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ABSTRACT

The study was conducted to gain an understanding of pupil-interaction and pupil-movement in an open-area learning environment. The only measures that were available were not sufficiently suitable and it was necessary to construct a new instrument to gain a valid measure of pupil behavior in a classroom setting. As a result, the Interaction-Network instrument was developed. Three elementary schools were used in the study. Two of the schools contained open-area classrooms and these constituted the experimental schools. The third school, which acted as the 'control' situation, employed a more traditional form of classroom instruction. Pupils from Grades 5, 6, and 7 participated. Samples of approximately 20% of the pupils in each grade at all three schools were observed. A descriptive analysis showed that there were major differences in both pupil-interaction and pupil-movement between the experimental schools and the control school. The role of the teacher was more pronounced in the traditional type school while in the open-area schools there was much more pupil-movement and pupil-interaction. Recommendations were made for the use of the instrument in future research. (Author)

RESEARCH REPORT

73-15

An Interaction-Network Instrument to Assess Pupil-Interaction and Movement in Open-Area Learning Situations.

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RESEARCH REPORT

AN INTERACTION - NETWORK INSTRUMENT TO ASSESS PUPIL - INTERACTION AND MOVEMENT IN OPEN - AREA LEARNING SITUATIONS.

July, 1973.

Peter Edwards

Research Report 73-15

Open-area at University Hill Elementary.

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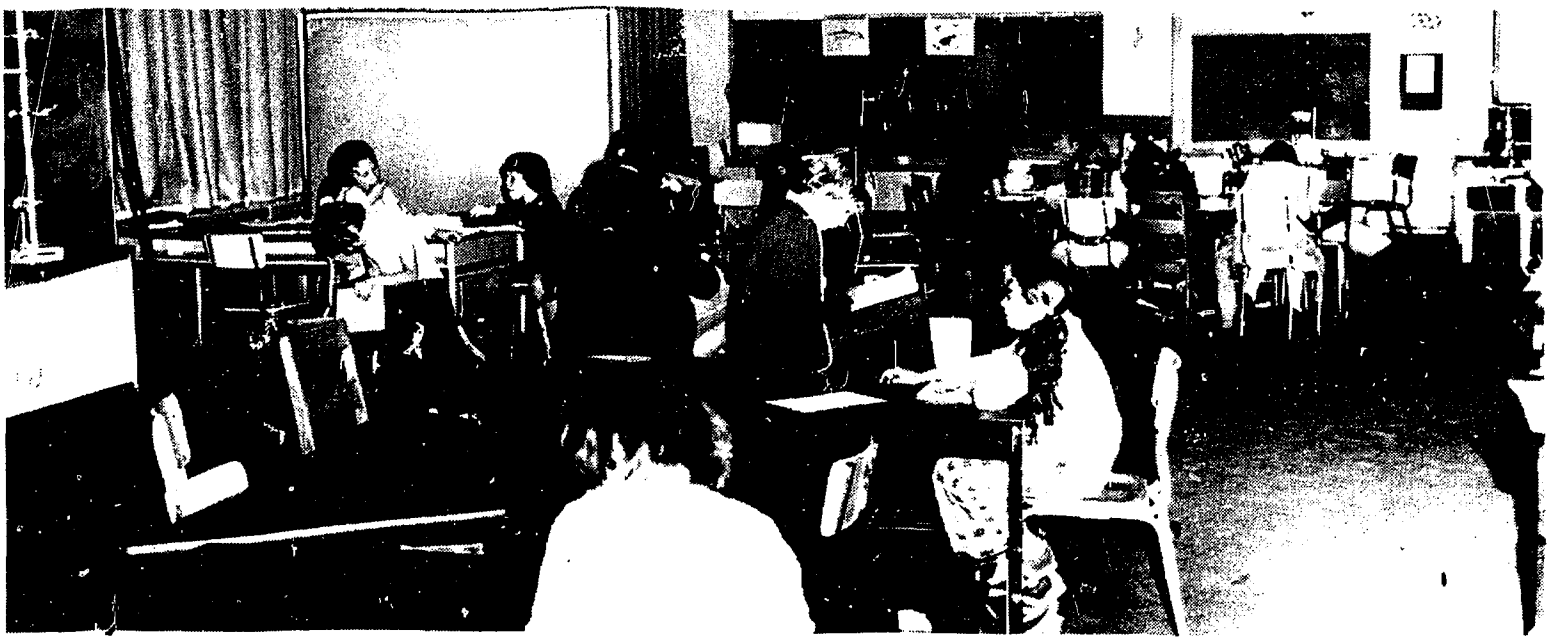
University Hill Elementary School
Queen Elizabeth Elementary School
Queen Mary Elementary School
Lord Kitchener Elementary School
South Hill Elementary School.

Open-area at Queen Elizabeth Elementary.



The pictures in this Report were taken by Marjean Borjesson, the Board's photographer.

TABLE OF CONTENTS

		Page
Abstract	.....	i
CHAPTER		
I	INTRODUCTION	1
	Background	1
	"Open - Area" Defined	1
	The Problem and Its Significance ..	2
	Purpose of the Study	2
	Limitations	2
II	REVIEW OF RELATED LITERATURE	3
	Early Research into Interaction ...	3
	The Open-Area Situation	4
	Future Research Questions	5
III	METHODOLOGY	6
	Design	6
	The Instrument	6
	Subjects	10
	Procedure	10
IV	RESULTS	11
	University Hill	12
	(a) Interaction Analysis	12
	(b) Network Analysis	13
	Queen Elizabeth	15
	(a) Interaction Analysis	15
	(b) Network Analysis	16
	Lord Kitchener	18
	(a) Interaction Analysis	18
	(b) Network Analysis	19
	Summary of Findings	21
	A. The Schools	21
	B. Evaluation of the Instrument ..	21
V	CONCLUSIONS AND RECOMMENDATIONS	22
	Conclusions	22
	Recommendations	22
	BIBLIOGRAPHY	24

LIST OF TABLES

Table		Page
I	Number of Boys and Girls in Grades 5, 6, and 7 Who Were Observed in Each of the Three Elementary Schools	10
II	The Total Number of Pupil-Interactions and Their Percentages for Each Category of the Interaction-Analysis Component, at the University Hill Elementary School	12
III	The Total Number of Pupil-Interactions and Their Percentages for Each Category of the Interaction-Analysis Component, at the Queen Elizabeth Elementary School....	15
IV	The Total Number of Pupil-Interactions and Their Percentages for Each Category of the Interaction-Analysis Component, at the Lord Kitchener Elementary School	18

LIST OF FIGURES

Figures		Page
1	The Ten Categories of the Interaction-Analysis Component of the Interaction-Network Instrument	6
2	An Early Design of the Network-Analysis Component of the Interaction-Network Instrument	7
3	The Network Analysis Component of the Interaction-Network Instrument	8
4	A Five-Minute Observation of Pupil-Interaction Made on an "Interaction Recording Sheet".	9
5	The Number of Interactions Observed For an Individual Pupil, and a Summary of the Results	11
6	The Percentages of Total Observation Time Spent by Students in Each Location at University Hill Elementary School Measured by the Network Analysis Component. Figures in brackets represent the number of pupils involved. (N = 18)	13
7	The Percentages of Total Observation Time Spent by Students in Each Location at Queen Elizabeth Elementary School Measured by the Network Analysis Component. Figures in brackets represent the number of pupils involved. (N = 13)	16
8	The Percentages of Total Observation Time Spent by Students in Each Location at Lord Kitchener Elementary School Measured by the Interaction-Network Component. Figures in brackets represent the number of pupils involved. (N = 17)	20

ABSTRACT

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Three elementary schools were used in the study. Two of the schools contained open-area classrooms and these constituted the experimental schools. The third school, which acted as the 'control' situation, employed a more traditional form of classroom instruction. Pupils from Grades 5, 6, and 7 were used in the study.

