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ABSTRACT

To develop a system for making systematic observations of classroom communicative interaction, to provide guidelines for its utilization, and to suggest applications of this system to problems in the development of communication skills, 94 deaf children were directly observed in class interaction. An evaluation instrument was developed from the Flanders system and employed 20 categories and 11 modes of description. Results showed that in all grade levels the majority of communication was teacher initiated, but that at higher levels there was a gradual increase in student response and initiation. Questioning and informing were the two most frequently observed categories used by teachers in both language-dependent and specialized instruction; these categories were also the ones used most frequently by students in initiating communication. The oral mode was predominant at primary and intermediate levels in the day and residential schools in which data was gathered, but non-oral modes increased noticeably on the high school level in the residential school but not in the day school. Suggestions were that this instrument be used in further research in an effort to adjust the behavior of students and teachers. (JM)

COMMUNICATION PATTERNS IN CLASSES FOR DEAF STUDENTS

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I. Background Information

Although communication is generally agreed to be the area in which the deaf person is most significantly handicapped, the measurement of communicative interactions among the deaf has remained on a non-quantifiable, descriptive level. The instruments used, both by investigators in gathering research data and by teachers in evaluating student progress, have generally been based upon the secondary language systems of reading and writing. For measuring and analyzing the communications and communicative ability of deaf persons, these instruments have the dual disadvantages of incompleteness and inaccuracy.

Reading achievement tests and written language assessment scales lack the sensitivity necessary to adequately describe either the deaf child's language or short-term changes in his language performance. Most have used hearing subjects as the norming population, and are therefore based on individuals who have an entirely different language-learning background. In addition, both these instruments and existing measures of oral (speech and lipreading) and manual language provide information on skills in isolation -- rather than in the total communication situation. With this compounding of incompleteness and inaccuracy, present measures of communication frequently provide a distorted picture of the linguistic and interactive competencies of deaf persons. A need is thus evidenced for an instrument which will assess the deaf child's actual communication skills in actual situations which he will encounter.

In classes for hearing children, the observation, description, and analysis of the communicative behavior of teachers and pupils has come to be considered one of the most exciting and promising methods of improving the instruction and learning which occur in that setting. Interaction analysis

is a technique which has been developed to make this possible. As a "shorthand" method for collecting observable data about the way people talk and act (Simon and Boyer, 1967), this technique provides a relatively compact record of the kinds of communicative behaviors which occur (focusing on these interactions rather than on the exact messages conveyed) and structures observations with sufficient precision to permit quantitative analysis of that record.

Historically, interaction analysis was developed and used for research purposes in an attempt to discover how the teacher's behavior affected the pupil's learning. As the technique has been improved, it has been used in the training and retraining of teachers, providing them with feedback or a "mirror" for observation of their own classroom behavior. Supervisors have also found the technique useful in providing objective data about the classroom behavior of their teaching staff. In allowing for analysis of interactions, rather than of isolated responses, and in arranging for the quantification of these interactions, this measure provides useful and practical data for application in the actual classroom situation.

The availability of such a system provides a new framework for considering the problem of measuring communication among deaf children. In light of the potential which this structure offers for gathering precise and relevant data on classroom interactions, the present research has sought to develop related procedures -- based upon direct observation of behavior -- for measuring these interactions among deaf pupils and their teachers. Perhaps because of lack of guidelines for observing communication which is impaired or deficient, direct observation has been used infrequently in studies of deaf students. However, a number of highly significant questions could be considered through this

approach. The use of systematic observation of communication behavior can provide insights both into particular instruction problems in the content areas and into the language problems frequently associated with deafness. Quantifiable data from the observation of interaction patterns could provide direct access to this communication -- to the central instructional problem of deaf students.

II. Statement of the Problem

In consideration of the foregoing the objectives of this research were:

1. To develop a system for making systematic observations of classroom communicative interaction between teachers and their deaf pupils, and between each deaf student and the other members of the class.
2. To provide guidelines for using this newly developed system to record and analyze communicative interactions in classes for the deaf. These guidelines were developed to provide maximum information on differences in the communicative modes employed, the language achievement levels attained in selected classrooms, and the subject matter being taught. For each of these areas, the factors of hearing loss, age, general academic attainment, and school attended are reported.
3. To suggest applications of this system to significant problems in the development of communication skills, language facility, and general educational attainment of deaf students.

A significant portion of the problem dealt with in this investigation was to describe, not only the type of interaction in classes of deaf children, but the mode of transmitting that communication. Investigations of communication patterns in classes for hearing students offer models or points of departure for studying communication in classes for the deaf. However, one significant element which is not necessarily a consideration with a hearing population must be considered when the communication of the deaf is to be studied. The oral

mode is by far the predominant vehicle of communication in classes of hearing children, and the research conducted in such classes has for the most part been concerned only with the oral aspects of communication. Deaf chi ..en, because of their generally depressed abilities to generate and understand oral communication, employ a variety of modalities to convey meaning. These children, their teachers, and other persons who have close and continuing contact with deaf persons often rely on nonoral modes of communication.

Thus, in order to both recognize and measure the interactions taking place by all modes of communication, and to facilitate analysis and interpretation of communication, the investigators alloted equal attention to interaction type and modality in developing an instrument for making systematic observation of this communication

III. Review of Relevant Literature

References on Observation Systems.

As noted briefly, interaction analysis systems are procedures which have been developed to quantify observations of classroom behavior, especially of those behaviors pertaining to teacher-student relationships. In definitively structuring observation schedules for collecting a record of specific behaviors, these systems allow an objective analysis of the behavior observed. To date, these procedures have been constructed for use with hearing pupils and teachers in public school classrooms, and the interactions measured have primarily been oral exchanges between the teacher and pupils.

The person constructing an interaction analysis system defines the categories to which the observed behavior is assigned via a predetermined code. Most of the various systems which have been developed can be used over a wide range of age levels and subject matter. Since the interaction in classrooms is a complex set of behaviors, each of the systems developed to date focuses not upon the full spectrum, but upon those aspects of behavior which its author has considered important. Simon and Boyer (1967) have reviewed 26 interaction analysis systems and, for purposes of convenience, have dichotomized them into "affective" and "cognitive" categories. The former are used to investigate the emotional climate of the classroom, the latter to measure the more academic-type behaviors. It is understood, of course, that this dichotomy is a functional one and that a true separation of the affective and cognitive domains is difficult if not impossible to achieve.

Two approaches have been used in designing observational schedules, the "sign system" and the "category system." The sign systems record a variety of initial behavior incidents, while the category systems record behavior relevant to only one dimension. Both systems provide prior check-lists on which to record the behavior which occurs, but the sign system lists specific acts or incidents, which may or may not occur; whereas the category system provides a mutually exclusive set of categories, one of which will necessarily include the behavior observed during a specified time unit. This is, the category system differs from the sign system in that it: (1) selectively relates behaviors to one dimension, (2) provides an exhaustive and non-overlapping set of categories for recording responses along this dimension, and (3) sets specific time intervals for recording that behavior.

The sign system has been used by investigators, such as Morsh (1956) and Jersild (1939) who were looking for a wide range of behaviors. In Jersild's (1939) evaluation of schools using an "activity program" in New York City, for example, observers were instructed to record each occurrence of the 23 pupil behaviors listed, including a number of diverse items, from offering objects (books, etc.) to the teacher to creating something original (a poem, a melody, etc.). Such a system requires the recording of behaviors along many dimensions, but if none of the behaviors listed occurs during the observation, nothing is recorded.

The category systems have been used more to implement existing theories, especially theories of classroom climate, and have thus focused more narrowly on some one dimension of interest. In the studies by Anderson (1939) and Anderson et al. (1946), for example, the responses were all recorded along the

dimension of "domination/integration" -- a theoretical construct similar in many ways to the "autocratic/democratic" dimension of Lewin, Lippit & White (1939), and to the "direct/indirect teacher-influence" framework of Flanders (1960). Anderson's observers were to record every "contact" of teacher with a child during the observation period and to categorize it along the continuum from domination to integration (eg. from "determines a detail of activity . . . for the child" to "grants permission to child's request"). Every contact during the specified time period was recorded in one (and only one) of the set of categories. These category systems have been more frequently used than the sign systems and have included -- in addition to the above -- those of Withall (1949), Hughes (1959), Smith (1959), and Wright and Proctor (1961). Classroom behavior rating schedules such as that developed by Becker et al (1967), which have been used in recent operant investigations, would also be classified as "category systems" -- concentrating on the continuum of responses appropriate/inappropriate to the learning situation.

The relative advantages and disadvantages of the sign and category systems are outlined by Medley and Metzel (1963). The sign system is considered preferable either "when several aspects of behavior seem to be of equal importance" or "when it is not known which aspects are important and which are not." (p.299) On the other hand, the category system is preferable when only one aspect of behavior is to be observed, providing more concentrated and directed information on this apsect. The category system is also considered "more comfortable" for observers to use in that it provides a more highly structured task with a definite recording response to make at each specified interval of time.

The category system developed by Flanders (1960) is generally recognized as the most sophisticated and well-elaborated technique, and it is this system which has served as the model for developing the system used in the present research. In the Flanders system, the emphasis is on the verbal communication between the teacher and pupils, with direct/indirect teacher influence as the primary dimension of interest. The 10 categories allow for 7 decisions about teacher influence, 2 for pupil responses and 1 for silence or confusion. The categories for teacher talk are:

1. Accepting feeling
2. Praising or encouraging
3. Accepting ideas
4. Asking questions
5. Lecturing
6. Giving directions
7. Criticizing or justifying authority

The categories for student talk are:

8. Student talk: Response
9. Student talk: Initiation

The remaining category, included to handle anything that is not either teacher talk or student talk, is:

10. Silence or confusion.

Entries are made by trained recorders every three seconds in one of these categories. The numbers are recorded in sequence in long columns in order to preserve the sequence of observed behaviors. The collected data is then recorded in a 10 - row by 10 - column matrix which will still preserve the generalized

sequence of teacher-pupil interaction. These matrices make it possible to describe the interactions, to determine the dominant patterns of the classroom behavior, and to analyze both the general and the specific aspects of the interaction.

Observational Techniques with the Deaf

Research in the area of deafness has relied more upon various test scores than upon direct observation. In reviewing the research related to the acquisistion of language in deaf children, Cooper and Rosenstein (1966) note that only a few studies have measured spoken language, while the majority have used some type of measurement of the secondary language skills, reading and writing. Achievement test scores have provided much of the data for these studies. The other prime source of data has been some kind of sample of deaf children's communication, mostly wirtten, infrequently spoken, and seldom if ever signed or fingerspelled.

