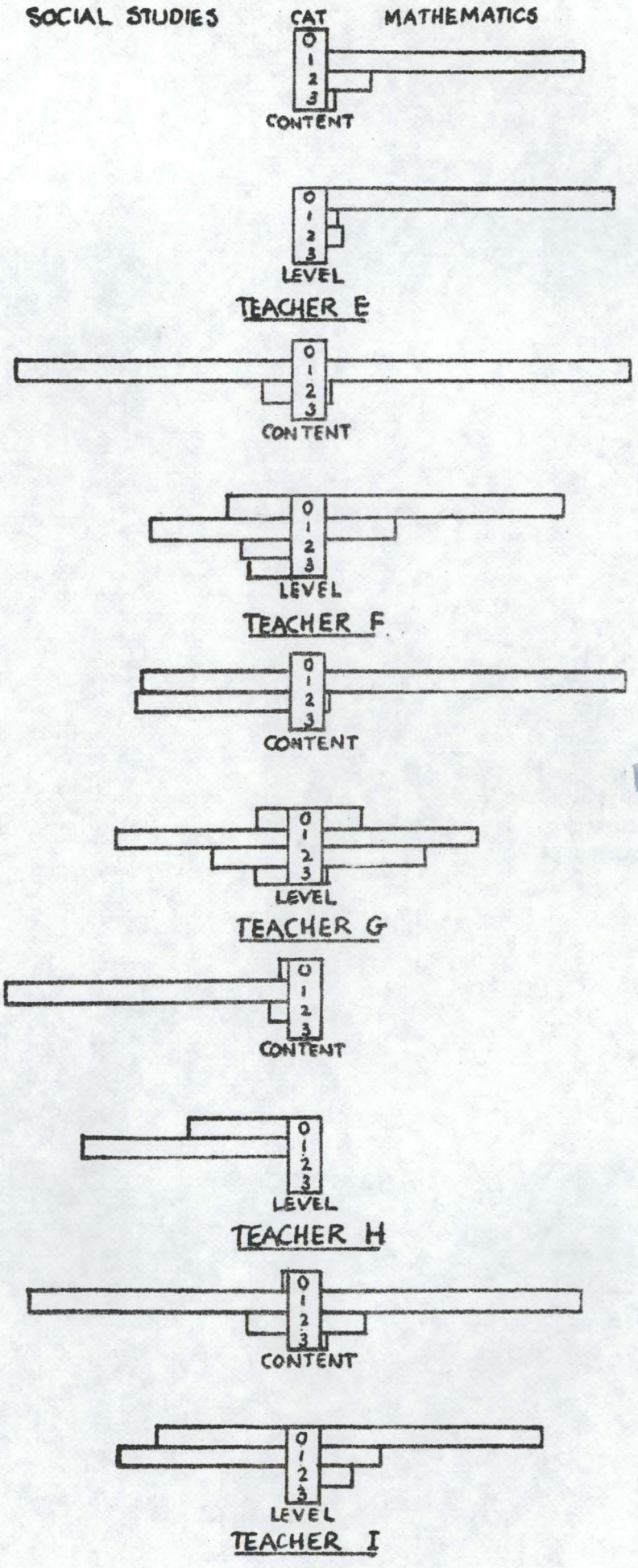


FIG. 16: (cont'd)


SOCIAL STUDIES
CAT
MATHEMATICS
0
1
2
3
CONTENT
LEVEL
TEACHER E
CONTENT
LEVEL
TEACHER F
CONTENT
LEVEL
TEACHER G
CONTENT
LEVEL
TEACHER H
CONTENT
LEVEL
TEACHER I

In Teacher F's lesson, as already indicated, much of the higher level interaction was initiated by the pupils. Teachers A, C, and particularly D and G are the only teachers who consistently generated higher level functioning in their lessons.

The data for Mathematics lessons shows an even greater tendency towards functioning at the knowledge level, and to a less extent the understanding level. Only Teachers D and G have frequent incidents at the application and evaluation levels.

The highest incidence of the differing level categories for any lesson in Social Studies were : 76.3% knowledge level (Teacher B), 68% understanding level (Teacher H), 24.5% application level (Teacher G) and 53.4% evaluation level (Teacher D). In Mathematics lessons the highest category incidences were : 95% knowledge level (Teacher B), 51.4% understanding level (Teacher G), 34.2% application level (Teacher G) and 3.3% evaluation level (Teacher D). Teacher D had the highest incidence of evaluation level interactions for both lessons and the highest incidence of knowledge level behaviour was recorded in Teacher B's two lessons. The mean for Social Studies lessons show that most of the verbal behaviour was at the understanding level or above, while in the Mathematics lessons it was at the knowledge level.

Comparative data for the content orientation and level for each lesson are presented diagrammatically in Figure 16.

(ii) Group Activities

As with the data reported for other variables observed

in this study, group activities showed variation both from teacher to teacher, and for different subjects for the same teacher. Data for group activities for the two types of lesson are set out in Table 15.

In the Social Studies lessons the most frequently used activity involving groups was similar to Adams' (1965) central group type class communication structure organisation - all groups were engaged with the teacher (usually in a teacher-pupil(s) discussion) without apparatus being used - category 2 44% of all activities. The next most "popular" activity was category 4 - with group, no apparatus in use which accounted for 16.3% of group activities in Social Studies. In most lessons this involved pupils in discussion activities, under a teacher appointed leader, with a group reporter being responsible for taking notes and reporting back to the whole class. Category 1 - with teacher using apparatus received minimal support in three Form II lessons, but was the most used activity in one of the Junior Two lessons. Small group activities involving the use of apparatus were observed as major activities in the lessons of Teachers B and G and were minimally used in three other lessons, and category 5 activities - individual work using apparatus, were used in the lesson of Teacher B only. Free choice activities occurred in two classrooms. In only one classroom was non-involvement of any significance observed. Category 8 - free choice activity - was used for only 4% of the time and only in two classrooms.

More variation in the activities was observed in Mathematics lessons, but as in Social Studies, category 2 activity - the whole class or individual groups directly involved with

TABLE 15: Group Activities for Each Lesson.