Samples of approximately 20% of the pupils in each grade at each of the three schools were observed. A descriptive analysis showed that there were major differences in both pupil-interaction and pupil-movement between the experimental schools and the control school. The role of the teacher was more pronounced in the traditional type school while in the open-area schools there was much more pupil-movement and pupil-interaction.

A number of recommendations were made concerning the use of the Interaction-Network instrument in future research.

AN INTERACTION-NETWORK INSTRUMENT TO ASSESS PUPIL-INTERACTION AND MOVEMENT IN OPEN-AREA LEARNING SITUATIONS

I. INTRODUCTION

Background

In 1972-73, the Open-Area Teacher Preparation Program (O.A.T.P.P.) was co-sponsored by the Faculty of Education at the University of British Columbia (U.B.C.) and the Vancouver School Board (V.S.B.). This training program, which was offered by the Elementary Division of the Faculty of Education, was an optional course for graduate students in fifth year Education programs.

The O.A.T.P.P. was a result of the great increase in open-area instruction taking place in classrooms throughout British Columbia. Allen (1972) pointed out that there were approximately 260 schools with open-area classrooms currently operating in the Province in May 1970, with a further 31 open-area classrooms under construction.

The major concern of the O.A.T.P.P. was to determine what type of training was most suitable for prospective teachers in open-area classrooms. The following are samples of the 'essential elements' suggested for teacher training in the O.A.T.P.P.:

1. Knowing how children differ in learning and development.
2. Formulating goals related to promoting continuous pupil progress.
3. Team-teaching skills.
4. Humanistic interactions.

(Moody and Gray III, 1972).

"Open-Area" Defined

The definition of "open-area" given in the description of the U.B.C/V.S.B. Project on Open-Area Teaching, was used in the study.

> Psychologically, an open-minded way of thinking about children, learning, and teaching is required in order to capitalize on the spatial openness of open-area classrooms. Open-area teachers think of children as individuals (rather than as a class) having the potential to become mature, self-reliant, responsible, life-long learners, with the assistance of teacher guidance and the provision of learning resources. Open-area teachers team-teach as a means of optimizing

their own personal and professional development and as a means of optimizing the developmental and learning potential of each child. Open-area teachers respond to the need of helping pupils become life-long learners by providing for 3 types of learning, each necessary and each complementary of the others.

a. individualized learning of essential concepts and skills in all curriculum areas in accordance with individual learner's needs, aptitudes, and interests. (This is teacher-centered in that teachers prescribe, direct and evaluate all aspects of the learning process).

b. personalized learning or personal discovery of important concepts and skills in curriculum topics of special relevance to each pupil. (This is teacher/pupil-centered in that both parties collaborate in prescribing, directing and evaluating all aspects of the learning process).

c. independent learning of whatever particularly interests each pupil. (This is pupil/learner-centered in that mature, self-reliant, responsible pupils plan, direct, and evaluate their own learning without need of teacher monitoring).

Educationally, this different way of thinking about children, learning and teaching is called Open Education.

(Moody and Gray III, 1972).

The Problem and its Significance

Research studies conducted into the advantages and disadvantages of open-area educational methods compared with traditional programs of instruction are inconclusive in their findings (Allen, 1972). There is a vital need to examine closely the effect that open-area education is having on pupils' cognitive, affective, social and psychomotor development so that sound educational planning can take place. Existing instruments used to measure a pupil's progress in school, however, often do not elicit the required information necessary to answer research questions. Thus new instruments and approaches must be innovated. The results of this research would relate directly to the O.A.T.P.P. and offer valuable feedback to the educational planners concerned with the training of teachers for open-area situations in British Columbia.

Purpose of the Study

The Vancouver School Board's research role in the O.A.T.P.P. was concerned with the evaluation of pupil performance, plus an analysis of

pupil-interaction with other members of the school population in an open-area learning environment. This information would aid the formulation of improved methods of teaching instruction. In order to accomplish the analysis of pupil-interaction, it was necessary to make use of a suitable technique which would focus appropriate attention on the pupil-interaction which was taking place. This examination of pupil behaviour was designed to be descriptive in nature and it was not meant to be an evaluation either of any one teaching technique or of any one school compared with another.

Limitations

1. As only a small sample of the total pupil enrolment in each school could be used, care should be taken in interpreting the results. The behaviour reported, however, did appear indicative of the general tone of the schools used in the study.

2. The study was involved with only Grades 5, 6, and 7 from two open-area elementary schools and therefore the data obtained were restricted to the grades and schools concerned.

3. The presence of two observers in a classroom could have caused a "Hawthorne Effect" which may have tended to make the pupils act in a more 'stereotyped' manner, thus accentuating the differences between the open-area and traditional classroom effects.

4. The Interaction-Analysis component of the Interaction-Network instrument was not designed to record many of the more subtle forms of verbal and non-verbal expressions used in the normal process of communication.

5. The study did not attempt to analyse sequences of interaction or cause and effect relationships of behaviour in the classroom. Consequently, the more advanced stage of coding the categories of interaction in pairs and tabulating an interaction analysis matrix (see Flanders, 1970, pp. 75-86) was not performed.

II. REVIEW OF RELATED LITERATURE

Early Research into Interaction

A great deal of research in education has examined social interaction in the classroom. Lewin, Lippett, and White (1939) began to study interpersonal interactions of children in various social climates. Their work was followed by Jenning's (1947) research into the socio and psyche groups operating in the complex network of inter-relationships in learning situations. Thelen (1951) and other researchers at the University of Chicago began to develop a theory of instruction which had a theoretical and empirical orientation and which was based on an interdisciplinary approach.

The first of the studies which concentrated on the teacher's verbal behaviour as an indicator of social climate was Withall (1949). He developed a "Climate Index" fox analyzing the verbal behaviour of teachers in classrooms. The "Climate Index" was used to categorize teachers' statements made in response to students' questions, statements, and responses. Flanders (1949) investigated the interaction between teachers and students to see how it contributed to classroom learning. Subsequent research by Flanders (1959, 1970) and Thelen (1959a, 1959b) continued to examine this aspect of social interaction in education.

As Withall and Lewis (1963) pointed out, however, much of the early research into classroom learning was conducted in totally different situations to those applying today. Much of the research also concentrated on teacher attributes (e.g. skills, techniques) and little regard was paid to the pupils in the classroom setting.

Recent research studies have been more involved with multiple-criteria which purport to conceptualize the significance of student behaviour in the classroom. (Withall, 1962) Medley (1968) reasoned that attempting to analyse and rate behaviour was impractical. He stressed an observational system which purported to 'measure' behaviour. From this premise the P.R.O.S.E. (Personal Record of School Experiences) instrument was developed. The P.R.O.S.E. contained a large number of items which were designed to measure young children's experiences.