Systematic direct observation has been used in one study (Craig, 1968) to determine the effectiveness of an operant procedure in modifying classroom attending behavior. The same method is also being used in an ongoing study (Barkuloo, 1969) to measure the behavioral effects of study carrels. Other studies using this approach with the deaf have been prompted by the present research and include those of Collins (1969) and Prince (1968).

IV. Procedure Objectives

In order to better describe the communication of deaf children and the manner in which this communication transpires in classrooms, an instrument for making systematic observations of this communication had to be developed, as well as techniques for its use. A system of interaction analysis was felt to offer promise as a method of investigating the communication in such classes.

Interaction analysis systems have been developed to describe the communicative behavior of students and teachers in classes of hearing children. These systems have been concerned almost exclusively with monitoring and categorizing verbal communication. Because of the limited verbal ability of most deaf children, an additional dimension had to be considered when an attempt was made to develop a system for describing their communicative behavior. This additional dimension was the means by which communication occurred. The task then was to develop a system which would describe the communication in classes for deaf students according to purpose and mode characteristics.

An interaction analysis system developed by Flanders was used as a model for this research. The Flanders system, contains seven categories descriptive of teacher initiated communication, two categories for student communication, and one to denote silence or confusion. In order to allow for a more complete description of communication, a decision was reached to expand this system from ten to twenty descriptive categories. The expansion of the system was planned in such a manner as to include identical categories of student and teacher communication. The system was also planned in such a way as to permit the description of mode characteristics of observed communication. Consultation

with teachers of deaf children, supervisory and administrative personnel, and observation of classes provided the basis for the selection of the categories and modes.

In order to test the utility of the instrument under development, it was necessary to arrange for its use over a rather wide range of age groups and subject areas. Classes of deaf children at the primary, intermediate and high school levels were observed. Subject areas were divided into three classifications: (1) the subjects which are included in the curriculum of nearly any school and which are heavily dependent on language, i.e., reading, social studies, literature; (2) subjects which are usually included in the curriculum of classes for the deaf but not for hearing children, i.e., speechreading, speech development and/or therapy, language instruction specially geared to deaf children; and (3) informal activities which are again part of the school day for both hearing and deaf children, i.e., physical education, recess, and vocational classes not taught in the typically structured classroom setting. These subject areas and their relationship with the age levels investigated are present in Figure 1.

Selected Subject Areas	SELECTED AGE GROUPING Group I 7-8 yrs.	Group II 12-13 yrs.	Group III 17-18 yrs.
Language Dependent Instruction: Reading, Literature Social Studies	AI	A2	A3
Specialized Instruction: Speech, Lipreading, Language Instruction	BI	B2	B3
Maximum Informal Participation: Games and Activities	CI	C2	C3

Differences in Interaciton Categories with
Increase in Age (and Language Level)

FIGURE I

Selection of Classes Used to Develop a Classroom
Interaction Analysis System for the Deaf

Population

The subjects for this investigation were 94 deaf children (50 males and 44 female) in 12 classes from 3 schools for the deaf. Existing classes were used in order to maintain a normal interaction pattern. The schools used were the Western Pennsylvania School for the Deaf, the Indiana School for the Deaf, and the Cincinnati Public School classes for the deaf. The Western Pennsylvania School and the Indiana School were selected as both are large residential schools for the deaf with numerous classes which are well graded and homogeneous. The Cincinnati Public School system, which has a well developed day class program, was selected to provide observations of children with somewhat different experiences from those attending a residential school.

The subjects were selected from three age groups in order to examine the effectiveness of the new system in recording communicative interactions at different levels of language attainment. These groups included 30 children from the Primary level (7 to 9 years), 30 from the Intermediate level (12 to 14 years), and 34 from the High School level (17 to 19 years). Children in the classes selected had hearing losses greater than 60 db in the speech range, losses sustained prior to the age of two, and a communicative handicap sufficient to require regular attendance in a school for the deaf.

The characteristics of the children in the classes which were observed are presented in Tables 1 - 9. The classes which were observed at the three schools were similar in many respects. However, as this was not a comparative study, no effort was made to match them except for general age levels and sufficient hearing loss.

Characteristics of the Instrument

The first task to be dealt with in an observational study is to decide what is to be observed. The system presented here did not come into existence as the result of single planning session, but developed after observers had used the Flanders (1960) system, educators of the deaf were consulted, and after some trial and error efforts by the investigators and observers working on this project. Using the Flanders model which was described in the Review of the Literature, an effort was made to build an instrument which would be descriptive of a wide range of communicative purposes. Somewhat traditional or expected categories such as Informing and Questioning were included as well as categories, such as Development and Acceptance, which are not so self-explanatory. The nonverbal nature of much of the communication of many deaf persons was also considered, and the development of the mode categories is felt to make possible the description of how thought is communicated in most instances.

The categories and modes of communication are defined next.

Category System to Measure Communicative Interaction in Classrooms for the Deaf

The teacher employs expressive communication skills and the child employs receptive communication skills in Categories 1 - 8.

1. Acceptance: accepts the feelings of the child in nonthreatening manner; praises the child's behavior, encourages child to continue.
2. Development: accepts or uses an idea or thought of the child by clarifying it, building it, or relating it to other ideas.

3. Questioning: asks a question about an idea, event, or behavior with the intent that the child respond to the questioning.

4. Demonstration: shows the child physically or graphically how a task should be performed.

5. Informing: gives information to the child about things, events, and ideas. (Example: That is a cow. We get milk from a cow. A cow is an animal.)

6. Directing: indicates to the child what he is or is not to do.

7. Feedback: indicates to the child that his behavior or ideas are correct or incorrect, desirable or undesirable, in a nonthreatening manner.

8. Criticism: indicates to the child that his behavior or ideas are not acceptable and that he is expected to change them; justification of teacher authority.

9. Response: child communicates a response to a communicative stimulus of the teacher.

10. No communication: indicates no communication is occuring between teacher and child.

11. - 18. these categories duplicate categories 1 - 8 except the child employs expressive communicative skills and the teacher employs receptive communicative skills.

19. Response: teacher communicates a response to a communicative stimulus of the child.

20. Confusion: both teacher and child are communicating expressively and neither is attempting to communicate receptively.

Because of their impaired ability to understand and use spoken language, deaf persons rely on a variety of communicative modes. Eleven modes of communication are a part of the observation system used in this study. They are described below.

Modes of Communication:

Combined (C): two or more of the following modes used together, not necessarily simultaneously.

Dactyl (D): the hand and fingers are employed to form letters of the English alphabet which spell words; single words, groups of words, or complete sentences may be utilized to convey a unit of thought.

Demonstration (Dm): showing how an event or action occurs or how a task should be performed.

Dramatization (Dr): role playing; acting out a story, event, or idea.

Evasive action (E): deliberate behavior designed to ignor communication. (Example: closing the eyes, averting the head.) Demonstration of ignoring the other person is inherent.

Gesture (G): natural gestures which are relatively easily understood in the context of a particular situation. (Example: waving "bye-bye"; forming a cup with the hand and going through the motions of drinking for "water.")

Kinesthetic (K): employment of the sense of touch to gain meaning. This often occurs when the deaf child places his hands on an adult's face to "feel" the muscular movement of a properly produced speech sound.

Manual (M): the formal sign language utilized by many deaf adults in the United States.

Mechanical (Me): use of mechanical device or instrument. (Example: slide projector, overhead projector).

Oral (O): speech

Written (W): written or printed English.

Method of Data Collection.

Once a decision has been reached as to what events or behaviors are to be observed and described the next step in an observational study is to decide on a method for recording data so that meaningful analysis can be made. The technique utilized by Flanders was used on a trial basis in this study and found to be well-suited to use in describing the communication in classes of deaf children. Observers memorized the purpose and mode categories of the system. They sat in classes of deaf children and coded the communication which transpired on a fixed interval schedule. This provided a permanent, sequentially correct record of the communicative acts which they had observed.

Training of Observers

Because of the variety of communicative modes which deaf children and teachers utilize, a decision was reached to use as data collectors persons who were cognizant of the communication deficit and knowledgeable about the communicative modes which are likely to occur in classes for deaf children. Two persons who were trained teachers of the deaf and who had classroom teaching experience were chosen and trained as observers for this project. Now only were these observers oriented to an understanding of the verbal communication of deaf children and teachers, they were also able to understand manual communication, fingerspelling, and the other less formal non-verbal communication which is part of the repertoire of deaf students and their teachers.

The first phase of the training of the observers was directed toward the learning and use of the Flanders system. Films were obtained of classes of deaf children and were utilized as the initial training device. The use of films during the early training phase made it possible to learn the Flanders category system without the necessity of interupting ongoing classes. This training device was felt to be of great assistance since the film could be stopped at any point for discussion of what was occuring in the classroom, the agreement between observers as to what was transpiring in the classroom could be checked at any point, and portions of the movies could be replayed instantaneously so that misunderstandings or differences in opinion between observers could be reconciled.

A simple battery operated device was obtained which could be set to emit a clicking sound at three, six, nine or twelve second intervals. During the early phases of the training a six second interval was used for recording the kind of communication which was occuring in the films. Each time the observers heard the auditory cue they recorded the appropriate symbol to denote what kind of communication had dominated the preceeding six second interval. Tablet paper was used and the observers simply recorded columns of numbers to denote the kind of communication which occured. After about thirty minutes observation time, the observers changed to a three second interval and found that recording was actually easier on the three second interval than on the six.

Following approximately eight hours of training with film, the observers were placed in classrooms. The Flanders system was still being used at this time. The timing device was also still used and both observers were placed in the same classroom. After approximately another two hours of observation and recording in classrooms the observers found it easier to observe and record without the use of the timing device. As Flanders reported, observers are able to settle into a routine where they can almost automatically record twenty observations perminute. The observers reported that their task was actually easier once the timing device was abandoned, since they were then able to attend more fully to the communication which occurred without the use of the timer, which had become a distraction.

The actual collection of data was accomplished as follows. An observer seated himself in a classroom in a position where he could hear and see the

communication which transpired. He first noted the time when observation started. Then at the end of each three second interval he recorded the symbols of the system which represented the category and mode of communication which had occurred during that interval. For example, if the teacher asked the class the time of day, using speech, the symbols 30 were recorded. In this instance the 3 represents "teacher question" and the 0 represents the Oral mode. If a student responded during the next three second interval, using fingerspelling, the symbols 9D were recorded next, the 9 signifying "student response" and the D signifying the Dactyl mode.