		GROUP ACTIVITY CATEGORIES									
TEACHER	LESSON	0	1	2	3	4	5	6	7	8	TOTAL
A	SOCIAL STUDIES			260	7	129					369
B		12	31		203	24	310				580
C			30	312	24						366
D				204		180					384
F		5		198		163					366
G			28		145	16				116	305
H				413							413
I		2	324	12	16	6				36	396
TOTAL		19	413	1399	395	518	310			152	3179
PERCENTAGE OF TOTAL		0·6	12·8	44·0	12·4	16·3	9·7			4·3	
MEAN		2·38	51·63	174·90	49·38	64·75	38·75			19·00	397·38
S.D.		4·00	103·86	146·55	73·83	73·26	102·52			38·51	75·07

TABLE 15: (cont'd)

		GROUP ACTIVITY CATEGORIES									
TEACHER	LESSON	0	1	2	3	4	5	6	7	8	TOTAL
A	MATHEMATICS	23		280				104	113		520
B	"	32		243				126	111		512
C	"	3		107		31		72			213
D	"			331				47			378
E	"	18		222		15		21			276
F	"	15		204				163	14		396
G	"		101	9	138		46			11	305
H	"		55	15	49		311			4	434
I	"	4	204	29	56		8		40	27	372
TOTAL		95	360	1440	243	46	365	533	278	42	3406
PERCENTAGE OF TOTAL		2·8	10·6	42·3	7·1	1·3	10·7	15·7	8·1	1·2	
MEAN		10·56	40·00	160·00	27·00	5·11	40·56	59·22	32·11	4·67	378·44
S.D.		11·18	67·03	115·52	44·75	10·28	96·67	57·28	44·31	8·63	96·93
TOTAL		114	773	2839	738	564	675	533	278	194	6585
PERCENTAGE OF TOTAL		1·7	11·6	43·2	9·8	8·8	10·2	7·9	4·1	2·8	
MEAN		6·70	45·47	167·00	37·53	33·18	39·71	31·35	16·35	11·41	387·35
S.D.		9·50	86·54	131·25	61·24	58·89	99·47	51·10	36·25	28·08	87·84

the teacher with no apparatus - was by far the most frequently used. In six of the seven Form II lessons textbook based activities were engaged in, and in three of these lessons written activities from the blackboard were also used. Non-involvement was much more frequent in Mathematics lessons (2.8%) than in Social Studies (0.6%), mainly at the Form II level. In the other Form II lesson and in the two second year junior lessons, the activities were mainly Categories 1, 3, 5 and 8 activities. Table 16 shows the activities engaged in by individual groups in each classroom for all lessons.

Correlation coefficients set out in Table 17 indicate that there is little relationship between the type of activity used in the different type of lesson. Column 1 shows correlations based on the analysis of all categories including unused activities for each lesson. The second column shows the correlation coefficients derived from the inclusion of only those activities used in any lesson. Only in the lessons of Teachers G and I are similar patters of group activity used.

(c) Comparison of Findings with Related Research.

(1) Flanders' 1957 Wellington Study.

Flanders (1960) reported findings of category tallies for the five high scoring and five low scoring teachers in the Wellington study. Table 18 sets out the equivalent data for the two lessons that achieved the lowest I.D. Revised (Flanders' style) ratio of the Social Studies lessons and the two lessons that achieved the lowest I.D. ratios for Mathematics. These were combined to make up the

TABLE 16 : Group Activities for each Teacher

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1			44	1	21					66
2			45	2	19					66
3			42	1	23					66
4			42	1	23					66
5			44	1	21					66
6			43	1	22					66
TOTAL			260	7	129					396

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	2		35				13	15		65
2	2		35				14	14		65
3	5		35				11	14		65
4	4		35				11	15		65
5	3		35				14	13		65
6	2		35				14	14		65
7	1		35				14	15		65
8	4		35				13	13		65
TOTAL	23		280				104	113		520

MATHEMATICS

TEACHER A

Table 16: Group Activities for Each Teacher

T. 16.

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		6			6	46				58
2		4		28	6	20				58
3		4		23		31				58
4		2		44	6	6				58
5		5		25		28				58
6		2		6		50				58
7		2		23		33				58
8	2	2		14	6	34				58
9		2		10		46				58
10	10	2		30		16				58
TOTAL	12	31		203	24	310				580

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	7		48				3	6		64
2	7		25				18	14		64
3	11		22				18	13		64
4	3		31				17	13		64
5	0		29				18	17		64
6	3		30				17	14		64
7	0		29				18	17		64
8	1		29				17	17		64
TOTAL	32		243				126	111		512

MATHEMATICS

TEACHER B

Table 16 (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		5	52	4						61
2		5	52	4						61
3		5	52	4						61
4		5	52	4						61
5		5	52	4						61
6		5	52	4						61
TOTAL		30	312	24						366

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	3		35		15		18			71
2			37		8		26			71
3			35		8		28			71
TOTAL	3		107		31		72			213

MATHEMATICS

TEACHER C

Table 16 (Contd.)

TAB 16.

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1			34		30					64
2			32		32					64
3			34		30					64
4			35		29					64
5			33		31					64
6			36		28					64
7										
8										
TOTAL			204		180					384

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1			55				8			63
2			54				9			63
3			55				8			63
4			54				9			63
5			59				4			63
6			54				9			63
TOTAL			331				47			378

MATHEMATICS

TEACHER D

Table 16 : (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
				N	/	A				
TOTAL										

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	3		37		3		3			46
2	3		37		3		3			46
3	3		37		3		3			46
4	3		37		1		5			46
5	3		37		2		1			46
6	3		37		3		3			46
TOTAL	18		222		15		21			276

MATHEMATICS

TEACHER E

Table 16 (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	2		33		26					61
2	2		33		26					61
3	0		33		28					61
4	1		33		27					61
5	0		33		28					61
6	0		33		28					61
TOTAL	5		198		163					366

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1	4		34				25	3		66
2	1		34				28	3		66
3	5		34				25	2		66
4	2		34				28	2		66
5	3		34				28	1		66
6	0		34				29	3		66
TOTAL	15		204				163	14		396