The Open-Area Situation

The introduction of open-area schools and the concept of "freedom with responsibility" for students necessitated a fresh look by educational researchers at their evaluative instruments.

Dill emphasized the urgency of the matter by stating:

> 'No longer can one enter a classroom, do a Flander's Interaction Analysis, "read the face of the matrix" with the data thus collected and know the nature of the interaction between students and teacher'. (Dill, 1972, p. 1)

Dill maintained that a 'principle of equifinality' dominated open systems of learning making it possible for students to reach desired objectives by a number of different patterns or routes of behaviour. Another approach was offered by Dopyera (1972) who constructed an Open Program Structure Index (OPSI) which enabled various categories of student behaviour to be assessed.

The need for continued research into the area of social interaction in education is emphasized by the findings of a recent study of open-area schools in British Columbia.

> "Teachers seem reasonably satisfied with open areas... Increased interaction with and between students seems to be one of the principal reasons for this satisfaction." (Allen, 1972)

Barclay (1972) points out, however, that all of the existing systems of measuring the classroom environment have doubtful validity. He states that the presence of an observer is an uncontrolled variable which can seriously affect the study. Barclay then offers his own comprehensive model for examining classroom environment, involving the evaluation of a multi-component inventory of classroom climate by means of a computer.

Future Research Questions

1. "Does the pupil in the open-area school exhibit more 'productive thinking' than his counterpart in the traditional classroom?" (Berlyne, 1965)

2. "Does the pupil in the open-area school have a better grasp of concepts and generalizations?" as Bruner (1960) would suggest.

3. "Is a permissive atmosphere in the classroom more conductive to creative growth?" Torrance (1967) asserts that this is indicated.

4. Is the following situation indicative of open-area schools?

   'Open plan schools emphasize the social development and self-discipline of the pupils... The child is expected to plan his day and determine a priority of activities to engage in... Pupils are encouraged to do things for themselves and to interact with the teacher as a resource person rather than as an authority.' (Wilson, Langevin, & Stuckey, 1969, p. 2).

For the purposes of this study, it seemed desirable to use an approach which would benefit from the previous research conducted into the use of an interaction - analysis technique, and also take into account the criticisms of Barclay and others. As a result, an "interaction - network" model was constructed. A description of this instrument is given in the following chapter.

For those readers who would like to obtain further information on the use of observational techniques to study teacher and pupil interaction, the discussions by Medley and Mitzel (1963) and Rosenshine and Furst (1973) offer comprehensive coverage.

III. METHODOLOGY

Design

Three elementary schools were used in the study. Two of the schools were being used as training areas for the Open-Area Teacher Preparation Program (O.A.T.P.P.) and therefore they supplied the experimental group of pupils. The third school was selected for its traditional approach to classroom instruction and it served as the control situation. The intermediate grades (5, 6 and 7) were used in the study, as they constituted the levels for which the teachers were being professionally trained.

The Instrument

In order to study pupil-interaction and behavioural characteristics in an open-area situation, several measuring instruments were examined. The Flander's Interaction Analysis technique was tested in the two elementary schools with open area classrooms. The main purpose of the Flander's system, however, was to study teaching behaviour and therefore it was not deemed suitable for the purposes of the study. Dill's Network Analysis approach was also considered, but the lack of a verbal-interaction component in Dill's model made its use inappropriate. It was therefore necessary to design an instrument which would record both verbal and non-verbal pupil-interactions as well as provide a description of pupil movement within a learning environment.

The Interaction-Network (I-N) model was composed of two basic sections. One section contained ten categories of behaviour (see Figure 1) designed to record all aspects of pupil interaction. The second section consisted of a schematic diagram representing pupil-movement through-out the learning environment.

Category	Key: (P) = Pupil being observed
1. (P) talks to T	P = Other pupils
2. T talks to (P)	
3. (P) talks to P	T = Teacher
4. P talks to (P)	
5. (P) talks to O	O = Other people
6. O talks to (P)	
7. (P) works (studying)	
8. (P) works (activity)	
9. (P) plays (organized)	
10. (P) plays (unorganized)	

FIGURE 1: THE TEN CATEGORIES OF THE INTERACTION-ANALYSIS COMPONENT OF THE INTERACTION-NETWORK INSTRUMENT.

(Figures and Tables were constructed by Lynne Murdoch and Lynne Durward.)

A number of techniques were experimented with in an attempt to depict graphically pupil-movement in a learning environment. Early designs attempted to show pupil-movement as a series of sequentially arranged locations where interactions may have occurred. (See Figure 2)