In those instances where more than one category of communication occurred during a single three second interval the predominant category was recorded, using time as the criterion. The only exception to this rule was that category 10 (No Communication) was never recorded if another category also occurred even for an instant.

The observer continued to code the communication he saw and heard until he had to leave the class, the class was over, or until the class turned to activities which did not require communication. The time when formal observing ended was entered and notations made were made about any behavior not customarily anticipated.

Refinement of the System

Numerous classes at the Western Pennsylvania School for the Deaf were utilized to give the observers experience in using the original Flanders system with children of different ages, in classes where different subject matter was taught, and in classes where a variety of communicative modes were encountered. After approximately another 8-10 hours of actual classroom observation, the observers felt themselves sufficiently familiar with the Flanders model to proceed with the expansion of the system.

The data which had been gathered to that point was reviewed to gain insight into which categories were heavily used and which ones were used infrequently. The opinions of the observers were sought regarding the characteristics of the communication they had observed in classrooms and a system containing twenty categories describing purposes of communication was developed. A short trial period of approximately five hours of observation resulted in some further modification which brought the purpose categories to their present form.

The observers continued to observe classes at the Western Pennsylvania School for the Deaf utilizing the twenty category system which had been developed. Since the number of categories had been doubled and since the numbers which symbolized the type of communication which occurred had been changed, it was necessary for the observers to spend a period of time learning and adjusting to the new system. Most of the remainder of the observation time at the Western Pennsylvania School for the Deaf was used by the observers to learn and develop facility in recording with the new system.

Once the twenty category system was mastered by the observers, it was possible to begin their training with the second half of the system - the mode categories. Observation of classes and consultation with teachers and supervisors

were again employed to develop this part of the system which is comprised of eleven categories describing modes of communication. The remainder of the observation time available at the Western Pennsylvania School for the Deaf was devoted to learning and practicing the combined purpose and mode system.

The system was then used at the Indiana School for the Deaf at Indianapolis, Indiana. For two and one half days, the observers visited classes at this school observing and recording the communication which occurred. Both the categories of communication and the modes of communication were utilized. An effortwas made to obtain a broad sampling of age groups and subject matter. One age group of seven to eight years of age; one age group of twelve to thirteen years and a thrid age group of seventeen to eighteen years were observed, in a variety of subject matter areas. One subject matter area was language dependent instruction and included such subjects as: reading, social studies, arithmetic, and science. Another subject area included subjects which are necessary for deaf children not for children with normal hearing. Examples of this type of instruction are: speechreading, developmental speech, and language development. A third area in which children were observed was in informal classroom behavior such as physical education, rhythm, and recreation.

The classes for deaf children in the Cincinnati Public School were also visited. The communication which occurred in classes was recorded according to category and mode as it had been at the Indiana School. An effort was made to observe the same age groups and general instructional areas.

Inter-observer Reliability

A perplexing and continuing problem which confronts investigators involved in observational research is the need for a check on the observations which persons in the field are making. Observation systems are seldom if ever so discretely constructed that some judgment on the part of observers is not necessary, since observers are mere humans they come equipped with the usual prejudices, attitudes, and perceptual variables which are part of human nature. This means that two observers will probably never interpret the definitions of the categories which comprise an observational system in exactly the same way. Even if this were possible, no two observers would probably perceive and interpret all behavior in the same way. If observers cannot be trained to use a system so that nearly the same kind of data is gathered by all observers then the system is of little value and the results obtained by its use are always highly questionable.

In an effort to make this system as reliable as possible, quite a bit of training and consultation time was spent with the observers in defining and re-defining the categories which comprise the system. Since the system was in a developmental stage and because the observers were experienced teachers of the deaf, they actually contributed to the development of the definitions of the categories which comprise this system. This probably was a factor in their reliable use of the system.

Determining whether observational data are being gathered reliably is not the clear-cut problem it might seem. Calculating the correlation between data collected by two observers works well when only a few categories are available for the assignment of data. When many categories are available to which behavior can be assigned, the more frequently used correlation techniques tend to be less useful. This is especially true when a portion of the categories available for use can be expected to be used infrequently.

Flanders (1965, p.30) discusses the point that the errors involved in interaction analysis are not fully understood and that much work is needed in this area. He uses "Scott's $\bar{p}i$" coefficient for estimating the relationship between data collected by his observers, while stating that the use of this technique is arbitrary (1965, p.28).

In spite of the difficulty involved, some criteria had to be developed for determining whether this instrument could be depended on to reliably yield data which accurately describe the communicative interaction in classes of deaf children. Following professional advice, "Scott's pi" coefficient was not used for this purpose. The main reason for not using this technique was that there is insufficient evidence at this time to support the applicability of this approach where as many as twenty categories can be used.

Spearman's rank - difference correlation method (Guilford, p.305) was used to check inter-observer reliability during this project. The use of this technique allowed the investigators to concentrate on the main thrust of the study, the general characterization of communication in the classroom, with the knowledge that the observers were perceiving the behavior they observed in a similar manner.

The rho coefficients which were derived from the dual observer sessions at the three schools are shown below:

Observer Reliability Coefficients

(Spearman's Rank - difference)

	Category	Mode
Western Pennsylvania School for the Deaf	.976	No Data Collected
Cincinnati Public Schools	.828	.896
Indiana School for the Deaf	.918	.990

During the early stages of training, the observers always observed together in order to provide data which could be analyzed to determine to what extent they were in agreement. Once they had reached a level of agreement which was considered acceptable, they observed in different classes. The reliability of data and experience collected was thus doubled. The observers did, however, make combined observations at least twice weekly as a continuing check on agreement. As each new phase of the instrument development occurred, the observers returned to observing the same classes at the same time so that speedy and continual reliability data was available.

Description of the Classes Observed

Observations of communication were made at the three educational facilities previously mentioned, i.e., the Western Pennsylvania School for the Deaf, the Cincinnati Public Schools, and the Indiana School for the Deaf. The bulk of the work was conducted at the Western Pennsylvania School for the Deaf because access was obtained for observation throughout the school on a nearly open time schedule. During the early phases of the training of the observers and during the development of the instrument, no attempt was made to observe classes of a particular age level or according to subject matter. A wide exposure to many classes was needed at this point and was the only consideration.

Once the project had reached the point where the twenty category system was in use, observations were confined to two classes, each at the primary, intermediate, and high school levels. Supervising teachers cooperated in the selection of classes which were comprised of students who had hearing losses in excess of 60 decibels, and were fairly representative of deaf students according to intellect, language ability, and academic achievement.

Because of time restrictions when observations were made at the Cincinnati Public Schools and the Indiana School for the Deaf, one class of children which met the age level criterion was chosen at each school and observed in different subject matter areas. Again, supervisory personnel assisted the investigators by choosing classes which they considered to be typical according to intellect, language ability and achievement. Data regarding the characteristics of these classes observed, are presented in Tables 1 through 9.

Being observed is certainly not a new experience to most teachers or students in classes fot the deaf. In some instances, hardly a week passes without visits from professional and/or lay visitors. It was felt, however, that certain preparations and explanations to teachers were necessary as part of this project.

The first step in this process was to provide the appropriate school administrator with an abstract of the research proposal at the time when a request was made to utilize classes in his school(s). This was followed by a personal or telephone contact for the purpose of clarifying any doubtful points.

Teachers who were to be observed were then given a brief written description of the project which focused on its observational aspects. (See Appendix A). An effort was made to allay most of the uneasiness or fears which teachers might experience as a result of coded written records being made of the behavior which occurred in their classes. Since many visitors in classes of deaf children are unsophisticated observers, teachers often interrupt the ongoing interaction in the class to explain their teaching methods and techniques. In an effort to prevent this from occurring during the observation connected with this investigation, the teachers were informed that the observers were trained teachers of the deaf and that explanation was undesirable as well as unnecessary. In spite of this effort, occasional explanations occurred throughout the project.

V. Results

The results of this study may be divided according to the purpose of the classroom communications and according to the mode characteristics of this communication. Total results -- across the three schools measured -- will first be presented, followed by individual results from the three different schools. In considering the communication-purpose categories, the results pertaining to language-dependent instructional areas, to specialized instructional areas, and to informal activities areas will be presented separately, as will results from the three age levels observed. In presenting the resutls of communication modes, only the individual school totals will be discussed. For these mode characteristics, an overall total was considered inappropriate because of possible differences in philosophy, teaching techniques, and individuals involved. Here again, the different age levels and different instructional areas will be duscussed separately.

At this point it should be mentioned that the communications reported during periods termed "informal activities" are to be considered only in a tentative sense. The total number of observations made in informal environments was small, and the system utilized does not appear to be maximally appropriate to these environments in which communication is non-structured and is likely to occur simultaneously between many members of a group. While the system was found to work well in structured classroom situations -- in situations having a natural leader or local point of discussion, it was found less easily applicable in the less structured situations provided by physical education classes, rhythm classes, recess activities, or free play activities. The results of the observations which were made in such settings are reported here with this precautionary introduction.

Purpose of Communication: Three School Totals

Primary Level:

As was true at all age levels and in all instructional areas, the teachers at the Primary level accounted for the major portion of the expressive communication. As Table 10 indicates, during the intervals of language-dependent instruction, teacher-generated communication accounted for 73.78% of the relevant behavior observed. Of this, 56.97% was actual teacher communication and 21.81% was student response to teacher-initiated communication. Students, on the other hand, initiated communication less than 3% of the time observed and teachers responded to these attempts less than .4%. The remaining interaction observed was divided between No Communication (15.75%) and Confusion (2.37%).

In the specialized instructional areas, teacher-initiated communication comprised 68.62% of the observed interaction, with 42.83% actual teacher communication and 25.79% student response to this communication. Students initiated communication 7.28% of the time and were responded to by the teachers about 1% of the time. During this period, No Communication accounted for 21.29% and Confusion for 1.54% of the responding observed.

During informal activities, the teachers continued to dominate the communication at the Primary level, with teacher-initiated communication comprising 67.53% of the interaction and student-initiated communication comprising 19.54%. No Communication and Confusion accounted for 10.12% and 2.82% respectively.

The major categories of teacher-initiated communication in the language-dependent areas were Questioning (15.32%) and Informing (15.06%). Giving Feedback, Demonstrating, and Directing each accounted for approximately 8%.