MATHEMATICS

TEACHER F

Table 16 (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		8		45	8					61
2		8		45	8					61
3		3							58	61
4		3							58	61
5		6		55						61
TOTAL		28		145	16				116	305

SOCIAL STUDIES

TEACHER G

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		38		17		6				61
2		38		18		5				61
3		9	3	41		8				61
4		9	3	41		8				61
5		7	3	21		19			11	61
TOTAL		101	9	138		46			11	305

MATHEMATICS

Table 16 (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1			59							59
2			59							59
3			59							59
4			59							59
5			59							59
6			59							59
7			59							59
TOTAL			413							413

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		25				37				62
2		3				59				62
3		7	2	49		4				62
4		7	4			51				62
5		3	2			57				62
6		1	4			57				62
7		9	3			46			4	62
TOTAL		55	15	49		311			4	434

MATHEMATICS

TEACHER H

Table 16 (Contd.)

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		53	2	4	1				6	66
2	1	53	2	3	1				6	66
3	1	53	2	3	1				6	66
4		54	2	3	1				6	66
5		56	2	1	1				6	66
6		55	2	2	1				6	66
TOTAL	2	324	12	16	6				36	396

SOCIAL STUDIES

GROUP	GROUP ACTIVITY CATEGORIES									TOTAL
	0	1	2	3	4	5	6	7	8	
1		36	5	8		8		5		62
2	1	34	8	10		4		5		62
3		42	4	1				15		62
4		26	3	18					15	62
5		43	3	1				15		62
6	3	23	6	18					12	62
TOTAL	4	204	29	56		12		40	27	372

MATHEMATICS

TEACHER I

Table 16 (Contd.)

TABLE 17: Correlation Co-efficients for All Categories and Actual Categories Used of Group Activities for the Two Lessons of Each Teacher.

TEACHER	CATEGORIES 0-8 (i)	LEVEL OF SIGNIFICANCE	CATEGORIES USED (ii)	df	LEVEL OF SIGNIFICANCE
A	$r_{ss.m}$ = .72	$p < .05$	$r_{ss.m}$ = .67	4	N.S.
B	$r_{ss.m}$ = .42	N.S	$r_{ss.m}$ = .50	7	N.S.
C	$r_{ss.m}$ = .76	$p < .05$	$r_{ss.m}$ = .74	4	N.S.
D	$r_{ss.m}$ = .69	$p < .05$	$r_{ss.m}$ = .48	1	N.S.
E	$r_{ss.m}$ = .48	N.S	$r_{ss.m}$ = .30	3	N.S.
G	$r_{ss.m}$ = .60	N.S	$r_{ss.m}$ = .48	5	N.S.
H	$r_{ss.m}$ = .12	N.S.	$r_{ss.m}$ = .32	4	N.S.
I	$r_{ss.m}$ = .96	$p < .01$	$r_{ss.m}$ = .96	7	$p < .01$
		(df = 7)			

TABLE 18: Tallies per Thousand for the Four High I/D Ratio and the Four Low I/D Ratio Lessons.

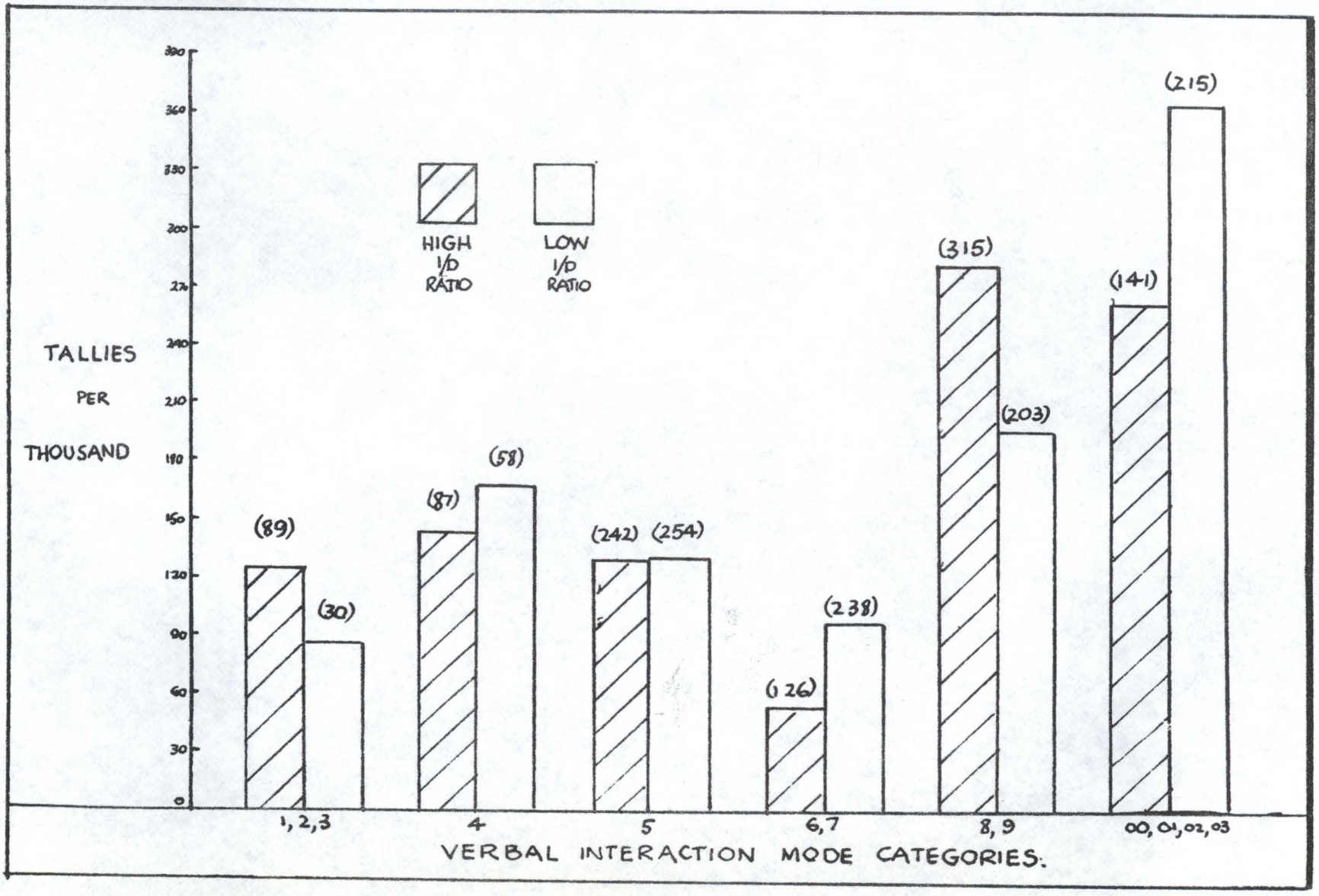
TEACHER	SUBJECT	VERBAL INTERACTION (MODE) CATEGORIES						
HIGH I/D RATIO LESSONS		1,2,3	4	5	6,7	8,9	00	TOTAL
C	SOC. ST.	91	113	141	23	138	102	608
G	"	94	59	62	15	313	81	624
C	MATHS.	67	137	90	39	176	164	673
I	"	69	57	39	61	91	317	634
	TOTALS	321	366	332	138	718	664	2539
	Tallies per Thousand	126	144	130	54	283	261	1000
LOW I/D RATIO LESSONS								
B	SOC. ST.	12	59	142	78	102	113	506
F	"	10	73	52	41	153	283	612
D	MATHS.	52	172	22	79	140	104	569
F	"	13	88	91	31	63	364	650
	TOTALS	87	392	307	229	458	864	2337
	Tallies per Thousand	38	168	131	98	196	369	1000

