THE DEVELOPMENT OF A SYSTEM FOR THE CLASSIFICATION
OF LEARNER BEHAVIOR POSSIBILITIES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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****

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1966

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ACKNOWLEDGMENTS

The writer is greatly indebted to Dr. Robert B. Sutton who served as major adviser throughout the period of formal study and examinations leading to this dissertation and to Dr. Ross L. Mooney and Dr. Paul R. Klohr who provided a large measure of the stimulation and guidance necessary to begin this study and carry it through. An even broader debt of gratitude is felt to Dr. M. Karl Openshaw who provided assistances, large and small, beyond enumeration throughout the course of the doctoral studies and dissertation preparation.

Thanks must also be extended to the school systems, teachers, and students who cooperated so willingly in the collection of data for this study. Without their complete support this project would not have been possible. To Turhan Oguzkan, Robert Ribble, Leniss Green, and Robert Croye much credit is due for serving so well as observers, coders, and critics. To Mrs. Katherine Wagner and Mrs. Harriet McNaughten, the writer expresses his sincerest appreciation for their patience and conscientious efforts in preparation of superior typed copy from a bewildering array of raw materials.

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Special thanks and acknowledgment are made to my wife for the unwavering support and assistance which she extended not only during the long days of writing on this project but through her direct participation as a member of one of the coding teams.
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"The Development of a Taxonomy for the Classification of Teacher Classroom Behavior." In collaboration with M. Karl Openshaw and Frederick R. Cyphert. The Ohio State University Research Foundation, 1966.

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CHAPTER I

INTRODUCTION

The efficacy of engaging in research which will produce change for good or provide a basis for such change is held widely and unquestioningly by those concerned with education. This, coupled with the burgeoning demand for creative programs which will reflect the findings of research, has led to increasing psychological and financial support for the prospective educational researcher. However, private, philanthropic foundations and governmental agencies with powers to dispense funds to research projects emphasizing the correct proportion of "goodness" and "creativity" tend to cause research efforts to focus on more practical, immediate concerns. Problem development may be based on expediency rather than on questions basic to education. Such an atmosphere is not conducive to basic research or developmental research because of its emphasis on the production of a usable, often marketable, end-product. The current emphasis on saleable ideas or projects threatens to produce an atmosphere in which free exploration of fundamental concepts, relationships and systems of organization, without immediate practical application is relegated to a subsidiary rather than primary position.
Some indication of the complexity of the problems confronting the researcher today may be grasped by consideration of Kurt Lewin's comments on personality and behavior, a single aspect of the total burden of this study.

Experimental studies of the dynamic laws of the behavior and structure of personality have forced us to consider more and more complicated problems. Instead of investigating the single psychological systems which correspond to simple needs and desires, we have to deal with the interrelationships of these systems, with their differentiation and transformations, and with the different kinds of larger wholes built up from them. These interrelationships and larger wholes are very labile and delicate. Yet one must try to get hold of them experimentally because they are most important for understanding the underlying reality of behavior and personality differences.¹

In quest of the complex dynamic, man must break the ties to a traditional conceptualization of knowledge and strive to evolve beyond the limits of his classical heritage. For example, the ecological approach in biology had to depend for many years upon the now discredited linear view of the classical taxonomists as a beginning point against which a dynamic view of life might be projected. The "classical" approach set forth by Aristotle was a way of looking at the relationships of the biological kingdoms. Its fallacy lay not in its errors but rather in the limitations of its acceptance as the taxonomic system. In this sense it is inadequate; nevertheless, it continues to provide guides to additional areas for fruitful scientific experimentation.

Education, on the other hand, has lacked even a rudimentary hierarchical ordering of its endeavors. Much of the present-day confusion and duplication of insignificant research is a result of the disorganized eruption of research in education. Today, researchers in education are faced with the problem of adapting research methods from other disciplines. In the haste to do something, a variety of things has been done with little or no discernible relationship existing between one experimental project and another.