Questioning and informing were also the categories most used by teachers in specialized instruction, with the Demonstration, Feedback and Directing categories again accounting for the bulk of the remaining teacher-initiated communication. Unlike in the two more formal instructional areas, the most frequently used categories of teacher communication in informal activities areas were Demonstration (37.65%) and Directing, (20.00%). The Acceptance and Development categories were used only rarely by the teacher, less than .5% of the time during any activity observed.

Student-initiated communication in the formal instructional areas at the primary level were restricted mainly to Informing and Questioning, although even these were infrequent (under 4% of the total interaction). None of the categories were used at all by the students in the language-dependent area; two others (Feedback and Criticism) were used, but rarely, in the specialized instruction area. During the informal activities, more variety in student-initiated communication was evidenced, with Demonstration (4.2%), Directing (4.00%), Informing (3.06%), and Questioning (3.06%) used about equally, and Feedback and Criticism comprising about 1% each. Teacher Response to the students was also higher during these informal activities -- with 3.53% of the total interaction.

Intermediate Level:

At the Intermediate level, data were collected only in the language-dependent and the specialized instructional areas. These results are tabulated in Table II. During the observed periods of language-dependent instruction, teacher-initiated communication comprised 77.98% by the students and 1.02% by the teachers in response to the students. No Communication and Confusion accounted for 15.90% and 1.02% of the remaining interaction in these periods.

In the specialized instruction areas, intermediate teachers generated 72.54% of the interaction, with 59.22% communicated by the teacers and 13.32% by the students in response. The students themselves initiated 11.97%, of which 11.75% was student communication and .22% teacher response. No Communication was recorded as 10.14%, Confusion as 5.35%.

Again, Questioning and Informing comprised the bulk of teacher-initiated communication. In language-dependent areas, teacher use of Questioning and Informing ranked first and second respectively, while in specialized instruction areas these positions were reversed. Feedback accounted for 12% of language-dependent teacher communication and 10.14% of the teacher-initiated specialized instruction. The use of Demonstration and Directing by the teachers decreased over the usage observed at the Primary level. In the specialized instruction area at this Intermediate level, the use of the student Informing category increased noticeably -- to 11.25% as compared with 3.89% in the Primary.

Of the student-initiated communications, the most noticable finding at the Intermediate level was the relatively high percentage of student Informing in the specialized instruction area. This category comprised 11.25% of the total classroom interaction observed during specialized instruction, compared with 3.89% in the Primary and .38% in the High School. In the language-dependent area, no such difference was observed -- with 2.61% student Informing in the Intermediate, 2.26% in the Primary, and 2.27% at the High School level. The remaining categories of student-initiated interaction were used only rarely, each comprising less than 1% of total interaction observed.

High School Level:

At the High School level, teacher-generated communication again accounted for over 75% of the total Classroom interaction. Table 12 summarized these results. In the language-dependent instructional areas, teachers initiated 78.98% of the interaction -- 57.33% by the teachers themselves and 21.65% by students in response to them. In the specialized instruction area, these teachers initiated 76.91% -- with 59.96% teacher communication per se and 16.95% student response to that communication. Student-initiated interaction comprised 9.99% and 6.48% of the behavior observed in the language-dependent and specialized areas respectively, both divided fairly evenly between actual student communications and teacher response to the students (4.91% and 5.08% in one; 3.66% and 2.82% in the other). The No Communication category was checked for most of the behavior observed, (10.70% and 16.15% in the two instructional areas), with the Confusion category accounting for less than 1% in both.

During informal activities, teacher-initiated communication dropped to 33.76% -- with no student response -- while student-initiated communication rose to 19.95% (of which 1.79% was teacher response). Almost half the time (46.29%) during this period was marked by No Communication.

In the language-dependent areas, teacher Informing comprised 28.77% of the total interaction observed, teacher Questioning 15.82%. Feedback accounted for most of the remaining teacher communication (7.94%), with Directing and Demonstration each accounting for somewhat over 1%, and Criticism, Acceptance and Development under 1% each. During the specialized instruction periods,

the rank order of the 3 main categories remained the same although the percentage figures changed (28.91%, 13.88% and 10.90% in Informing, Questioning & Feedback respectively). During informal activities, teacher communications were almost totally categorized as Directing, with Feedback at less than 1% the only other teacher-initiated category checked.

Student-initiated communications in the formal instructional areas, although much more scarce than those initiated by the teacher, were also divided mainly between the Questioning and INforming categories (although in no category comprising more than 4% of the total interaction). During informal activities, the major communicative effort of the students was in Demonstration (with 12.79% of the total interaction observed), followed by Directing (4.35%). The categories of Development, Feedback, and Criticism were not observed in use by the students at all; Acceptance was observed only rarely (.03%).

Purpose of Communication - Individual Schools

The following data for the individual schools are presented, not to compare the schools, but to demonstrate the sensitivity of this system to similarities and differences in interaction patterns and to indicate its value in isolating and analyzing the factors contributing to classroom communication.

Primary Level

For the Primary level, Table 13 summarizes the data collected at the Western Pennsylvania School for the Deaf, (W.P.S.D.), Table 16 the Indiana School for the Deaf, (I.S.D.) and Table 19 the Cincinnati Public Schools, (C.P.S.)

In the area of instruction which is language dependent, the teachers in all three schools generated far more expressive communication than did the students. In the individual schools, this teacher-generated interaction ranged from 74.95% to 91.25% -- with from 50.20% to 72.50% in actual teacher communication and from 18.31% to 24.75% Student Response to this communication. Student-initiated communication, on the other hand, ranged from 1.10% to 7.44% (including .00% to .50% Teacher Response).

A more complete break-down of these figures shows some interesting patterns. In the Primary department (W.P.S.D.) with the highest degree of teacher initiation (91.25%), the No Communication percentage was also the lowest (4.00%), whereas in the primary class (C.P.S.) with the lowest teacher initiation (74.95%), the No Communication percentage was the highest (23.15%). The actual student initiation of communication was approximately the same for these two schools, with 1.10% and 2.75% of the total interaction. In the third

school, with 76.46% teacher initiation, No Communication comprised 10.26% but Confusion accounted for 5.84% of the interaction. Here student-initiated interaction was the highest, with 7.44% -- mainly in the Informing category.

A further relation may be noted between the proportion of Student Response (to teacher-initiated communication) and the utilization by the teachers of the Questioning category. The school (C.P.S.) in which Student Response was the highest (24.75%) also had the highest proportion of teacher Questioning in relation to the other categories of teacher-initiated interaction (about 30% of the actual teacher communication). Although the actual percentage of Questioning was approximately the same in all three schools (between 15% and 16% of the total interaction), its relative weight in teacher communications was less in the other two schools (about 22% in W.P.S.D., and about 25% in I.S.D.) and Student Response was also lower (18.75% and 18.31%). At W.P.S.D., where teacher initiation was the highest, the greatest proportion of teacher communication was in Demonstration (with 34.50% of the total interaction), followed by Questioning and Informing; whereas at I.S.D. the most used teacher category was Informing, followed by Questioning, with no reported use of Demonstration at all. The other categories were used in approximately the same proportion (and relatively infrequently) by the Primary teachers at all the schools.

In the specialized instruction area, considerable fluctuation was found in the amount of teacher-initiated interaction, with actual teacher communication ranging from 25.34% to 53.06%. The No Communication category accounted for a fairly high percentage of the observed behavior in the two schools having

the lowest degrees of teacher-initiated interaction, with 38.11% (W.P.S.D.) and 27.24% (I.S.D.). No Communication reported in the schools with 25.34% and 40.02 % respectively of direct teacher-communication. This may be compared with the 9.74% No Communication in the school with the higher percentage (53.05%) of teacher-communication. The Student Response category also comprised a relatively high proportion of the interaction (34.31%) in the school having the lowest degree of actual teacher communication. Unlike in the language-dependent area, however, there does not appear to be any definite relation between the proportion of time devoted to teacher Questioning and that taken up by Student Response. In all three schools, the Teacher use of the various communication categories was more balanced in the Specialized Instruction areas, so that the Questioning, Demonstration, Informing, Directing, Feedback and Criticism categories all contributed to the interactions without the skewed distribution (toward the first three) evidenced in the language-dependent areas. Again, however, teacher use of Acceptance and Development was negligible.

During the informal activities at the Primary level (at the one school so measured), the teacher-initiated interaction accounted for approximately 2/3 of the communicative effort. Demonstration and Direction were the two high-use categories of teacher communication (37.64% and 20.00% respectively), with Student Response to these communications comprising a very low percentage (1.41%). Student-initiation of communication, however was higher than in the more formal situations (16.01%) and was distrubuted over a wider number of communicative categories -- including Questioning, Demonstration, Informing, Directing, Feedback and Criticism -- rather than being restricted primarily to Questioning and Informing.

Intermediate Level:

The data for observations at the Intermediate level are summarized in Tables 14, (W.P.S.D.), 17, (I.S.D.), and 20,(C.P.S.). In the language dependent area, teacher-initiated interaction in these schools comprised approximately the same percentage of the total interaction (from 74.18% to 81.82%), but the communication so generated was distributed differently in the three schools. In two of the schools, a fairly large proportion of this interaction was comprised of Student Response (31.91% at W.P.S.D. and 28.19% at I.S.D., compared with 14.89% at C.P.S.) Again, as noted in the results of the language dependent area of the Primary level, there appears to be a relation between the degree of Student Response and the proportion of teacher-communication devoted to Questioning. In both schools with the high Student Response, Questioning accounted for the greatest percentage of almost half of teacher-communication, with 22.44% and 22.62% respectively of the total interaction. In the school with the lower Student Response, teacher Questioning accounted for 16.27% of the total interaction -- less than one-fourth of the teacher communications presented. At the latter school, the predominate category used by the teachers was Informing (29.67% of the total).

For the other teacher-initiated categories, the three schools presented similar patterns -- all with Feedback comprising between 10% and 14% of the interaction and the other categories used only infrequently. No Communication (21.14%) was again highest at the school (I.S.D.) with the lowest degree of teacher-initiated communication. Student-initiated interaction was similar in all schools, both in percentage (about 4% actual student communication plus negligible teacher response) and in categories used (Informing and Questioning.