four lessons for the low scoring lessons. Similarly the two highest I.D. ratio Social Studies lessons and the two highest Mathematics lessons were combined to provide the data for the high scoring lessons. The data from Table 18 is shown in more graphic form in Figure 17.

There is a remarkable coincidence between the shape of the graph for the present study shown and that presenting the data for the Flanders' study, but a vast difference in the numerical values. Both the high scoring teachers and the low scoring teachers "better" the data Flanders reports for categories 1, 2 and 3. (The low scoring teachers in the present study are almost equal with the high scoring teachers in Flanders report.) Both low and high scoring teachers are "better" than either of Flanders' group of teachers in category 4. An interesting feature of the present study data is the higher incidence of questioning by the low scoring teachers. The low scoring and high scoring Hamilton teachers have much lower tallies per thousand than their 1957 Wellington counterparts in categories 5, 6 and 7. The difference between tallies for the present group of teachers show remarkable decreases in category 5 and almost dramatic decreases in the categories of Flanders' "vicious circle".

Teachers in Flanders' sample generated more category 8 and 9 behaviour but the difference is slight for both high scoring, 315 compared with the present 283, and the low scoring 196 compared with Flanders reported 203. The higher incidence of No Talk tallies in this study is possibly a reflection of the greater amount of discussion, and group activities that were observed by comparison with the silences and confusions

FIG. 17 Incidence of Tallies per Thousand of Verbal Interaction Mode Categories for the Four High Adjusted Revised I/D Ratio Lessons, and The Four Low Adjusted Revised I/D Ratio Lessons.



included in Flanders' data where coding stopped when pupils were engaged in bookwork).

It seems evident from these comparative data that the teachers of both the high scoring and the low scoring lessons in the Hamilton study cannot be compared with those observed by Flanders, and tentatively at least it would be possible to suggest that a null hypothesis for these data could be rejected.

(ii) Biddle and Adams' 1967 Missouri Study

The complexity of the Biddle and Adams (1967) study and the different means of data collection in the present study make any valid comparisons rather tenuous. No specific data equivalent to Biddle and Adams' content categories were collected, but data from the present study indicate a similar picture of content orientation of both the New Zealand and Missouri classrooms. The amount of non-scheduled subject matter disseminated (6%) is higher than the 0.5% in Social Studies and the 0.2% in Mathematics found in this study. Subject-matter accounted for 81% in Social Studies and 91% in Mathematics of the New Zealand classroom incidents compared with 47% dissemination of scheduled subject-matter in Biddle and Adams report to which needs to be added 19% intellectualisation about subject-matter. The 18.5% in Social Studies and 7% in Mathematics found for organisation, compares with their 10% dissemination of information about organisation, but as indicated, much of the New Zealand data relates to subject-matter organisation. Sociation at 0% in Social Studies and 1.5% in Mathematics, is about equivalent to their findings but this is offset in the present study by the relatively high

high incidence of categories 1, 2 and 3 in mode behaviours. Analyses of cognitive levels of verbal interactions in the present study have no direct counterpart in Biddle and Adams analysis, but the trend observed in communication mode with the emphasis on dissemination rather than intellectualisation is analogous to the level findings set out above.

Data on teacher location and participant location in this study, already discussed above (Tables 6 - 9), is much more easily compared, but as previously indicated, it seems that while there are similarities for some teachers in comparing data, in general the patterns in the sample studied here have a distinctive characteristic that differ from Adams findings and need much more empirical confirmation.

(d) Testing the Hypotheses Stated.

As a number of the hypotheses required a number of comparisons to be made for each variable class observed in the study, the data related to each teacher (for whom two lessons were available), and the level of significance derived are set out in Table 19.

(i) The General Hypothesis

The general hypothesis that : No significant inter-relationship would be found among the variables observed was not statistically tested in this study, but the data previously discussed at the descriptive level suggest that a number of trends observed need to be further studied.

(ii) The Specific Hypotheses (Intra-teacher Differences)

HYPOTHESIS 1.2: No significant differences in the patterns of teacher location would be found between lessons for a teacher.

TABLE 19: Significance Testing of the Hypotheses.