Those who believe that the most productive avenue for education lies along a route of increased identification of underlying relationships have been rallying to the banner of "basic" or "fundamental" research. In the vanguard of this type of research in the area of classroom behavior have been the studies of Smith, Bellack, Wright, and Travers, among others. They have been concerned to develop a body of general data and findings upon which more specific research for improvement of teaching and learning may take place. They have made use of varying observation techniques. Observation of personal behavior in a given setting, either pupil, teacher, administrator, or school board, has been assumed to yield reliable information which may be formulated into analyzable data on the basis of some construct developed for the experiment. The variety and value structure of many of the procedures have made the problems surrounding valid observation more critical. Some degree of rigor has been
developed by each of the projects and researchers mentioned above. But in each case, the rigor has been obtained by concentrating on a single activity or dimension or by use of static records of the total situation. A great amount of information has become available when a composite picture has been developed from such an undertaking. But the results have been multidimensional linear projections of activity with little or no sense of the dynamic of the actual situations. If, as some modern theory maintains, the most important aspects of education are the encounters within the teaching-learning situation, ways must be devised to capture, describe, and analyze these encounters more adequately.

This study was designed to investigate one aspect of what was conceived to be a primary concern of curriculum developers, teacher educators, learning theorists, and instructional specialists, namely, the process of behavior in the instructional setting. The role of the teacher has been the natural focus of most research to date. However, an expanding view of curriculum and instruction has forced consideration of the role of the student. The obvious result has been pointed out by Aschner.

Since the student equally with the teacher is an agent of his learning, and hence also of his success or failure to learn, it is impossible to evaluate the effectiveness of teaching without at the same time determining what the student is doing.²

Statement of Problem

The purposes of this study were to develop an instrument for identification of the responsive behaviors of junior high students to selected teacher behaviors and to delineate the process for development of the system for classifying such student behaviors. The germ of this focus may be traced to a number of historical antecedents that will be developed more thoroughly in the second chapter. The immediate stimulus which gave rise to this particular meeting and conjunction of research procedures and objectives arose from a series of experiences the author had in courses of study directed toward curriculum theorizing and work he did on a research project in the development of a taxonomy for the classification of teacher classroom behavior. The study reported here formed a natural complement to the Taxonomy Project. While the earlier study was concerned to select, define and order the unique behaviors of the teacher, any minimal understanding or conceptualization of the total instructional situation dictates the inclusion of the major

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3The two courses in which the author participated at The Ohio State University were: "Curriculum Theory" with Dr. Paul Klohr, and a graduate seminar, "Curriculum and Supervision: K-12," with Dr. Ross Mooney and Dr. Paul Klohr.

4M. Karl Openshaw and Frederick R. Cyphert in collaboration with Norman V. Overly and Edgar Ray Smith, The Development of a Taxonomy for the Classification of Teacher Classroom Behavior, U.S. Office of Education Cooperative Research Project 2288 (Columbus, Ohio: The Ohio State University Research Foundation, 1966). Future reference to this study will be called the Taxonomy Project.
receptor quantity, the student, in classroom interaction. Use of the term, "receptor," in this instance did not mean that the observation of student behaviors was limited in this study to "receiving" behaviors, nor should it be assumed that the author subscribed to a theory of instruction which holds that students are merely receptors. But in common understanding and expectation of classroom behavior the teacher-student relationship has been basic; furthermore, the provider-receiver analogy has been firmly established.5

This study was, in many ways, a part of an effort to synthesize and seek out the "relatedness" of the author's own experiences in teaching education. The immediate concern was for the improvement of preparation of teachers. However, the study also had relevance to and implications for a wide variety of research within the scope of formal education. Openshaw6 has noted the general pessimistic attitude surrounding current programs in teacher education. Further, curriculum development at all levels has suffered from a


6 Openshaw, op. cit., p. 1.
dispersion of focus, in part precipitated by the lack of empirical data to support or refute what have been at best the logically generated products of cooperative councils or, more frequently, the culminating product of a "group-think" emotional experience.

The ultimate objective of this study was to develop a preliminary instrument for the observation and classification of student behaviors in order to provide a method for quantifying specific student behaviors. If the results of this study prove acceptable, the product should provide an indication of future directions for extension of the instrument and of needs which may exist for further observations to develop a more complete picture of possible student responses to more complex teacher behaviors. Because of the exploratory nature of this study, specific types of teacher behaviors were selected which it was anticipated would reveal the most consistent types of student response.