Specialized instruction was observed at only two of the schools at the Intermediate level. Again, a wide difference was reported in the proportion of time expended by teachers in initiating communication -- 88.57% in one school (C.P.S.) and 52.50% in the other (W.P.S.D.). In both cases, Student Response accounted for approximately the same percentage (14.14% and 12.28% respectively) so that the difference occurred in the actual teacher-communications (with 74.43% and 40.22% respectively). The category most noticeably used in conjunction with the high teacher initiation was that of Informing (43.73%). The percentage of student-initiated interaction for these two schools at this level appears to be inversely related to the degree of teacher-initiated interaction. In the school with the teachers directly responsible for 74.43% of the interaction, the pupils initiated only 2.71%; in the school with teachers directly providing only 40.22%, the students initiated 23.06% of the total classroom communication. This latter figure was the highest percentage of student-initiated communication observed throughout this study. The Confusion category also comprised a fairly large proportion (12.03%) in this classroom -- although the No Communication category was about standard (12.41%).

No data were collected in the informal activities section for any of the schools at this level.

High School Level:

Data for the individual schools at the High School level are tabulated in Tables 15, (W.P.S.D.), 18, (I.S.D.), and 21, (C.P.S.). In the language dependent instructional area, teacher-initiated interaction ranged from 73.99% to 88.48%, with 48.73% to 73.13% direct teacher communication and 15.35% to 25.26% Student Response. Again, the lowest degree of Student Response (15.35% at I.S.D.) corresponds with the lowest proportion of teacher Questioning (approximately 14% of the direct teacher communication). At this school, teacher Informing was also correspondingly high -- with 58.47% of the total response. The two schools with higher Student Response (25.26% at C.P.S. and 21.60% at W.P.S.D.) and lower direct teacher communication (48.73% and 56.44% respectively) both had a higher proportion of teacher Questioning (about 30% each of the direct teacher communication) and a lower proportion of teacher Informing (with approximately the same percentages as for Questioning).

Communications initiated and provided by the students had essentially the same percentage of interaction in the three schools (about 5%) in the language dependent area. One difference reported was in the Teacher Response to student communications -- comprising 7.95% in one school and about 2% in the other two schools. As shown in Table 21, the school with the highest Teacher Response to the students was also the school with the highest Student Response to the teachers, the lowest (5.44%) direct teacher communication and the highest actual student communication. Again, student Questioning and Informing were the major student-initiated interactions. The No Communication and Confusion categories appeared to be used less frequently at the High School than at the other two levels.

In the area of specialized instruction, High School data was gathered at only two of the three schools. During this period, teachers initiated 71.80% of the communication at one school and 85.98% at the other -- with approximately 17% Student Response in both cases. In the school with the highest teacher-initiated communication, teacher Informing accounted for 48.98% of the interaction, whereas, in the other school teacher communication was more evenly distributed among the Informing, Questioning and Feedback categories. In the latter school, the percentage of Teacher Response to student communication was also higher (4.42%), although actual student communications were approximately the same, (3.75% and 3.35%).

Only one school was observed during informal activities at the High School level. Here, teachers initiated 33.76% of the communication (with no Student Response), while students initiated 19.95% of the interaction (including 1.79% Teacher Response). Almost all of the teacher communication was devoted to Directing (32.99% of the total), whereas, the major portion of student communication was in Demonstration (12.79% of the total). The No Communication category accounted for almost half of the time observed during informal activities. These results are presented in Table 18.

Characteristics of Communication: Mode

Data regarding the mode of communication in classes of deaf children were collected at two of the schools utilized in this investigation, the Indiana School for the Deaf and the Cincinnati Public Schools. The mode-related data collected at the Western Pennsylvania School for the Deaf was not used because the instrument was still in the developmental stage and its reliability with respect to communication mode was not sufficiently established at the time of observation.

Primary Level:

Tables 22 (I.S.D.) and 25 (C.P.S.) summarizes the data related to mode use at the Primary level. In the language dependent areas, the Oral mode of communication was predominately used by both the teachers and children. At the Primary level in the Indiana School, 84.41% of the communication was conducted orally, as was 89.77% in the Cincinnati Public Schools. At the Indiana School, Primary level, 8.39% of the communication was conducted through Dramatization. Mechanical modes were used for 2.88% of the communication, Written for 2.88%. Dactyl communication and Gesture were also used by teachers and students but each accounted for less than 1% of the total communicative effort. The Combined method, Demonstration, Evasive Action, Kinesthetic, and Manual modes were not used for language dependent instruction in the Primary classes of the Indiana School.

In the Cincinnati Public Schools, in addition to the 90% of Orally conducted communication in the language dependent subjects, about 7% of the interaction employed the Written mode. Demonstration accounted for 1.84% of this communication

while the Combined, Gestural, and Evasive Action modes each accounted for less than 1%. The Dactyl, Dramatization, Kinesthetic, Manual, and Mechanical modes were not reported in this area for the Cincinnati School, Primary classes.

During specialized instruction classes at the Indiana School, the Oral mode was used 90.44% of the time by teachers and students. The Written mode was used 5.17% of the time and Gestures, 2.35%. Modes which were used but which each accounted for less than 1% of the total communicative efforts were the Combined, Dactyl, Demonstration, Dramatization, and Evasive Action. The Kinesthetic, Manual, and Mechanical modes were not observed during specialized instruction at this level.

In the Cincinnati Schools, the Oral mode accounted for 88.74% of the communication which occurred during specialized instruction. The Written mode accountef for 5.67%,while Demonstration and Dramatization comprised 2.53% and 1.92% respectively. Modes which were used, but less than 1% of the time, included the Combined, Gesture, Kinesthetic, and Manual. The Dactyl, Evasive Action and Mechanical modes were not used in this school for specialized instruction at the Primary level.

Observations were conducted at this level during one informal activity. The results show a decrease in the use of the Oral mode (to 48.92%) and an increase in the Demonstrative mode (to 44.05%). The Combined mode accounted for 4.33% and the Gestural mode for 2.70% of the communication.

In brief, the observations indicated that the Oral mode accounted for approximately 90% of the communication in the two schools measured in Primary level classrooms during structured situations -- either language dependent or specialized instruction. Neither formal manual communication nor finger-spelling were used to any noticeable extent. During informal activities, the Demonstrative mode appears to have been used to convey meaning which might have been conveyed Orally during language dependent or specialized instruction

Intermediate Level:

As indicated by Tables 23 and 26, the Oral mode remained the predominant communicative vehicle at the Intermediate level. In the language dependent areas, the Oral mode accounted for 74.21% of the communication at the Indiana School and 76.59% at the Cincinnati Schools. In the classes observed at the Indiana School, the Combined method was the second most popular mode, used for 11.65% of the communications. The Mechanical and Written modes were both used about 5% of the time, while Gesture and Demonstration comprised between 1% and 2% of the communications. The Dactyl, Dramatization and Manual modes were used less than 1% of the time, and the Evasive Action and Kinesthetic categories were not observed.

Intermediate level classes at the Cincinnati Public Schools were observed to rely most heavily on the Written mode (10.77%) when Oral communication was not being used. Demonstration accounted for 5.83% of the observed communicative behavior, the Combined mode and Gestural mode for 2.72% and 2.64% respectively, and Dramatization for 1.19%. The Manual and Kinesthetic modes were both used less than 1% of the time, and the Dactyl, Evasive Action and Mechanical modes were not observed.

Observation of specialized instruction was conducted only in the Cincinnati schools. For this type of instruction, Oral communication was utilized 92.56% of the time, Written communication 7.11% and Gestures .33%. No other modes were observed during specialized instruction at this level.

High School Level:

Tables 24 and 27 summarize the findings related to mode use at the Indiana and Cincinnati High School levels respectively. A definite shift was noted at this level at the Indiana School for the Deaf, in that the Oral mode was used much less than at the Primary and Intermediate levels. In language dependent instruction, the Combined mode was used to convey 70.98% of the messages transmitted. The Manual mode was used 14.65% of the time and the Mechanical mode, 7.54%. The Written mode accounted for 3.41% of the communication, while the Gesture and Oral modes were used about 1% of the time. The Demonstration, Evasive Action and Kinesthetic modes were not observed.

In the Cincinnati Schools at the High School level, the Oral mode remained predominant during language dependent instruction, accounting for 80.44% of all communication. The Written mode (13.63%) was also frequently employed. Mechanical and Gesture modes accounted for 3.25% and 1.69% respectively. The Combined, Demonstration, Dramatization and Evasive Action modes each comprised less than 1% of the communication observed and the Kinesthetic, Manual and Dactyl modes were not observed at all.

Communication mode relative to specialized instruction at the High School level recorded only at the Indiana school. During these periods, the Manual mode was most often used, accounting for 26.52% of the communicative effort. The Written (24.66%) and Combined (23.65%) modes were used almost as frequently. The Dactyl mode was also frequently used (14.48%) and Gesture accounted for 5.98% of the total. The Oral mode was used 1.60% of the time, while the Dramatization, Evasive Action, and Mechanical modes each comprised less than 1% of the usage. The Demonstration and Kinesthetic modes were not observed.

During informal activities, four modes were used by the students and teacher to conduct communication. Gesture (45.72%) was the predominate mode while the Combined (24.76%) and Demonstration (23.81%) modes were also frequent. The Oral mode (5.71%) was the only other mode observed during informal activities.

An interesting finding became evident when the data for this school and age level were analyzed. By chance, all the observations of language dependent instruction at the Indiana School for the Deaf had been made in a class taught by a deaf teacher, while all the observations in specialized instruction, subjects had been made in a class with hearing teachers. As the data indicates, the hearing teachers used the Manual mode of communication more than did the deaf teacher (26.52% to 14.65%), whereas, the deaf teacher utilized the Combined mode as his prime means of communication (70.98%).

Summary of Results

Purpose Categories

In the structured areas of instruction -- both language-dpendent and specialized subjects -- the teachers in all schools and for all age levels were observed to dominate the initiation of classroom communication. In the language-dependent areas at all age levels, teacher initiated interaction prevailed over student-initiated interaction by a ratio of approximately 11 to 1. In the specialized instruction areas, this ratio was somewhat lower at the Primary level (6 to 1) and the Intermediate level (5 to 1) but higher at the High School level (15 to 1).

Questioning and Informing were the two most frequently observed categories used by teachers in both language-dependent and specialized instruction. In the language-dependent area, teachers at the Primary and Intermediate levels tended to spend as much or more time asking questions than in supplying information, whereas the High School level a shift was noted toward more Informing -- particularly at one school (See Table 15). In the area of specialized instruction, Informing comprised a somewhat greater proportion of the time observed than it did in the language-dependent subjects. Teacher Questioning did tend to predominate over Informing at the Primary level, but teacher Informing exceeded the Questioning at the two higher levels. However, in all cases, both these categories were observed with relatively high frequency.