	(HYPOTHESIS 1·2)				(HYPOTHESIS 2·2)				(HYPOTHESES $^{1\cdot2}_{2\cdot2}$)	
	TEACHER LOCATION				PARTICIPANT LOCATION				TEACHER LOCATION PARTICIPANT LOCATION	
	ROWS v ROWS LOCATION		COLUMNS v COLUMNS LOCATION		ROWS v ROWS LOCATION		COLUMNS v COLUMNS LOCATION		TEACHER MOVES v No. PUPIL V. I. UNITS	
TCHR.	χ^2	LEVEL OF SIGNIFICANCE	χ^2	LEVEL OF SIGNIFICANCE	χ^2	LEVEL OF SIGNIFICANCE	χ^2	LEVEL OF SIGNIFICANCE	χ^2	LEVEL OF SIGNIFICANCE
A	26·85	$p<.01$	430·33	$p<.01$	9·96	N.S	46·73	$p<.01$	70·89	$p<.01$
B	715·28	$p<.01$	197·96	$p<.01$	69·49	$p<.01$	16·57	$p<.01$	0·05	N.S.
C	11·56	$p<.05$	209·11	$p<.01$	110·86	$p<.01$	21·19	$p<.01$	2·20	N.S.
D	580·21	$p<.01$	155·79	$p<.01$	40·48	$p<.01$	18·63	$p<.01$	2·13	N.S.
F	53·19	$p<.01$	134·30	$p<.01$	48·94	$p<.01$	63·87	$p<.01$	19·67	$p<.01$
G	371·15	$p<.01$	226·73	$p<.01$	41·29	$p<.01$	8·35	N.S.	15·67	$p<.01$
I	874·81	$p<.01$	84·93	$p<.01$	N/A		N/A		61·46	$p<.01$

TABLE 19: (cont'd)

	VERBAL INTERACTION (HYPOTHESIS 4·2 to 6·2)														GROUP ACTIVITIES (HYPOTH. 7·2)	
	CATEGORIES 1-3 v 7		CATEGORIES 4 v 5		CATEGORIES 8 v 9		CATEGORIES 5 v 6		CATEGORIES 1-4 v 5-7		CONTENT		LEVEL		CATEGORIES 0,2,4,6,7 v 1,3,5,8.	
TCHR	χ^2_c	LEVEL OF SIGNIF.	χ^2_c	LEVEL OF SIGNIF.	χ^2_c	LEVEL OF SIGNIF.	χ^2_c	LEVEL OF SIGNIF.	χ^2_c	LEVEL OF SIGNIF.	χ^2	LEVEL OF SIGNIF.	χ^2	LEVEL OF SIGNIF.	χ^2	LEVEL OF SIGNIF.
A	9·77	$p<.01$	0·31	N.S	72·38	$p<.01$	0·01	N.S.	11·72	$p<.01$	17·16	$p<.01$	153·68	$p<.01$	7·10	$p<.01$
B	4·04	$p<.05$	94·39	$p<.01$	210·30	$p<.01$	10·37	$p<.01$	92·48	$p<.01$	177·44	$p<.01$	61·21	$p<.01$	953·10	$p<.01$
C	3·48	N.S.	11·46	$p<.01$	44·95	$p<.01$	7·19	$p<.01$	0·39	N.S.	55·60	$p<.01$	111·79	$p<.01$	334·05	$p<.01$
D	2·04	N.S.	2·60	N.S	49·90	$p<.01$	0·14	N.S.	10·69	$p<.01$	64·87	$p<.01$	305·40	$p<.01$	1·37	N.S.
F	0·12	N.S.	2·16	N.S	52·87	$p<.01$	9·92	$p<.01$	0·07	N.S.	21·12	$p<.01$	215·09	$p<.01$	0·53	N.S.
G	2·10	N.S.	19·62	$p<.01$	0·34	N.S.	43·64	$p<.01$	2·23	N.S.	357·38	$p<.01$	42·20	$p<.01$	1·50	N.S
I	1·08	N.S.	0·65	N.S	9·25	$p<.01$	2·19	N.S.	1·58	N.S.	6·06	$p<.05$	135·70	$p<.01$	49·99	$p<.01$

All X^2 tests with one exception are at below the .01 level of significance, and suggest that the null hypothesis be rejected. It appears that there are significant differences in location patterns adopted by teachers for different kinds of lessons. The other X^2 test is below the .05 level of significance.

HYPOTHESIS 2.2: No significant differences in the patterns of participant location would be found between lessons for a teacher.

With two exceptions, significant differences in patterns of participant location were obtained at below the .01 level. The two non-significant results are close to the .05 level of significance however. Again the null hypothesis was rejected as this sample of lessons suggests that the location of pupil participants does differ from lesson to lesson for a teacher.

Chi square tests were also carried out on the data for the level of teacher location movement and the volume of participant location behaviours. Four of the seven X^2 tests show significant differences at below the .01 level for each teacher for the different lessons, and indicate the need for additional data to confirm this trend.

HYPOTHESIS 4.2: No significant differences in the mode categories of verbal interaction would be found between lessons for a teacher.

A number of tests were carried out, using different combinations of categories, for this hypothesis. Only two teachers show a significant difference (One at the .01 level, and one at the .05 level) when categories 1 - 3 are compared

with category 7. For the other teachers there appears to be no significant difference in the incidence of these categories between lessons.

When category 4 is compared with category 5, the results for four of the seven teachers show significant differences (three at below the .01 level) for the use of these categories for different lessons. Four significant results (below .01) were also obtained when category 5 was compared with category 6 incidence for the two lessons observed for each teacher.

When the categories used by Flanders for establishing I/D ratio levels are compared (categories 1-4 v categories 5-7), three results were obtained on X^2 tests at below the .01 level of significance.

These data suggest that in general there appear to be significant differences between the incidence of mode categories for a teacher for different lessons, but any rejection of the null hypothesis can be only tentative. More substantial data are required to confirm this.

HYPOTHESIS 5.2: No significant difference in the content categories of verbal interaction would be found between lessons for a teacher.

All tests for significance were acceptable (six at below the .01 level) as the basis for rejecting the null hypothesis. The data suggest that teachers do differ significantly in their use of the categories for this variable from lesson to lesson.

HYPOTHESIS 6.2: No significant differences in the level categories of verbal interaction would be found between

lessons for a teacher.