With the completion of a careful delineation of possible student responses to each category of teacher behavior it should be possible to develop tables of probability for specific behaviors as responses to selected teacher behaviors. From such analysis, it will then be possible to predict the type of student behaviors which may be anticipated from a given teacher behavior when selected student and teacher variables are controlled. On such a basis, programs for
teacher education curricula may be developed with considerably more relevance to a common core of content and skills critical to the performance of the teaching function as well as teacher role.

With increasing frequency, scholars have addressed themselves to furthering understanding of the dynamics of the process of interaction. There is a growing body of data available on various aspects of interaction in the classroom. Each study has (of necessity) limited its approach and thus its results. The bi-polar approach has characterized most studies to date. Some emphasize dominative-integrative behavior, some the verbal-non-verbal dichotomy, others the active-passive aspects of classroom participation. It is obvious that a given situation may be approached from a number of perspectives. This study attempted to produce a synthesis of portions of several previous researches in a limited area to develop an initial approach to student behaviors which holds promise of utility in expanded studies of behaviors in various instructional situations.

Specific questions posed as guidelines within which to work while developing an instrument for classifying student behaviors were:

1. Are the samples of student response behaviors

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7 Ten papers directly related to interaction were presented at the Fiftieth Annual Meeting of the American Educational Research Association in Chicago, February 17-19, 1966.
adequate for the establishment of a comprehensive system of categories of possible response behavior?

2. Is the classification system adequate?

3. Are observer records reliable, i.e., do different observers record a given behavior in the same way, and does each observer record a given group of behaviors in the same way over a period of time?

Delimitations

In studies of this type some boundaries must be set. In this case they were of two types: assumptions and limitations. Formal limitations set for this study were: the size of the sample, the range of teacher behaviors providing the student stimulation, and the frequency and duration of the observation data used. Validation of the whole classification system was limited to the behaviors of the regular classroom population of ten selected classes. Coding of typescripts was limited to one observation and taping of ten teachers in different classroom situations.

Assumptions compose a more fundamental group of delimiting factors. The basic assumptions underlying this research included a wide range of concepts. First, instruction was viewed as an interactive process between teacher and student, or students, which included both teaching and learning. Second, aspects of both teaching and learning were considered to be separable and subject to independent
consideration. However, a critical factor in the total process was assumed to be the dynamic nature of interaction. It was to this dynamic that special attention was focused in this study.

It was further assumed that observation and categorization of the relationship and interaction of teacher and learner behaviors would be fruitful approaches to an analysis of the teaching-learning process; that observers could be trained to record with reliability both verbal and nonverbal behaviors of both students and teachers in a classroom; that the best record of teacher and student behaviors would include as large a portion as possible of the behaviors which actually occurred in the given situation; that while neither the student's perception of the teacher's behavior nor the student's understanding of it is quantifiable from observation of a classroom, the student's overt behavior--action and/or reaction--to a given teacher behavior may be observed by an observer in a manner similar to that of the teacher and recorded and quantified for purposes of analysis.

**Definitions**

An understanding of the meaning of certain terms as used in this study will facilitate the reading of the discussion which follows. **Teacher speech**, as used in this research referred to all spontaneous spoken behavior of the teacher but specifically eliminated reading and singing.
They were categorized as separate modes of oral communication in keeping with the categories developed in the Taxonomy Project. A more extended discussion of all concepts and terms used in this study which were developed in the earlier study may be obtained by reference to the final report of the Taxonomy Project.

Special attention in this research was focused on the Function Dimension of teacher behavior. This was one of four major dimensions of the Openshaw Classification System which defined a system of categories for coding the significant teacher behaviors in terms of goal-directed learning or the purposes the teacher serves in the classroom.

Particular attention was given to selection of classes for observation which it was anticipated would primarily provide instances of behaviors falling in two categories of this dimension. These categories were: (1) the Structure category, which contained those teacher behaviors which set the context for subsequent classroom behaviors by initiating, providing focus, and launching a full unit, a single class session, or a single topic, and (2) the Develop category which was composed of those teacher behaviors which fulfill the functions of elaborating or extending the structure of subject matter and/or process.