Informing and Questioning were also the categories used most frequently by the students in initiating communication, although they were used much less frequently than the teacher-initiated categories. For the students at the

Primary and Intermediate levels. Informing was used more than Questioning -- both in language-dependent and in specialized instruction; at the High School level, the reverse was true. More student-initiated interaction as a whole was noted during the periods of specialized instruction than during the periods of language-dependent instruction.

In analyzing the individual school data, some interesting relationships were noted relative to teacher -student interactions. In particular, and as might be expected, a higher proportion of behavior was observed in the Student Response category when teacher Questioning comprised a high proportion of the teacher-initiated behaviors. In the one case, with a relatively high proportion of teacher response to student communications, there was also a higher proportion of student response to teacher communications than in the other schools at that level. In several of the cases in which teacher-initiated interaction were relatively low, (around 50% as compared with the more common 80%), the bulk of the remaining time was comprised of No Communication. However, the one case of fairly high student-initiated communication (22.68%) did correspond to a fairly low degree of teacher-initiated communication.

Informal activities were defined as class activities (gym, rhythm, and shop) in which communication does not occur in as highly structured forms as during usual schoolroom activities. As the present system was not found to lend itself to use in these instances, only a minimum amount of time was spent observing in such classes. The fragmentary data accumulated suggest that teachers initiated communication in these settings at the ratio of about 4 to 1 at the Primary level and of about 2 to 1 at the High School level. Teacher Demonstration and teacher Directing were the categories most frequently observed at the Primary level. Teacher Directing and student Demonstration were the two categories of highest use at the High School level, except for the No Communication category which was recorded for almost half of the observational time.

Mode Characteristics

Results were gathered from recording the mode of communication at only two of the schools investigated -- the Indiana School and the Cincinnati Public Schools. The results from these two schools were considered separately as the different philosophies regarding communication mode rendered cumulative treatment inappropriate.

At the Indiana School for the Deaf, in the Primary and Intermediate level classes, the communication which was observed during language-dependent and specialized instruction classes was mainly conducted through the Oral mode. At the Primary level, the Oral mode was used to conduct 84% of the communication in the language-dependent areas and 90% of the communication during specialized instruction. At the Intermediate level, the Oral mode accounted for 74% of the observed communication. Dramatization (8%) and Written (5%) were the next most popular modes at the Primary level. At the Intermediate level, the Combined mode (12%), Mechanical (5%) and the Written (5%) modes were also utilized with some frequency.

At the High School level at the Indiana School for the Deaf, the Combined mode was the most popular during language-dependent instruction, accounting for 71% of the communicative effort. The Manual mode (15% and the Mechanical mode (8%) were also frequently used. During specialized instruction at the High School level, the Manual mode (27%) was the most frequently used mode, followed closely by the Written (25%) and Combined (24%) modes. The Dactyl mode (14%) and Gesture(6%) were also used rather frequently.

Observation of informal activities at the primary level indicated that approximately 49% of the communication during these activities occurred via

the Oral mode, while Demonstration accounted for another 44%. At the High School level, during informal activities, Gesture accounted for nearly 46% of the communication while the Combined mode was used 25% of the time and Demonstration 24%.

Classes in the Cincinnati Public School relied most heavily on the Oral mode of communication at all three levels observed. At the Primary level in language-dependent instruction the Oral mode accounted for 90% of the communication while the Written was used 7% of the time. During specialized instruction at the primary level the Oral mode was used 89% of the time and the Written mode 6%.

At the Intermediate level the Oral mode accounted for approximately 77% of the communication and the Written mode approximately 11%. In specialized instruction at this level the Oral mode was used approximately 93% of the time and the Written mode approximately 7%. The Oral mode continued to be the most popular mode at the High School level, accounting for approximately 80% of the communication, while the Written mode was next with approximately 14%.

No relationships could be discovered between mode of communication and communication type or initiation. That is, there was no systematic difference in interaction patterns for those classes which were conducted primarily through the Oral mode and those which used the Manual or the Combined modes. However, it should be noted that the data was insufficient to make any conclusions about such lack of relationship. Recorded observations on mode were made at only two schools, and for both of these shcools the Oral mode was the only mode used to any noticeable degree at the Primary and Intermediate Levels. Data at the High School level, which did reflect the use of two modes (Oral and Manual), did not provide enough of a sample to indicate reliable patterns.

Interaction Matrices

Flanders (1965, pp. 33-44) uses matrices of interaciton as a graphic means of illustrating the interaction which occurs in a classroom. This technique is also possible with the twenty category system developed in this investigation. A matrix which illustrates a ten minute period of interaction in a Geography class at the Intermediate level provided the data for Figure 2.

The data was entered into this figure according to the method used by Flanders. In keeping with Flanders convention of having the entire series of observations begin and end with the same number (category), Category 10 (Silence) is added to the beginning and end of the series, unless it is already present in that position. This procedure is followed in order that the sum of each individual column equals the sum of its corresponding row in the finished matrix. Flanders suggests the use of category 10 because it will affect the interpretation of teacher influence least.

The numbers are tallied in the matrix one pair at a time, the row being designated by the first number of the pair and the column by the second. In a series of numbers reading 3, 9, 2, and 6, the number 10 would be added to the beginning and end of the series. The first pair of numbers would then become 10 - 3 and a tally would be entered in the cell where row 10 and column 3 meet. The next pair of numbers would be 3 - 9 and an entry would be made where row 3 and column 9 intersect. The third pair would be 9 - 2, the fourth pair 2 - 6, and the last pair would be 6 - 10.

Flanders discusses the interpretation of these matrices at some length (1965, pp. 33-44) and the reader is reffered to that source for a more complete treatment of the subject. For our purposes, at this time, this technique

seems appropriate for determining which categories of communication tend to be clustered together, and also which categories tend to follow one another. In Figure 2, for instance, it can be seen that the Student Responses (9) tended to be rather long since the 9 - 9 cell contains the highest number of entries, and that some rather long periods occurred when No Communication (10) transpired, the 10 - 10 cell. Another example of interpretation is to point out that on five occasions during this ten minute segment, a Teacher Question followed a Student Response (row 9, column 3).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
1																					0
2																					0
3			6			1			10	1					1						19
4																					0
5					7				2	1											10
6			1			2									1						4
7			2		1		3		5	2											13
8																					0
9			5		1		8		50	7					1		1				73
10			5				2		3	49			1		1						61
11																					0
12																					0
13													1		1						2
14																					0
15					1	1			2	1					15						20
16																					0
17									1								1				2
18																					0
19																					0
20																					0
TOTAL	0	0	19	0	10	4	13	0	73	61	0	0	2	0	20	0	2	0	0	0	204

FIGURE 2

INTERACTION IN AN INTERMEDIATE LEVEL

Geography Class - 10 Minute Sample

VI. Discussion

Remarks Related to this System and its Results

The most significant outcome of this investigation was the addition of a new and quantifiable technique for the study of communication in classrooms for the deaf. The particular instrument developed during this study proved to be both easily usable by the observers and sufficiently discerning to bring out differences and relationships in the ongoing interactions. It is anticipated that, following continued use, this technique will be altered and refined, and perhaps replaced, by its authors and by others who have occasion to use it. However, the basic concept, which makes possible the study of communication as it occurs between deaf persons themselves and with those in their environment, is felt to be of sufficient value that the techniques stemming from it may be applied in many areas of language development, education, and research.

All the categories but one (Student Development) were used to some degree by the teachers and students observed in this study. Informing and Questioning were the most often recorded. Some were infrequently used, notably the Acceptance, Development and Criticism categories of purpose and the Evasive Action and Kinesthetic categories of mode. Because of the small amount of communication observed to be generated by students, the eight categories of student-initiated communication, in particular, usually comprised small percentages of the total communication which transpired. In this case, it is still considered preferable to keep this division of student-initiated communication intact, rather than to lump all student communication into one category. It is also felt that the other infrequently used categories

should be retained -- at least for a time -- both since the observations conducted for this research may not have been an inclusive enough sample of communication in all classes for the deaf, and because infrequent use of a category is not clear-cut evidence that this category should not be occurring. For research purposes, for example, it might prove enlightening to demonstrate that some instructional method could increase the amount of teacher Acceptance or that a relationship appeared between such an increase and the percentage of student-initiated communications.

Although the present study was designed primarily to develop an instrument for future use in investigating communications in classrooms for the deaf -- and to provide guidelines for this usage -- some of the observations recorded also provide definite leads toward productive research directions. The most obvious finding on interaction in the classrooms investigated was the overriding preponderance of teacher-initiated communication at all age levels and in all formal subject areas. The degree of this domination raises the question as to whether deaf students lack the communication ability necessary to initiate a greater proportion of the communication or whether they simply do not get the chance to initiate this communication. This whole question is caught up in the larger problem of how much student participation is necessary or desireable in the classroom. However, assuming that one purpose of educating deaf children is to instruct them in expressive communication, what methods or types of interaction can best be emphasized to encourage more of this communication? Further, how can this best be accomplished without sacrificing teacher information to the No Communication or Confusion categories?

The tentative relationships pointed out between teacher Questioning and Student Response, between Teacher Response and Student Response, and between the degree of direct teacher communication and the percentage of student-initiated communication provide suggested points of departure for further investigation in this area.

The information related to the modes of communication used at different age levels, in different instructional areas, and at different educational facilities is interpreted as showing the effect that the philosophy of a particular school has on the modes of communication employed at that school. The results obtained during this study indicate that in both a residential school and day classes, the Oral mode is the predominant mode used at the Primary and Intermediate levels. The Oral mode continued to be the main mode at the High School level in the day class environment, while non-oral modes increased noticeably in the residential High School. This is not an unexpected finding and could probably be replicated at many of the residential and day class facilities in the country.

Although differences were observed in the use of the purpose categories and mode categories at the different schools and age levels, no clear-cut relationship was discernable. Due to the limited sample actually available for relating mode and purpose (the High School levels at only two schools), this lack of definite pattern is not surprising, and the investigation of relationships existing between the mode and interaction variables still offers a potentially fruitful direction for research.