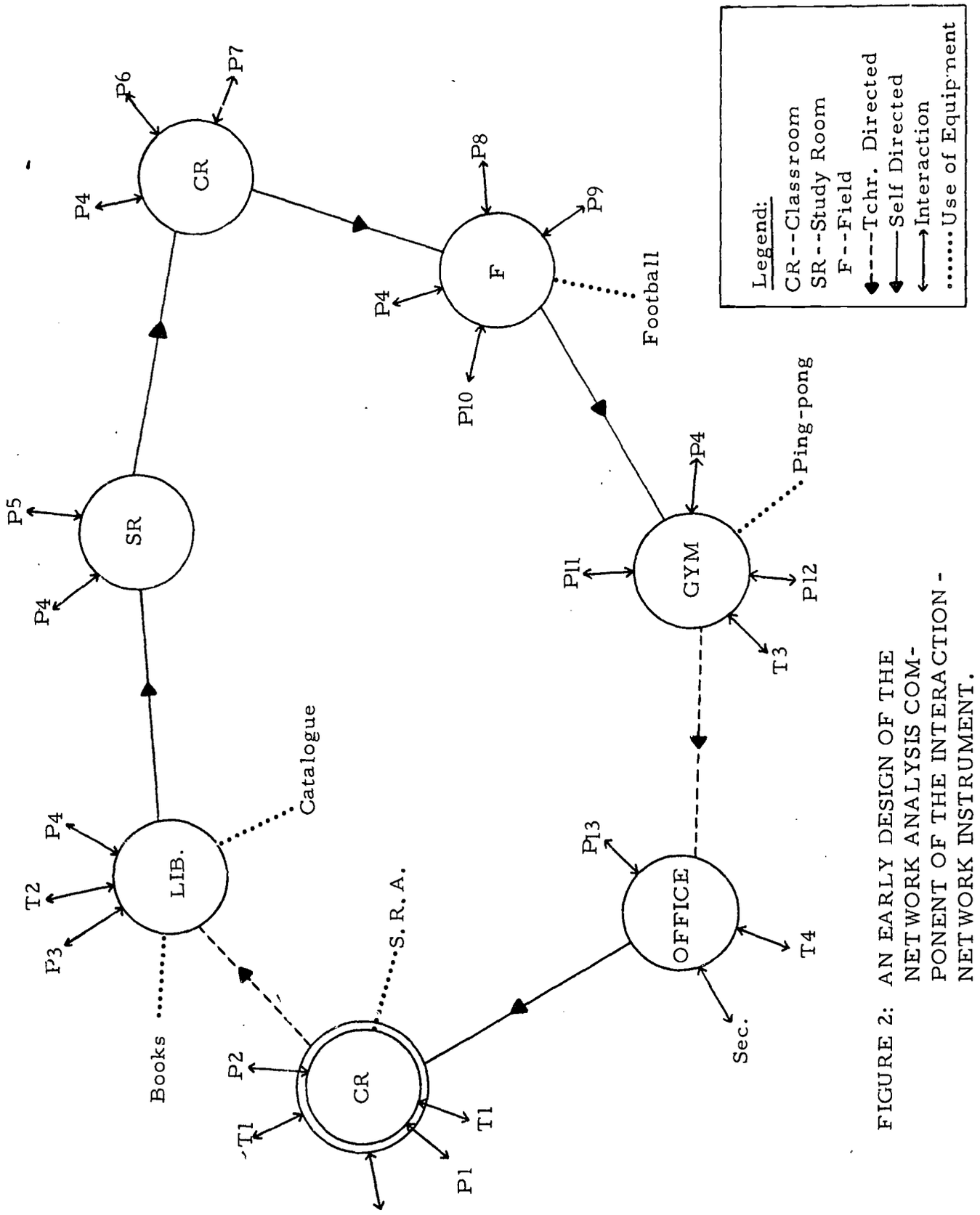


FIGURE 2: AN EARLY DESIGN OF THE NETWORK ANALYSIS COMPONENT OF THE INTERACTION - NETWORK INSTRUMENT.

However, the need to be able to distinguish clearly the return visits of pupils to a specific area led to the development of the existing procedure which is presented in Figure 3.

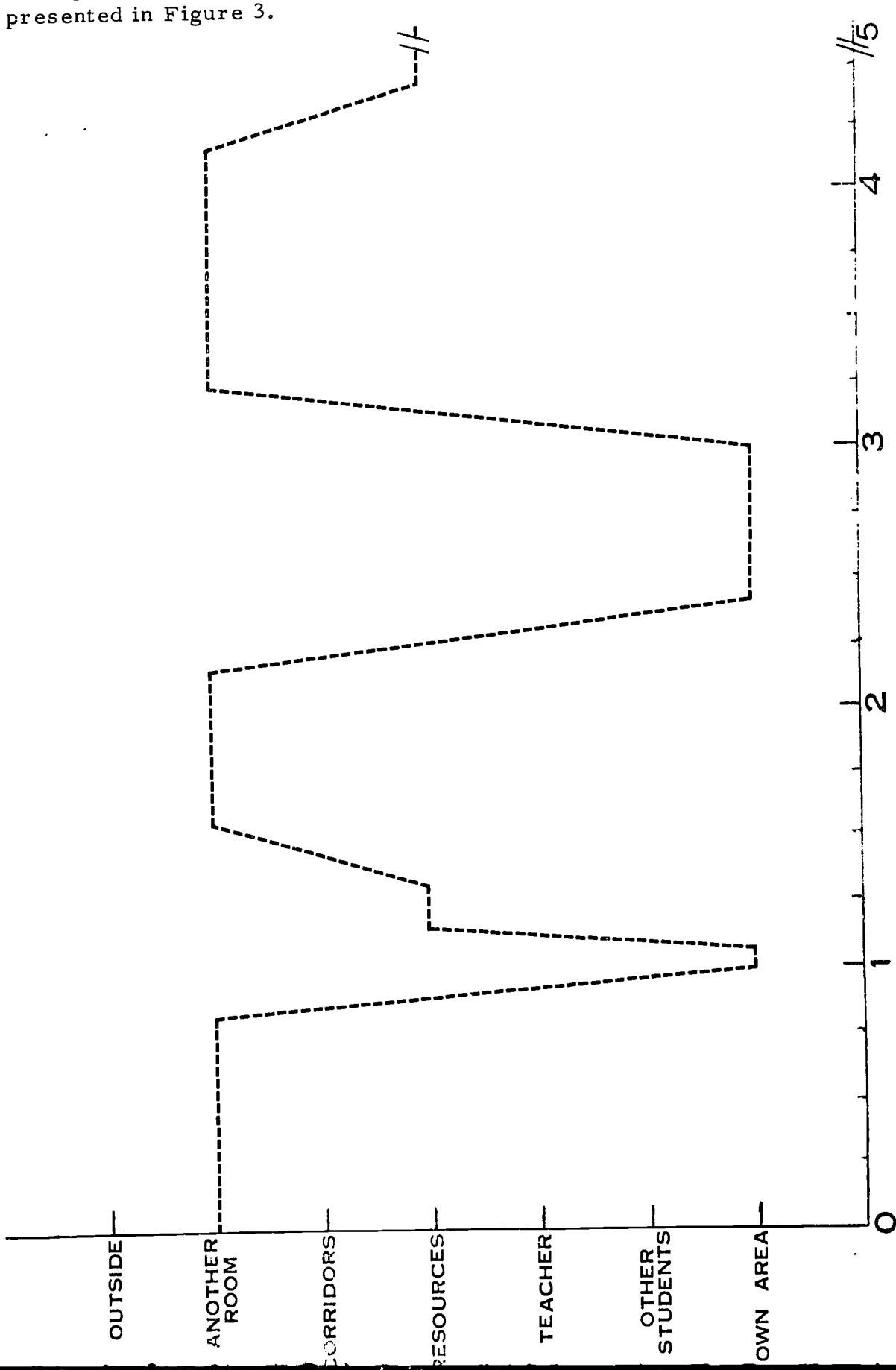


FIGURE 3: A FIVE-MINUTE OBSERVATION OF PUPIL-MOVEMENT MADE ON A "NETWORK RECORDING SHEET."

INTERACTION RECORDING SHEET

SCHOOL QUEEN ELIZABETH BOY -- GRADE 7 DATE 27 · 2 · 73

1	2	3	4	5	6	7	8	9	10	11	12
3	4	3	4	3	4	3	4	3	4	1	2
I	AT LIBRARY SHELVES. MEETS PUPIL 1. (P1)					MOVING OUT OF THE LIBRARY.				SAYS 'GOOD-BYE' AND LEAVES THE LIBRARY.	
3	4	3	4	3	4	3	4	8	8	8	8
II	ARRIVES BACK IN THE CLASSROOM.	LOOKS IN BOX. (RESOURCES)		GOES TO THE OPEN AREA. (ANOTHER ROOM)						LOOKS AT THE AQUARIUM.	
3	4	3	4	3	4	3	4	3	4	3	4
III	JOINED BY PUPIL 2. (P2)	GOES BACK TO THE CLASSROOM.		JOINED BY P1.							
3	4	3	4	3	4	8	8	8	8	8	8
IV	GOES BACK TO THE OPEN AREA. (ANOTHER ROOM) P1 AND P2 ARE WITH HIM.										
3	4	3	4	8	8	8	8	8	8	8	3
V	WANDERING AROUND WITH P1 AND P2 LOOKING AT THE GUINEA PIGS. (RESOURCES)										

FIGURE 4: A FIVE-MINUTE OBSERVATION OF PUPIL-INTERACTION MADE ON A "INTERACTION RECORDING SHEET".