The significance levels in all cases for this variable for all teachers are well below the .01 level, and the null hypothesis can be rejected. Teachers appear to differ markedly in the level at which they handle verbal interaction for different types of lesson.

HYPOTHOSIS 7.2: No significant difference in the types of group activity pupils engage in would be found for different lessons for a teacher.

Data for four group activities show four significant X^2 tests at below the .01 level (categories 0,2,4,6 and 7 compared with categories 1,3,5 and 8) out of the seven tests carried out. These data suggest that teachers do differ in the types of group activity they use for different lessons, but this can only be tentative in view of the small sample included.

Taking all variables into account, of the eighty-nine tests of significance carried out 61 are significant at below the .01 level, three at below the .05 level, with twenty-five not significant. It seems that the number of significant results is much greater than could be expected by chance, and on the basis of these results it is possible to suggest that there are marked differences in teacher behaviour for lessons of different kinds.

HYPOTHESIS 8.1: No relationship would be found between Pupil I.Q. and the level of participant verbal interaction for individual pupils.

Seven of the eleven correlation coefficients are significant (five at below the .01 level) and indicate that there is a relationship between pupil I.Q. and the number of

interactions a pupil has with the teacher. More data is required to confirm this.

Group Activities.

Four of the tests of the significance of differences in group activities for different subject-matter are at better than the .01 level of significance, and further studies of this variable are needed before the null hypothesis can be accepted or rejected. Data suggest that there are both interteacher and intrateacher differences in the selection of group activities used.

I.Q. v Level of Participant Response.

Seven of the eleven correlation co-efficients shown in Table 20 indicate that there is a significant relationship between a pupil's I.Q. and his level of participation in verbal interactions with the teacher. As the sample is small, however, the data are suggestive of a trend only, and a great deal more information is needed before any rejection of the null hypothesis is possible, but it seems that factors other than chance operated in the lessons observed in this study. Reasons for the finding of this tendency can only be speculative, but as there were more significant correlations for Mathematics lessons, and these lessons tended to be at lower levels when analysis of cognitive level was made, it is possible the teacher's own tentativeness in handling the subject-matter is such as to invite the correct answer by directing questions at the known correct responders.

(e) Conclusions to be Drawn.

The number of teachers to be drawn, in the sample for

TABLE 20: Correlation Coefficients for I.Q. and the Number of Individual Pupil Participant Verbal Interaction Units.

TEACHER	SOCIAL STUDIES	LEVEL OF SIGNIFICANCE	MATHEMATICS	LEVEL OF SIGNIFICANCE
A	$r = \cdot 2935$ $(N=36)$	N.S.	$r = \cdot 35$ $(N=36)$	$p < \cdot 05$
B	$r = \cdot 08$ $(N=35)$	N.S.	$r = \cdot 48$ $(N=35)$	$p < \cdot 01$
C	$r = \cdot 53$ $(N=36)$	$p < \cdot 01$	$r = \cdot 27$ $(N=18)$	N.S
D	$r = \cdot 32$ $(N=39)$	$p < \cdot 05$	$r = \cdot 46$ $(N=39)$	$p < \cdot 01$
E	N./A.		$r = \cdot 59$ $(N=41)$	$p < \cdot 01$
F	$r = \cdot 43$ $(N=39)$	$p < \cdot 01$	$r = \cdot 09$ $(N=39)$	N.S.
		$df = N-2$		

this study, places serious limitation on the generalisations that can be derived from the data despite the random nature of the selection, but the findings are suggestive of a number of important influences that are operating in the classroom setting.

It seems likely that the teacher's position does have an influence on the level of participation of pupils. A teacher who moves over the whole classroom rather than adopting a front-oriented location seems to interact verbally with pupils over a much wider area of the classroom. However, there seems to be a level of teacher movement which is inhibiting of pupil participation rather than facilitating - Teacher A's highly mobile Mathematics lesson resulted in a lowering of the level of pupil talk by comparison with the Social Studies lesson. The teacher's movement patterns when groups are working independently of the teacher seem to lessen the level of non-involvement. For example, in Teacher B's Social Studies lesson during which 58 locational moves were made, one group was non-involved for a considerable period of time because the teacher was at a distance from the group which was situated near the back (where the teacher seldom positioned himself). The teacher tried to get involvement by giving directions from a distance, and while involved himself with another group, but the group did not return to the activity until the teacher moved closer. * Group activities seem to be associated with teacher movement that is not front-oriented. In the classrooms where the teachers were

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* See flow diagram moves 40-48 which relate to this incidence.

more inclined to spend a large proportion of their time in the centre or at the back of the room, were also to be found teachers most likely to have pupils engaged in activities that involved the use of apparatus-centred learning activities rather than discussion or workbook oriented tasks.

Verbal interaction also seems to be enhanced by the location flexibility of the teacher, but the relationship between the two variables is not clear-cut. Teacher G used the classroom environment fully in his movements and the level of both lessons was higher than that achieved by most teachers. Teacher D, however, moved little, used the front frequently or the left-rear area for a long period and also had a high level of cognitive functioning going. Similarly Teacher C who dominated the "footlight parade" in Social Studies was able to do so while maintaining cognitive functioning at a reasonably high level.

It seems reasonably clear that teachers are significantly different when teaching the two different types of subject-matter used in this study, but the reasons for the differences are not so obviously isolated. Tentativeness with the content may be a factor, certainly in the only lesson observed with Teacher E, she seemed to have difficulties that were related to inadequacy of content knowledge to the extent that the pupils were disinterested in what was happening in the lesson and became disruptive of the teacher's efforts to teaching. Teacher F had a class which was made up of pupils of very high I.Q. level and handled the content in both lessons at a very low level, gave little praise, yet had little of the difficulty experienced by Teacher E.