As previously mentioned, this system, in the opinion of the investigators, is highly appropriate for use in typical classroom settings where there is a

a teacher or other natural leader of communication. Although its attempted use during informal or nonstructured activities indicates that another type of technique would be more appropriate for use under such circumstances, the present system was found to be useful in structured situations -- whether groups of 10 or more, or as few as 2 participants, were being observed.

Training

For training purposes, it is suggested that a ten-category system be the starting point. The first ten categories listed on the data sheets seem to be appropriate here. Trainees can direct their attention to learning to record communication into one of these categories, without having to pay attention to whether communication is student-initiated or teacher-initiated. Once the ten categories are mastered, it is a simple matter to begin to differentiate between student and teacher initiation. The size of the ten categories is then doubled (including the addition of the Confusion category). It is suggested that the mode categories be included in the data gathering process after all the purpose categories have been mastered.

As the result of experiences gained during the course of this investigation, the use of films is suggested as a valuable training device. Another pointer so derived is the desirability of making multiple observations with this system before conclusions are drawn about any particular teacher or group of children. As with any other behavior to be measured, the larger the sample the more reliable the results can be considered.

Relation of Results to Research Objectives

In terms of the research objectives, the data collected at the various schools indicate that the communication in classes for deaf students can be described according to purpose and mode characteristics through the use of this system. The system also showed itself to be sensitive to changes in the characteristics of communication which occurred at different age levels or in different areas of instruction. In addition, procedures for training the observers were able to be refined until workable guidelines could be provided for instruction in the systematic use of this observational technique.

VII. Research Implications

Suggestions for Further Research

A logical step to be taken next would seem to be the development of normative data related to both categories of communication and modes of communication. Observation in many facilities which provide educational programs for the deaf seems indicated. In addition to this, the development of norms based on hearing children's educational experinces, with this system serving as the norming instrument, would offer valuable comparative data.

The use of this system as a research instrument would also seem to hold promise. Instead of being forced to rely on measures of secondary language skills such as reading and writing, the use of this system to measure primary language and communication skills would seem much more appropriate in a variety of research efforts. Research related to learning under a variety of mode conditions is a specific example. Another is the amount of learning which takes place when greater or lesser proportions of the interaction is controlled by the teacher.

Another classroom related area which could be investigated through the use of this system is an effort to change the behavior of teachers and student teachers. Through the use of the technique described in this report, it should be possible to determine whether or not the communicative behavior of teachers can be changed over both short and long time periods.

The language acquisition and development of young deaf children could also be studies through the use of this technique. The effects which the family, peers and professionals have on the communication of the young deaf child could concievably be studied in this manner. Differences between the

interaction patterns of deaf children who successfully integrate into the hearing population and deaf children who do not is a specific example of this type of research.

It is possible that the communicative abilities of the deaf child are as important for the prediction of school success as such variables as I.Q. or degree of hearing loss. This system could be used as the research instrument in seeking answers to this question.

Stimulated Research

Three additional research studies have been stimulated by the investigation reported here, indicating both the interest generated by this technique and the wide applicability it has for the study of the communication of the deaf. Prince (1968) used an observational technique, an adaptation of Bales (1950) categories of interaction to study the differences between the reported and observed communication of adult deaf workers. Collins (1969) utilized the system reported here to study communication between deaf preschoolers and their mothers. Hammermeister and Collins (in progress) are now studying the effect that exposure to this system has on the teaching behavior of student teachers.

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CHARACTERISTICS OF CLASSES OBSERVED

TABLE I

Western Pennsylvania School for the Deaf

Primary Level

CLASS A -	Males	5
	Females	3
	Mean Age	7.8 years
	Mean Years in School	4.4 years
	Mean Reading Achievement	2.1 grade (Gates-MacGinite)
	Residential Students	7
	Day Students	1
	*Hearing Loss	93.3 dB (ISO)
	Mean Intelligence Quotient	107.1 (Leiter)
CLASS B -	Males	4
	Females	4
	Mean Age	8.9 years
	Mean Years In School	5.7 years
	Mean Reading Achievement	2.6 grade (Gates-MacGinite)
	Residential Students	6
	Day Students	2
	*Hearing Loss	96.1 dB (ISO)
	Mean Intelligence Quotient	97.4 (Leiter)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 2

Western Pennsylvania School for the Deaf

Intermediate Level

CLASS A -	Males	7
	Females	0
	Mean Age	12.6 years
	Mean Years in School	7.3 years
	Mean Reading Achievement	2.0 grade (Stanford)
	Residential Students	7
	Day Students	0
	*Hearing Loss	88.3 dB (ISO)
	Mean Intelligence Quotient	78.3 (Leiter)
CLASS B-	Males	5
	Females	2
	Mean Age	12.8 years
	Mean Years in School	8.7 years
	Mean Reading Achievement	2.8 grade (Stanford)
	Residential Students	7
	Day Students	0
	*Hearing Loss	90.9 dB (ISO)
	Mean Intelligence Quotient	90.6 (Leiter)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 3

Western Pennsylvania School for the Deaf

High School Level

CLASS A -	Males	2
	Females	6
	Mean Age	17.7 years
	Mean Years in School	13.0 years
	Mean Reading Achievement	5.2 grade (Stanford)
	Residential Students	8
	Day Students	0
	*Hearing Loss	83.1 dB (ISO)
	Mean Intelligence Quotient	97.3 (WISC)
CLASS B -	Males	6
	Females	3
	Mean Age	18.6 years
	Mean Years in School	14.1 years
	Mean Reading Achievement	7.6 (Stanford)
	Residential Students	9
	Day Students	0
	*Hearing Loss	93.8 dB (ISO)
	Mean Intelligence Quotient	116.4 (WISC)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 4

Indiana School for the Deaf

Primary Level

Males	3
Females	5
Mean Age	8.9 years
Mean Years in School	4.1 years
Mean Reading Achievement	2.2 grade (Gates)
Residential Students	8
Day Students	0
*Hearing Loss	96.4 dB (ISO)
Mean Intelligence Quotient	103.3 (Leiter)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 5

Indiana School for the Deaf

Intermediate Level

Males	0
Females	9
Mean Age	13.0 years
Mean Years in School	8.1 years
Mean Reading Achievement	4.3 (Metropolitan)
Residential Students	8
Day Students	1
*Hearing Loss	92.0 (ISO)
Mean Intelligence Quotient	99.5 (WISC)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 6

Indiana School for the Deaf

High School Level

Males	7
Females	2
Mean Age	17.5 years
Mean Years in School	11.6 years
Mean Reading Achievement	5.8 grade (Metropolitan)
Residential Students	8
Day Students	1
*Hearing Loss	85.0 dB (ISO)
Mean Intelligence Quotient	108.4 (Revised Beta)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 7

Cincinnati Public Schools

Primary Level

Males	3
Females	3
Mean Age	9.5 years
Mean Years in School	5 years
Mean Reading Achievement	No Data Available
Residential Students	0
Day Students	6
*Hearing Loss	85.3 dB (ISO)
Mean Intelligence Quotient	91.2 (Leiter)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 8

Cincinnati Public Schools

Intermediate Level

Males	3
Females	4
Mean Age	13.8 years
Mean Years in School	7.0 years
Mean Reading Achievement	4.7 grade (Stanford)
Residential Students	0
Day Students	7
*Hearing Loss	86.4 dB (ISO)
Mean Intelligence Quotient	96.9 (Leiter)

* Better Ear Average: 500, 1000, 2000 cps.

CHARACTERISTICS OF CLASSES OBSERVED

TABLE 9

Cincinnati Public Schools

High School Level

Males	5	
Females	3	
Mean Age	17.5 years	
Mean Years in School	12.4 years	
Mean Reading Achievement	4.3 grade	(Stanford)
Residential Students	0	
Day Students	8	
*Hearing Loss	76.3 dB (ASA)	
Mean Intelligence Quotient	6 students	82.0 (Leiter)
	2 students	92.0 (WISC)

* Better Ear Average: 500, 1000, 2000 cps.

TABLE 10

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

Reported in Percentages

Three School Totals

Primary Level

	Language Dependent N=1899	Specialized Instruction N=3706	(Indiana Only) Informal Activities N=425
Acceptance	.47	.49	———
Development	.47	.49	.24
Questioning	15.32	12.41	2.59
Demonstration	7.69	6.40	37.65
Informing	15.06	9.28	.47
Directing	6.64	4.34	20.00
Feedback	8.48	7.83	1.41
Criticism	2.84	1.59	3.76
Student Response	21.81	25.79	1.41
No Communication	15.75	21.29	10.12
Acceptance	———	———	———
Development	———	———	———
Questioning	.47	2.83	3.06
Demonstration	———	———	4.24
Informing	2.26	3.89	3.06
Directing	———	———	4.00
Feedback	———	.40	.94
Criticism	———	.16	.71
Teacher Response	.37	1.27	3.53
Confusion	2.37	1.54	2.82
	100.00	100.00	100.00

TABLE II

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

Reported in Percentages

Three School Totals

Intermediate Level

	Language Dependent N=6698	Specialized Instruction N=1795	Informal Activities
Acceptance	.69	.11	
Development	.54	.39	
Questioning	20.05	12.42	
Demonstration	.76	1.28	
Informing	17.90	30.09	
Directing	2.03	3.73	
Feedback	12.00	10.14	
Criticism	.63	1.06	
Student Response	23.38	13.32	No
No Communication	15.90	10.14	Data
Acceptance	———	———	Collected
Development	———	———	
Questioning	.88	.22	
Demonstration	.34	———	
Informing	2.61	11.25	
Directing	.03	———	
Feedback	.15	.28	
Criticism	.07	———	
Teacher Response	1.02	.22	
Confusion	1.02	5.35	
	100.00	100.00	

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 12

Reported in Percentages

Three School Totals

High School Level

	Language Dependent N=6923	Specialized Instruction N=2377	Informal Activities N=391
Acceptance	.33	.13	—
Development	.36	.17	—
Questioning	15.82	13.88	—
Demonstration	1.55	4.63	—
Informing	28.77	28.91	—
Directing	1.59	1.26	32.99
Feedback	7.94	10.90	.77
Criticism	.97	.08	—
Student Response	21.65	16.95	—
No Communication	10.70	16.15	46.29
Acceptance	.03	—	—
Development	—	—	—
Questioning	2.60	3.11	1.02
Demonstration	.01	—	12.79
Informing	2.27	.38	—
Directing	—	.17	4.35
Feedback	—	—	—
Criticism	—	—	—
Teacher Response	5.08	2.82	1.79
Confusion	.33	.46	—
	100.00	100.00	100.00