Two trained observers operated the I-N instrument. One observer was responsible for recording on a work sheet (see Figure 4), all pupil interactions (at five second intervals) while the second observer plotted the pupil's movement.

Subjects

Because of the number of students involved, sampling procedures were used in the three elementary schools selected for the study. Approximately 20% of the pupils in each of Grades 5, 6, and 7 from each of the schools were observed. Equal numbers of boys and girls were used in the study (See Table I). Care was taken to ensure that a variety of the main content areas (English, Social Studies, Math and Science) were observed at similar periods of the school day.

TABLE I: NUMBERS OF BOYS AND GIRLS IN GRADES 5, 6, AND 7 WHO WERE OBSERVED IN EACH OF THE THREE ELEMENTARY SCHOOLS.

	University Hill		Queen Elizabeth		Lord Kitchener		
Grade	Boys	Girls	Boys	Girls	Boys	Girls	Total
5	4	2	1	1	4	2	14
6	3	3	2	3	3	3	17
7	3	3	3	3	2	3	17
Total	10	8	6	7	9	8	48
	18		13		17		

Total Number of Boys -- 25
Total Number of Girls -- 23

Procedure

The two observers who constituted the Interaction-Network (I-N) team, positioned themselves on one side of the room and selected a pupil. One observer recorded the category of interaction that took place every five seconds while the other observer noted the pattern of movement of the pupil. Both observers endeavoured to make anecdotal comments on their sheets during the period which usually lasted for about five minutes.

The observers then checked the reliability of their work by comparing the independent results they had obtained. (Trial runs of the I-N instrument made before its use in the study produced figures of over 90% concurrence between observers.) This procedure was then repeated for other members of the class. The observers made certain that they selected pupils of both sexes from all parts of the room. Finally the results obtained from the observation (or a number of separate observations) were tallied on a sheet and a table of the frequencies for all interactional categories was compiled. (See Figure 5)

Category	Tally	Total	%
1	/	1	1.7
2	/	1	1.7
3	𝍸 𝍸 𝍸 𝍸 /	21	35.0
4	𝍸 𝍸 𝍸 𝍸	20	33.3
5		0	0
6		0	0
7		0	0
8	𝍸 𝍸 𝍸 //	17	28.3
9		0	0
10		0	0
		60	

FIGURE 5: THE NUMBER OF INTERACTIONS OBSERVED FOR AN INDIVIDUAL PUPIL. EACH CATEGORY OF INTERACTION IS EXPRESSED AS A PERCENTAGE OF THE TOTAL.

IV. RESULTS

The results of all pupil-interactions for each of the three schools used in the study are presented in TABLES II, III, and IV. The total time spent by pupils in each location at each of the three schools is presented in Figures 6, 7, and 8. The schools will be discussed in the following order: University Hill, Queen Elizabeth, and Lord Kitchener.

University Hill

(a) Interaction Analysis

TABLE II: THE TOTAL NUMBER OF PUPIL-INTERACTIONS AND THEIR PERCENTAGES FOR EACH CATEGORY OF THE INTERACTION-ANALYSIS COMPONENT AT THE UNIVERSITY HILL ELEMENTARY SCHOOL.

	University Hill	
	Total	%
(P) talks to T	106	8.6
T talks to (P)	70	5.7
(P) talks to P	262	21.2
P talks to (P)	230	18.7
(P) talks to O	-	-
O talks to (P)	-	-
(P) works (studying)	348	28.2
(P) works (activity)	150	12.2
(P) plays (organized)	-	-
(P) plays (unorganized)	67	5.4

Legend: (P)--Pupil P--Other Pupils
T--Teacher O--Other People

The main areas of pupil-interaction at this school were in the "pupil-pupil" category (39.9%) and in the "work" category (40.4%). In the latter case, a considerable proportion of "pupil work" was recorded as study-type work of an individual nature. Pupils appeared able to work from a number of resource areas including text books, pin-up boards, displays, libraries, etc. A much smaller amount of interaction (14.3%) was involved with a teacher. Only 5.4% of pupil-interaction was classified as "disorganized play".

(b) Network Analysis

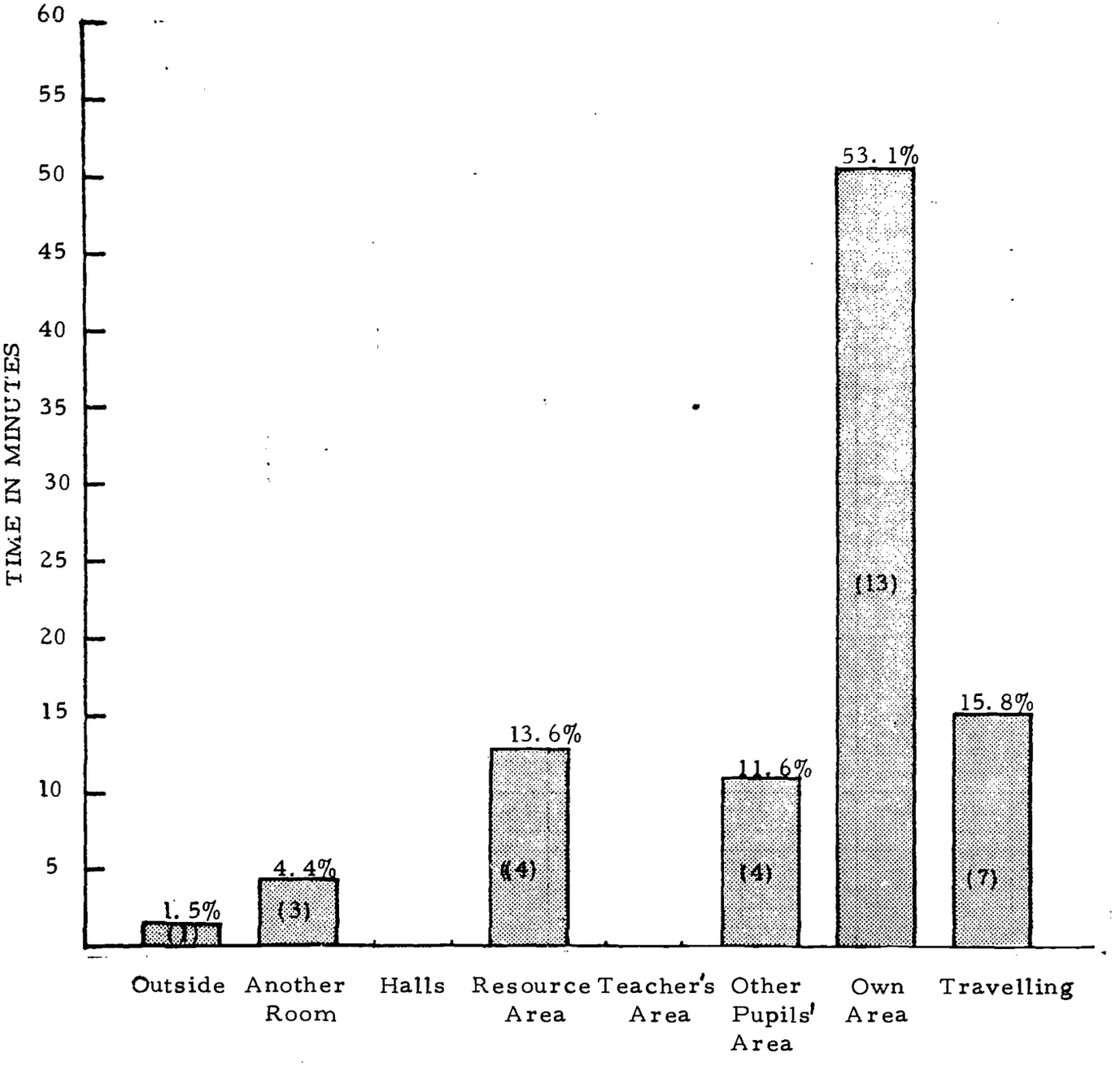


FIGURE 6: THE PERCENTAGE OF TOTAL OBSERVATION TIME SPENT BY STUDENTS IN EACH LOCATION AT UNIVERSITY HILL ELEMENTARY SCHOOL. Figures in brackets represent the number of students involved. (Total N = 18)