Teaching at different levelsof the school also seems to have distinctive characteristics. Teachers of Second Year Junior classes tended to bring the whole group together in close proximity, in the place where the teacher has left a large space for this purpose. Subject-matter at this level tends to be introduced through the medium of stories read or told in Social Studies. In Mathematics the children work in groups, exploring mathematical ideas and relationships, with little direction from or participation with, the teacher except in individual one-to-one interactions. Country school lessons also differ from those of the intermediate school despite the similar age group of some of the pupils. The wider age range tends to impose patterns of group organisation which necessitate the use of more informal "pupil-centred" activities and more independent pupil activity. Form II classes in intermediate schools tend to be more formally organised and run. Strict adherence to a school-wide timetable, set lesson periods, pupils moving from classroom to classroom, from teacher to teacher, and from one group of pupils to another for different subjects, may tend to produce conditions which are reflected in the behaviours of the teachers, and frequently of the pupils. This is absent in the other types of classroom visited. Enthusiasm, for the activities being undertaken, tends to be minimised (emphasis on teacher directed activities) distancing between teacher and students tends to be maximised (with loctional distance and verbal distance as shown in data above) in many cases.

The characteristics of the lessons tend to suggest

to suggest there is in some way a subtle inter-relationship between the variables that this study set out to explore. Hopefully data gathered from more comprehensive studies will bring a clearer understanding of the way these variables act together in producing learning-teaching situations that enhance the quality of both the learning and the teaching, and also provide for improved human relationships.

CHAPTER VI

EVALUATION OF THE STUDY

In evaluating the project undertaken it is proposed to deal briefly with the question of the viability of the systems developed for measuring classroom activities, the difficulties inherent in direct observation, techniques that need to be developed to enhance objectivity, and some directions that classroom research needs to take.

(i) Systems for Analysing Classroom Activities.

In general the four measuring devices proved adequate for recording objectively the behaviours observed. The coding system for recording teacher location and movement was satisfactory, provided the research assistant had recorded adequate reference points on the coding sheets prior to the commencement of the lesson to ensure that the correct grid location for the teachers was recorded. Pacing of the three second intervals provided no real difficulties. While lacking perhaps in empirical precision, in the sense that maintaining precise time units over a half hour period imposed considerable strain on the recorder, the data collected did give an accurate record of movement, but duration of location may need the support of a mechanical timing device to improve accuracy.

Recording participant location exposed some weaknesses in the system developed. To keep a sequential coding that would coincide with the timing of teacher location - identical three second intervals - proved impossible, because the two coders had no common time reference point,

being separate from one another, and because in coding pupil interactions it was frequently necessary to break the three second rule if more than one behaviour occurred within the time unit interval. Also it was necessary for the participant location recorder to maintain the three second time unit sequence throughout the whole lesson period, even though the only data required were the units of pupil verbal behaviour. It seems desirable that this be removed but that some means of correlating pupil location during verbal interaction with teacher location be retained. A further difficulty in using this system was that pupils frequently left their desks to move towards the teacher to engage in verbal interaction, and no useful means of recording this kind of data was developed - a variable that it seems may be of some significance. In the present study such interactions were recorded against the pupil's desk location with an arrow and circle (241) to indicate that this interaction was in a location away from the pupil's own desk. Pupil movement may need more precise measurement than has been to date explored. In view of these difficulties no precise reliance could be placed on data obtained from comparing the sequential coding for teacher location and participant location to see if coincidence was occurring in patterns of interaction location.

Other than to confirm subjective observations of the nature of group activities, no systematic analysis of teachers' responses to the questions about the group arrangements for the classroom were undertaken. It seems

though, that if teachers really do believe that group arrangement of the classroom is structurally desirable some means of convincing them of the functional benefits should be provided by gathering data about this aspect of classroom organisation, and relating it to the types of group activity that can be beneficially used.

The coding system for recording the verbal behaviours that occurred from the taped lessons, despite its complexity, proved very successful in providing a means of encoding interaction in three dimensions without the need to make typed transcripts of the whole tape for each. One of the obvious deficiencies of the system was that it precluded the use of any unit of measurement other than the arbitrary timed unit, but it is believed that a close inspection of the sequential data for each lesson makes it possible to analyse out the behaviour episodes. This rather massive task was not attempted in the present study but does give some hope for such analysis in future projects. Some doubt about the reliability of the four level categories remains, and while they are still considered reasonably satisfactory, the gap between understanding and evaluation, filled only with the application category, seems to be something of a conceptual vacuum. Some category derived from Taba et al's system may need to be included to add refinement that presently seems lacking. As with the other coding systems, the lack of a precise time measuring device weakens the reliability of the data generated. While there was, in general, a reasonable coincidence of the number of three second time unit for each system used for each lesson, more

precision is desirable.

The group activities coding system also proved very easy to administer in the live setting of the classroom. A stop watch with a large sweep hand was used to give precise time units of 30 seconds, and consequently this also provided a reference point for teacher location and pupil location coding timing when the teacher's location was recorded coincidentally with a particular group. The broad categories of activity selected as the means of analysing the group to group activities were very satisfactory, but all who coded in the system suggested that sub-category refinements could easily be accommodated without making the task of recording any more difficult. For example category 1 could differentiate between whether pupils or teacher are using apparatus, or even both. Category 8 needs refinement to indicate whether the activities are oriented to the subject matter of the lesson being observed or are "free" choice. The time unit seemed adequate as a means of checking other codings being made simultaneously.

(ii) Difficulties of Direct Observation.

As has been suggested earlier, one teacher was under obvious stress during the observation of one lesson, and it is likely that other teachers are under less obvious stress during the visit to a classroom. It becomes questionable as to how closely the behaviour recorded is representative of the natural behaviour of the teacher and the pupils. This difficulty does not necessitate the abandonment of classrooms as the place to collect data about the natural events of classrooms. It seems desirable

that the use of video-tape recordings be used to minimise the stress teachers experience when under obvious observation - especially when the observing team has a number of Teachers' College staff as members. While the lessons observed did appear to be natural, and the teachers when questions did agree that they had not noticed the presence of the team too much, it seems essential that some means of reviewing lessons, as provided by video-tapes, is the only completely satisfactory means of measuring all the desired variables concurrently. In addition there is no way of estimating the missed behaviours in the direct observation type study. The recorder focusing attention on behaviour one moment and the coding sheet the next will inevitably lose some incidents. Video-tape used in conjunction with a recorder working alongside an observer should eliminate the possibility of wastage. It is also possible to use more precise timing instruments to ensure greater accuracy of the duration of behaviour incidents. This study was undertaken with the long term aim of developing coding systems that could be used with video-taped lessons.