TABLE 13

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

Reported in Percentages

Western Pennsylvania School for the Deaf

Primary Level

	Language Dependent N=400	Specialized Instruction N=714	Informal Activities
Acceptance	.25	.14	
Development	———	———	
Questioning	15.75	5.46	
Demonstration	34.50	7.42	
Informing	10.25	1.26	
Directing	1.50	3.50	
Feedback	7.25	4.48	
Criticism	3.00	3.08	
Student Response	18.75	34.31	
No Communication	4.00	38.11	No Data Collected
Acceptance	———	———	
Development	———	———	
Questioning	———	.56	
Demonstration	———	———	
Informing	2.25	.28	
Directing	———	———	
Feedback	———	———	
Criticism	———	.42	
Teacher Response	.50	.42	
Confusion	2.00	.56	
	100.00	100.00	

TABLE 14

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

Reported in Percentages

Western Pennsylvania School for the Deaf

Intermediate Level

	Language Dependent N=909	Specialized Instruction N=798	Informal Activities
Acceptance	.33	.25	
Development	.11	____	
Questioning	22.44	11.53	
Demonstration	____	.88	
Informing	13.20	13.03	
Directing	1.21	7.14	
Feedback	10.23	5.89	
Criticism	____	1.50	
Student Response	31.91	12.28	No
No Communication	14.52	12.41	Data
Acceptance	____	____	Collected
Development	____	____	
Questioning	1.65	____	
Demonstration	____	____	
Informing	2.09	22.68	
Directing	____	____	
Feedback	.22	.38	
Criticism	____	____	
Teacher Response	2.09	____	
Confusion	____	12.03	
	100.00	100.00	

TABLE 15

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

Reported in Percentages

Western Pennsylvania School for the Deaf

High School Level

	Language Dependent N=1630	Specialized Instruction N=884	Informal Activities
Acceptance	.12	____	
Development	____	.23	
Questioning	22.58	12.67	
Demonstration	.67	.68	
Informing	22.03	48.98	
Directing	3.68	2.04	
Feedback	6.75	4.86	
Criticism	.61	.23	
Student Response	21.60	16.29	No
No Communication	13.93	9.28	Data
Acceptance	____	____	Collected
Development	____	____	
Questioning	2.21	3.73	
Demonstration	.06	____	
Informing	2.39	____	
Directing	____	____	
Feedback	____	____	
Criticism	____	____	
Teacher Response	2.27	.11	
Confusion	1.10	.90	
	100.00	100.00	

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 16

Reported in Percentages

Indiana School for the Deaf

Primary Level

	Language Dependent N=497	Specialized Instruction N=1799	Informal Activities N-425
Acceptance	.20	.28	———
Development	1.40	.39	.24
Questioning	15.30	13.56	2.59
Demonstration	———	5.84	37.64
Informing	22.14	6.84	.47
Directing	7.24	5.50	20.00
Feedback	8.85	6.11	1.41
Criticism	3.02	1.50	3.76
Student Response	18.31	20.68	1.41
No communication	10.26	27.24	10.12
Acceptance	———	———	———
Development	———	———	———
Questioning	1.40	5.39	3.06
Demonstration	———	———	4.24
Informing	6.04	1.78	3.06
Directing	———	———	4.00
Feedback	———	.67	.94
Critlcism	———	———	.71
Teacher Response	———	2.39	3.53
Confusion	5.84	1.83	2.82
	100.00	100.00	100.00

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 17

Reported in Percentages

Indiana School for the Deaf

Intermediate Level

	Language Dependent N=3103	Specialized Instruction	Informal Activities
Acceptance	.13		
Development	———		
Questioning	22.62		
Demonstration	.03		
Informing	9.09		
Directing	2.58		
Feedback	11.54		
Criticism	———		
Student Response	28.19	No	No
No communication	21.14	Data	Data
Acceptance	———	Collected	Collected
Development	———		
Questioning	.55		
Demonstration	.13		
Informing	3.00		
Directing	.06		
Feedback	.10		
Criticism	———		
Teacher Response	.55		
Confusion	.29		
	100.00		

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 18

Reported in Percentages

Indiana School for the Deaf

High School Level

	Language Dependent N=1909	Specialized Instruction N=1493	Informal Activities N=391
Acceptance	.05	.20	———
Development	———	.13	———
Questioning	10.21	14.60	———
Demonstration	1.62	6.97	———
Informing	58.47	17.28	———
Directing	.58	.80	32.99
Feedback	2.10	14.47	.77
Criticism	.10	.07	———
Student Response	15.35	17.28	———
No communication	4.87	20.23	46.29
Acceptance	———	———	———
Development	———	———	———
Questioning	1.15	2.75	1.02
Demonstration	———	———	12.79
Informing	3.09	.60	———
Directing	———	———	4.35
Feedback	———	———	———
Criticism	———	———	———
Teacher Response	2.41	4.42	1.79
Confusion	———	.20	———
	100.00	100.00	100.00

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 19

Reported by Percentages

Cincinnati Public Schools

Primary Level

	Language Dependent N=1002	Specialized Instruction N=1293	Informal Activities
Acceptance	.70	.93	
Development	.20	.85	
Questioning	13.17	13.69	
Demonstration	.80	6.11	
Informing	13.47	16.40	
Directing	8.38	2.86	
Feedback	8.78	11.45	
Criticism	2.70	.77	
Student Response	24.75	26.22	No Data Collected
No Communication	23.15	9.74	
Acceptance	———	———	
Development	———	———	
Questioning	.20	.31	
Demonstration	———	———	
Informing	.40	8.51	
Directing	———	———	
Feedback	———	.23	
Criticism	———	.23	
Teacher Response	.50	.15	
Confusion	.80	1.55	
	100.00	100.00	

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 20

Reported in Percentages

Cincinnati Public Schools

Intermediate Level

	Language Dependent N=2686	Specialized Instruction N=997	Informal Activities
Acceptance	1.45	____	
Development	1.30	.71	
Questioning	16.27	13.14	
Demonstration	1.86	1.60	
Informing	29.67	43.73	
Directing	1.68	1.00	
Feedback	13.14	13.54	
Criticism	1.56	.71	
Student Response	14.89	14.14	No
No Communication	10.31	8.32	Data
Acceptance	____	____	Collected
Development	____	____	
Questioning	1.01	.40	
Demonstration	.71	____	
Informing	2.38	2.11	
Directing	____	____	
Feedback	.19	.20	
Criticism	.19	____	
Teacher Response	1.19	.40	
Confusion	2.20	____	
	100.00	100.00	

COMMUNICATION IN THE CLASSROOM BY CATEGORIES

TABLE 21

Reported in Percentages

Cincinnati Public Schools

High School Level

	Language Dependent N=3384	Specialized Instruction	Informal Activities
Acceptance	.59		
Development	.56		
Questioning	15.75		
Demonstration	1.92		
Informing	15.28		
Directing	1.15		
Feedback	11.85		
Criticism	1.63		
Student Response	25.26	No	No
No Communication	12.47	Data	Data
Acceptance	.06	Collected	Collected
Development	———		
Questioning	3.61		
Demonstration	———		
Informing	1.77		
Directing	———		
Feedback	———		
Criticism	———		
Teacher Response	7.95		
Confusion	.15		
	100.00		

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 22

Reported in Percentages

Indiana School for the Deaf

Primary Level

	Language Dependent N=417	Specialized Instruction N=1276	Informal Activities N=370
Combined	____	.86	4.33
Dactyl	.96	.55	____
Demonstration	____	.16	44.05
Dramatization	8.39	.31	____
Evasive Action	____	.16	____
Gesture	.48	2.35	2.70
Kinesthetic	____	____	____
Manual	____	____	____
Mechanical	2.88	____	____
Oral	84.41	90.44	48.92
Written	2.88	5.17	____
	100.00	100.00	100.00

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 23

Reported in Percentages

Indiana School for the Deaf

Intermediate Level

	Language Dependent N=2438	Specialized Instruction	Informal Activities
Combined	11.65		
Dactyl	.16		
Demonstration	1.19		
Dramatization	.57		
Evasive Action	———	No Data Collected	No Data Collected
Gesture	1.68		
Kinesthetic	———		
Manual	.41		
Mechanical	5.29		
Oral	74.21		
Written	4.84		
	100.00		

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 24

Reported in Percentages

Indiana School for the Deaf

High School Level

	Language Dependent N=1816	Specialized Instruction N=1188	Informal Activities N=210
Combined	70.98	23.65	24.76
Dactyl	.72	14.48	———
Demonstration	———	———	23.81
Dramatization	.11	.25	———
Evasive Action	———	.42	———
Gesture	.99	5.98	45.72
Kinesthetic	———	———	———
Manual	14.65	26.52	———
Mechanical	7.54	.08	———
Oral	1.60	3.96	5.71
Written	3.41	24.66	———
	100.00	100.00	100.00

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 25

Reported in Percentages

Cincinnati Public Schools

Primary Level

	Language Dependent N=762	Specialized Instruction N=1147	Informal Activities
Combined	.39	.35	
Dactyl	———	———	
Demonstration	1.84	2.53	
Dramatization	———	1.92	
Evasive Action	.39	———	
Gesture	.39	.35	No Data Collected
Kinesthetic	———	.35	
Manual	———	.09	
Mechanical	———	———	
Oral	89.77	88.74	
Written	7.22	5.67	
	100.00	100.00	

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 26

Reported in Percentages

Cincinnati Public Schools

Intermediate Level

	Language Dependent N=2350	Specialized Instruction N=914	Informal Activities
Combined	2.72	____	
Dactyl	____	____	
Demonstration	5.83	____	
Dramatization	1.19	____	
Evasive Action	____	____	No Data Collected
Gesture	2.64	.33	
Kinesthetic	.09	____	
Manual	.17	____	
Mechanical	____	____	
Oral	76.59	92.56	
Written	10.77	7.11	
	100.00	100.00	

MODE OF COMMUNICATION FOR TEACHER-PUPIL INTERACTION

TABLE 27

Reported in Percentages

Cincinnati Public Schools

High School Level

	Language Dependent N=2957	Specialized Instruction	Informal Activities
Combined	.24		
Dactyl	———		
Demonstration	.37		
Dramatization	.14		
Evasive Action	.24	No Data Collected	No Data Collected
Gesture	1.69		
Kinesthetic	———		
Manual	———		
Mechanical	3.25		
Oral	80.44		
Written	13.63		
	100.00		