The pupils spent over half of their time (53.1%) in their own work area. The amounts of time spent in travelling from one location to another (15.8%); at a resource area (13.6%); or with other students (11.6%), were fairly evenly distributed. Probably because the open-area at the school is quite large and very well equipped, the pupils did not spend much time either in another room (4.4%) or outside (1.5%). The pupils being observed did not need to move to clearly defined "teacher's areas" because of the mobility of the staff in the learning environment.

UNIVERSITY HILL ELEMENTARY SCHOOL OPEN-AREA

Group work with the teacher.

Helping one another solve the problem.

Getting on with w··k activities.

Queen Elizabeth

(a) Interaction Analysis

TABLE III: THE TOTAL NUMBER OF PUPIL-INTERACTIONS AND THEIR PERCENTAGES FOR EACH CATEGORY OF THE INTERACTION-ANALYSIS COMPONENT AT THE QUEEN ELIZABETH ELEMENTARY SCHOOL.

	Queen Elizabeth	
	Total	%
(P) talks to T	139	13.4
T talks to (P)	128	12.3
(P) talks to P	173	16.7
P talks to (P)	273	26.3
(P) talks to O	-	-
O talks to (P)	-	-
(P) works (studying)	89	8.6
(P) works (activity)	236	22.7
(P) plays (organized)	-	-
(P) plays (unorganized)	-	-

Legend: (P)--Pupil P--Other Pupils
T--Teacher O--Other People

The greatest concentration of interaction was between pupils (43.2%). This was facilitated by the seating arrangement which placed small groups of pupils around clusters of desks. 30.5% of the total interaction was classified as "work", and of this amount slightly over 20% consisted of work activity as distinct from "study-type" activity (8.7%). Approximately one-quarter of the pupil-interaction (25.7%) was involved with a teacher. There were no instances of "play" recorded although one pupil did spend a considerable amount of time wandering from one area to another. This was recorded as "work-activity".

(b) Network Analysis

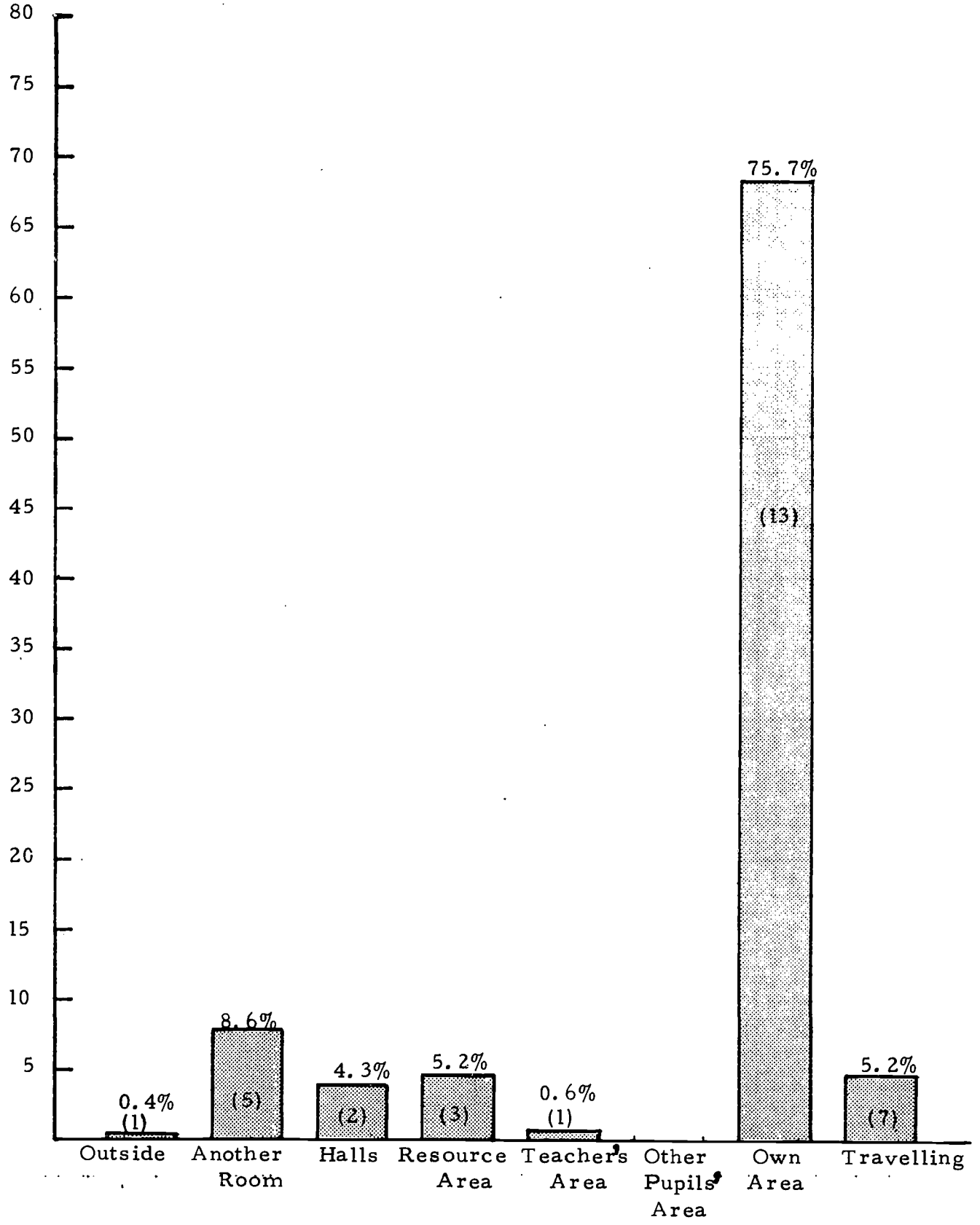
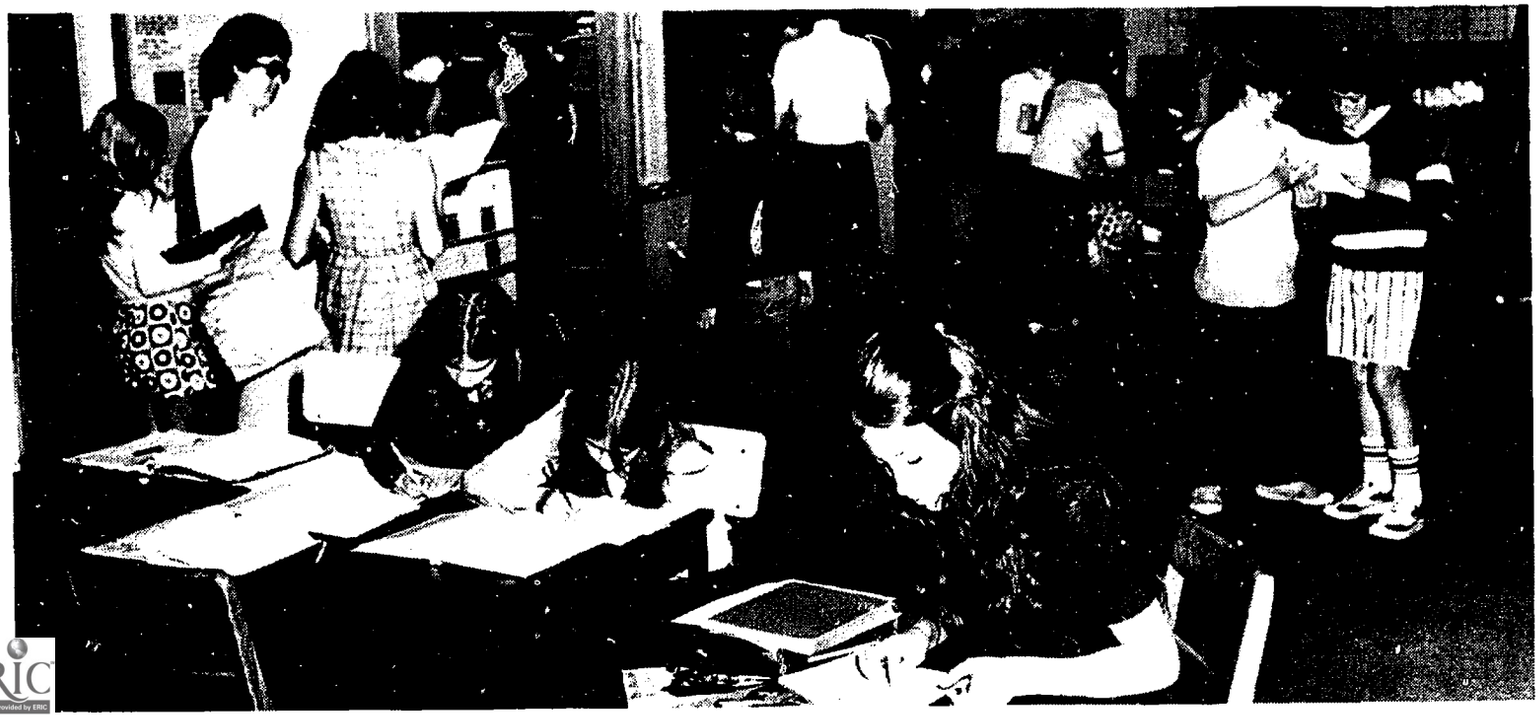