(iii) Techniques for Improving Objectivity.

In addition to the difficulties in direct observation it seems desirable that means be developed to subject data collected to more precise statistical analysis. Throughout the reportage of this study there has been a doubt as to the efficiency of the statistical measures being used to explore the inter-relationships among the variables being observed. It was for this reason that the main statistical focus has been on the intrateacher differences rather than those that

exist between teachers. Neither correlation coefficients nor the chi square statistic seem adequate for this purpose, and more sophisticated statistical techniques need to be developed to cope with the particular kinds of data encountered in classroom observations.

The use of concensus coding of the content and level components of verbal interaction seemed adequate for a study of this nature, but for a study from which generalisations may become a possibility, it seems desirable that more precise techniques be developed. The use of Adams' coefficient of intercoder reliability used for the mode codings, or some similar statistical procedure needs to be employed on the content and level codings. In practice it appeared that often the persuasiveness of the coder with the more definite opinion in arriving at a concensus could sway the decision of the other coders. This was however, overcome by repeated replays of the excerpt until, hopefully, an unbiased consensus was achieved.

Manual processing of the massive amount of data collected in studies even as modest as this present one, needs to be replaced by computer. Despite care in checking data analysed the likelihood of error is increased when manual techniques are used.

(iv) Future Research Directions in the Search for Understanding.

This study has merely scratched the surface of the analysis of classroom interactions. A great deal more evidence about the important variables that determine classroom behaviour is needed. It seems that the findings for variables focused on in this study give hope for

developing some understanding of the nature of the teaching-learning cycle. With modification and the achievement of greater precision, and an extension of the means of analysis of data, we can begin to know what is happening in New Zealand classrooms at different levels in different types of schools.

Further evidence of the relationship between teacher proximity to his pupils (or the distancing that occurs), and the nature and quality of verbal interactions needs to be explored. More information is also needed about the locational patterns of teachers in a larger sample than that reported here, and the patterns of pupil participation in the verbal interactions. Additional data is also needed on I.Q. and pupil participation in verbal interactions. It is necessary that the verbal interaction dimensions be analysed more systematically to see the relationship that exists between the effect of the level of teacher questioning on pupil response. A refinement of the pupil talk categories may be necessary to differentiate between response and initiation verbal behaviour.

If it is established through future research, that there are differences between teachers in classroom behaviour it might be desirable to ascertain the degree to which teacher role expectancy and role conflict are involved. If Thompson's (1972) findings about these are found to apply to a wider sample of teachers the establishment of differences based on these data might be worth pursuing in parallel to the kind of findings suggested by this study.

Group structure and the functional effects of different types of group or class activities need much additional

study to ascertain the relationship of these to pupil participation, teacher location and the dynamics of intragroup behaviour. It seems that some means of obtaining data on the verbal behaviour of pupils in small group activities must be developed. This would require a number of tape recorders being used to record the small group interactions, if all the behaviours of individual groups are to be captured for analysis. This, while a task of major proportions may be necessary to understand New Zealand classroom activities as group arrangements seem to be the most used form of furniture arrangement in classes at the primary and intermediate levels. In making tape recordings for the lessons on this study it was found that small group pupil-teacher interaction was able to be recorded successfully by fading out the omni-directional microphones and recording only via the teacher's neck microphone (where this was worn). The quality of teacher talk was excellent, and pupil talk, while at low level, was always codable. An essential for any future project would be a cordless neck microphone for the teacher and the placing of overhead microphones above each group.

Studies of classroom behaviour need to be extended to secondary institutions too if complete understanding and generalisability of findings is to be achieved. This latter must probably remain a distant goal, but it is only likely to be realised by the building up of data for classrooms at all levels in all subjects.

While we know comparatively little as yet about the natural events of our classrooms, it is believed that the data from this pilot study, suggest that New Zealand

classroom activities do have distinctive characteristics that preclude the use of generalisations from classrooms of other countries. The task of accumulating data which will further confirm this is likely to be an onerous but exciting one.

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APPENDIX A.

The formula for computing intercoder reliability in all the variable classes was an adaptation of that used by Adams (1965): $R = \frac{A - (\frac{1}{N - 1} \cdot D)}{A + D}$, where

A = No. of incidents of agreement,

D = No. of incidents of disagreement,

A + D = Total No. of incidents in the lesson segment, and

N = No. of tolerated coding incidents.

1. TEACHER LOCATION.

CODER	A	B	C
A	-	0.94	0.97
B	1.00	-	0.91
C	0.97	0.89	-

(i) No. of Teacher Location Moves.

(ii) No. of Teacher Duration Units.

MEANS	
(i)	0.95
(ii)	0.94

2. PARTICIPANT LOCATION.

CODER	A	B	C
A	-	0.90	0.87
B	0.92	-	0.82
C	0.94	0.81	-

(i) No. of Participant Verbal Interaction Units.

(ii) No. of Participant Verbal Interaction Units by Location.

MEANS	
(i)	0.89
(ii)	0.86

3. GROUP ACTIVITIES.

CODER	A	B	C
A	-		
B	0.84	-	
C	0.91	0.80	-

Incidence of Group Activities.

MEAN 0.85

4. VERBAL INTERACTION MODE (Means for the 3 x 5 minute Lesson Segments).

CODER	A	B	C
A	-	0.87	0.84
B	0.88	-	0.81
C	0.75	0.85	-

(ii) Lesson II
Teacher D (Maths)

(i) Lesson I
Teacher C (Soc St)

MEANS
(i) 0.83
(ii) 0.84

CODER	A	B	C
A	=	0.89	0.82
B	0.92	=	0.86
C	0.95	0.86	-

(iv) Lesson IV
Teacher G (Maths)

(iii) Lesson III
Teacher H (Soc St)

MEANS
(iii) 0.91
(iv) 0.86