FIGURE 7: THE PERCENTAGES OF TOTAL OBSERVATION TIME SPENT BY STUDENTS IN EACH LOCATION AT QUEEN ELIZABETH ELEMENTARY SCHOOL MEASURED BY THE NETWORK ANALYSIS COMPONENT. FIGURES IN BRACKETS REPRESENT THE NUMBER OF PUPILS INVOLVED. (N = 13)

Above: Getting down to the Job.
Upper Right: A time for private study.
Opposite: A co-operative effort.
Below: Getting on with work activities.



Three quarters of the pupils' time was spent in their own area (75.7%). The seating arrangement (mentioned in Interaction Analysis) allowed considerable pupil-interaction without requiring the pupils to move about. The time spent in another room (8.6%) occurred when pupils visited the library or moved to a classroom directly opposite the open area. Small periods of time were involved in travelling to and from these other areas (5.2%); being in a resource area (5.2%); or working in a corridor (4.3%).

Lord Kitchener

(a) Interaction Analysis

TABLE IV: THE TOTAL NUMBER OF PUPIL-INTERACTIONS AND THEIR PERCENTAGES FOR EACH OF THE CATEGORIES OF THE INTERACTION-ANALYSIS COMPONENT AT THE LORD KITCHENER ELEMENTARY SCHOOL.

	Lord Kitchener	
	Total	%
(P) talks to T	15	1.4
T talks to (P)	409	37.8
(P) talks to P	85	7.9
P talks to (P)	266	24.6
(P) talks to O	-	-
O talks to (P)	-	-
(P) works (studying)	202	18.7
(P) works (activity)	63	5.8
(P) plays (organized)	-	-
(P) plays (unorganized)	42	3.8

Legend: (P)--Pupil P--Other Pupils
T--Teacher O--Other People

Almost 40% of the total interaction observed at the 'control' school was between teacher and pupil (39.2%). The great majority of this interaction (37.8%) consisted of the teacher presenting content material to the class. Desks were placed in evenly distributed rows, and pupil to pupil interaction (32.5%) occurred mainly between pupils who were seated near one another. The "work-activity" which accounted for about 25% of the time, was predominantly of a "study-type" nature (18.7%). There was little movement by pupils around the classroom, except when they distributed resource material or worked at the front of the room. Only 3.8% of the pupil interaction was recorded as "disorganized play".

(b) Network Analysis

The vast majority of pupil-time (85%) was spent at their desks. The teacher was usually at the front of the room and the lesson was directed from this position. A number of pupils (4) moved from their seats to distribute materials or work at the front board (13.5%). Only one pupil was observed to move to another pupil's area (1.5%). Undoubtedly other types of lessons take place at the school. The lessons reported here, however, serve to act as a sample of the more traditional, teacher-directed form of presentation. (See Figure 8, page 20)

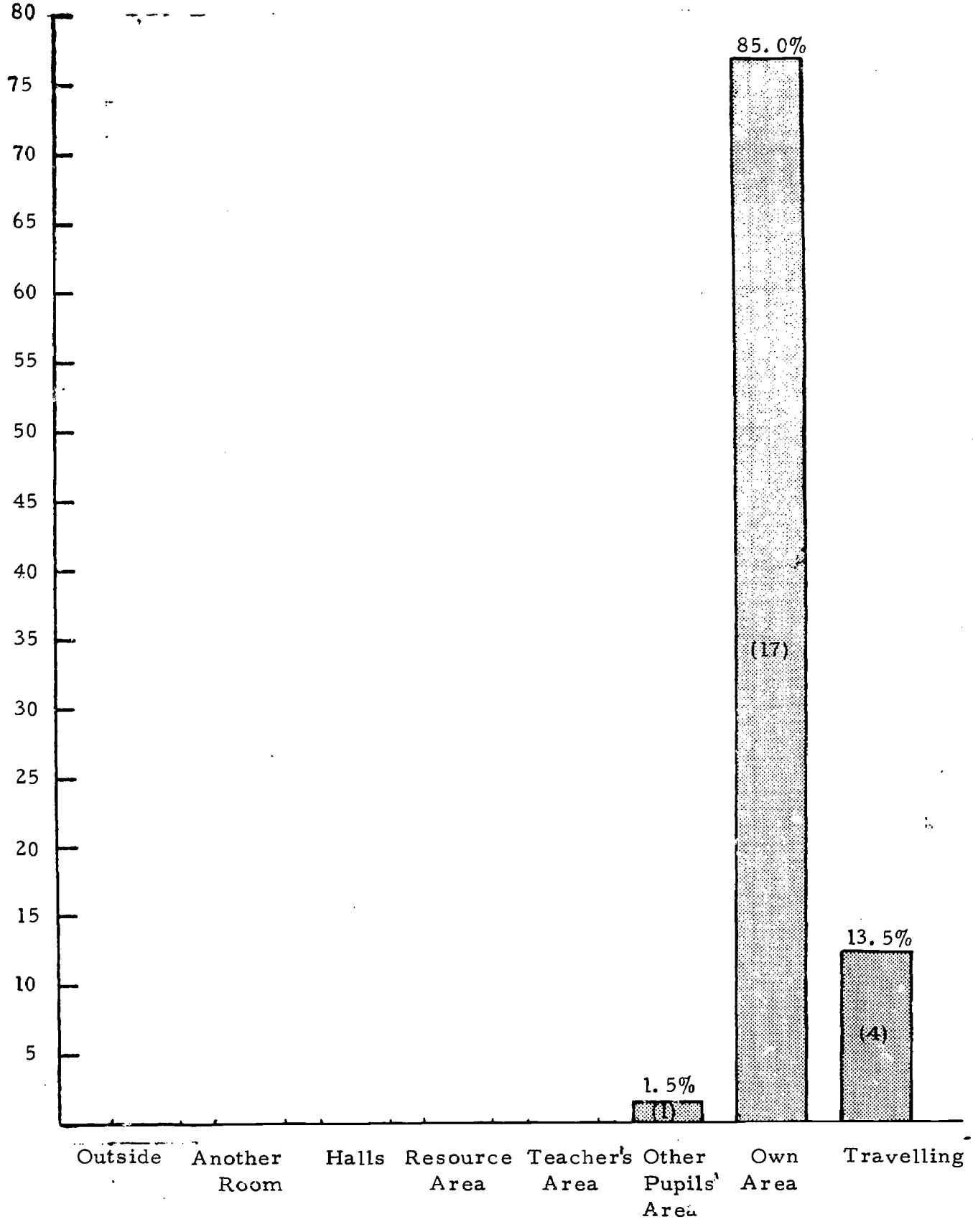


FIGURE 8: THE PERCENTAGES OF TOTAL OBSERVATION TIME SPENT BY STUDENTS IN EACH LOCATION AT LORD KITCHENER ELEMENTARY SCHOOL MEASURED BY THE INTERACTION-NETWORK COMPONENT. FIGURES IN BRACKETS REPRESENT THE NUMBER OF PUPILS INVOLVED. (N = 17)

SUMMARY OF FINDINGS

A. The Schools

University Hill

The pupils under observation spent over half their time in their own area and were mainly engaged in individual study or activities involving other children. The teachers mingled freely with the pupils and few of the pupils moved outside the open-area environment.

Queen Elizabeth

Although the pupils being observed spent three-quarters of their time in their own area there was considerable interaction with other children owing to the seating arrangements in the open-area. The teachers tended to move among small clusters of pupils and a good deal of pupil-teacher interaction also occurred. The pupils were mainly engaged in 'activity' type work.

Lord Kitchener

Most of the pupils used in the study stayed in their own area during the observation period. Some movement occurred when pupils moved to the front of the room or helped the teacher display visual aids. The greatest amount of interaction was between pupil and teacher with the teacher presenting content material or giving instructions to the class. Pupil-pupil interaction occurred mainly between children who were seated in close proximity to one another.

B. Evaluation of the Instrument

The Interaction-Network instrument was relatively easy to use and no major problems were encountered by observers during the study. There was always the danger that the presence of observers in a classroom would inhibit normal pupil behaviour, but in the schools visited, the children did not appear to be unduly affected.

The two components of the instrument will now be discussed separately.

(a) The Interaction Component

All of the ten categories are concerned with pupil-interaction of one form or another. Seven of the ten categories record interactions which have been initiated by the pupil being observed, and the other three categories involve interactions which have been initiated by others. It was therefore possible to construct a description of the types of social interaction engaged in by a pupil in a learning environment. The use of annotated notes on each of the recording sheets contributed to the accuracy of the interactional description as it allowed for an immediate reliability check by the two observers. The five-second interval for each of the interactions

was found to be of sufficient length to permit the recording of relevant data.

The need for an additional category of pupil-interaction was discovered during the study. It was found that when a pupil was wandering aimlessly around the open-area, his/her behaviour was categorized as #8, 'activity type work'. It would have been more appropriate to define this behaviour under a more descriptive category.

(b) The Network Component

The schematic-diagram approach which was used to plot pupil-movement, complemented the interaction analysis of the pupil being observed. The various locations in the school which were visited by the pupil as well as the amount of time spent in each area, were clearly indicated on the chart. It was also possible to determine how long a pupil took to travel from one location to another, by measuring the difference between any two consecutive points at different levels, on the calibrated time scale on the base-line of the chart.

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The use of the Interaction-Network instrument to describe pupil-interaction and pupil-movement in an open-area environment resulted in a number of clear distinctions being made.

1. There were major differences between the open-area situations and the traditional classroom in terms of pupil-teacher interaction and pupil-movement. The greater mobility afforded the pupil in the open-area classroom necessitated a similar mobility on the part of the teacher. The traditional teacher-pupil relationship observed in the 'control' school was non-existent in the two open-area schools. As a result, entirely new teaching and learning strategies had to be adopted in the latter situations.

2. Some differences were noted between the two open-area schools. The large space at University Hill School and the availability of more resource materials meant that there was more pupil-movement and less interaction with the teacher than there was at Queen Elizabeth School.

3. The Interaction-Network instrument did not make a clear enough distinction between some types of pupil-interaction. In particular, it was difficult to classify 'aimless wandering' under any category other than "work activity", which was not a satisfactory arrangement.

Recommendations

The section of the study dealing with the Interaction-Network instrument was primarily designed to describe quantitative and qualitative aspects of pupil behaviour in an open-area situation. Consequently, the recommendations relate to the future use of the Interaction-Network instrument.

1. An additional category needs to be added to the ten categories in the Interaction-Analysis component of the instrument. The new category would record pupil behaviour which was described as 'aimless wandering', 'fighting', or 'anti-social' behaviour, etc. This category, #11, could be entitled "Confusion".

2. A larger sample of students would provide a more thorough check on the validity of the pupil-behaviour recorded for a specific school. Similarly, a wider sampling from a number of open-area schools across the city would enable a more general description of pupil behaviour in an open-area to be made for the school district.

3. The observation of pupils in primary grades would provide valuable insights into characteristics of pupil behaviour in open-area classrooms at the beginning stages of their schooling.

4. Other observational techniques, including the use of audio-visual equipment should be considered in future research studies of this nature.

5. A more detailed study to determine patterns of interaction and cause-effect relationships between teacher and pupil interactions in the classroom would present valuable feedback to educators and administrators. The study would involve the 'pairing of events' and the construction of an interaction analysis matrix discussed by Flanders (1970, p. p. 75-86).

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