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8 Appendix C contains a complete copy of the Openshaw Classification System.

9 Loc. cit.
Confusion over the perimeter of the term "junior high school" is not uncommon. In this study the wider limits were accepted initially. When development of the project began, it was found to be advisable to use a group of classes, all of which were at the ninth-grade level. Therefore, all data used in checking the reliability of the instrument developed in this study were collected from the single-grade level. However, preliminary observations were conducted at other levels of the junior high school, namely, seventh and eighth grades.

Frequent differences of opinion leading to confusion of the meaning of the terms "teacher-teaching" and "learner-learning" as well as confusion of the meaning of "learner" and "student" and the distinction between the terms was noted in much literature related to curriculum and/or instruction. While this research did not seek to resolve these confusions in usage, note must be taken of the problem and the efforts of the author to establish some limits in use of the various terms.

The term "teacher" was used to denote the person charged with primary responsibility for conducting the activities within the classroom. Teaching may or may not be the behavior he displays. His behavior is called "teaching" when he is engaged in the pursuit of some established instructional goals. Therefore, taking the class roll may
be teacher behavior but it is not teaching behavior. Likewise, the term "student" may be used as a synonym for "learner," but when so used not all learner behavior may be called "learning." The learner is learning only when some change is taking place in his cognitive or affective sphere of activity. In other words, no assumption of learning on the part of the learner may be made without evaluation of change in his subsequent behavior. Modifications of meanings of these terms may be noted from the context in which they are used.

Because the classes selected for collection of data were using materials developed within the framework of the "discipline" approach to curriculum and instruction, special care must be exercised in defining this term. Elizabeth Maccia has written an extensive delineation of this concept.10 A simple definition will merely indicate the direction of the full discussion of the term provided by Maccia. "Discipline" means instruction or teaching in distinction to regulation or control, the commonly accepted priority in definitions. Two other meanings of "discipline" provided by Maccia explicate the concept further. Discipline is (1) organized branches of knowledge and (2) rules of practical conduct. A synthesis of these meanings was sought by

defining discipline as a structured or organized problem-solving approach which incorporates "rules or cognitive structures or ways of solving problems distinctive to that kind of human living."\textsuperscript{11}

\textbf{Description of Method}

This study was pursued in four fairly distinct segments. The first step was the development of a tentative system of categories based on filmed sequences of actual classroom teaching situations, direct observation of classes, anticipated responses to teacher behaviors identified in previous research, and descriptions of student behaviors found in previous research. In the second phase the initial identification of categories was synthesized and arranged in a logically consistent framework that was checked for adequacy in the third stage. Throughout stages one and two, frequent discussions were held with specialists and advisors to provide a maximum opportunity for the sharing of ideas. Data for the adequacy stage was collected at ten junior high schools in the northeastern quadrant of the state of Ohio. Recordings were made of several class sessions in each of ten schools. Synchronized observations of non-verbal elements of the students' behaviors were made and recorded

\textsuperscript{11}\textit{Ibid.}, p. 99. Cf. Appendix A. the rationale for the materials being developed by the Social Studies Curricu-lum Project in Economics conducted at The Ohio State Uni-versity.
by two trained observers. Then these two sources of data were collated and a composite typescript was prepared to be used by coders in establishing the reliability of the coding and the adequacy of the instrument.

Four persons divided into two teams performed the coding. Each person had spent a minimum period of two weeks familiarizing himself with substantive materials of the course of study the classes were using, the system of categories to be used in the classification process, and the coding procedures.

The fourth stage, the review of the literature, was pursued intermittently throughout the development of the project. The report of this phase of the study follows in Chapter II.
CHAPTER II

REVIEW OF RELATED LITERATURE

A review of the literature related to any given topic confronts one with the necessity of selection at every turn. The determination of relevance is not easily dispatched and may lead to many interesting but somewhat fruitless digressions. In an effort to be complete, one begins to feel like the man suffering from a surfeit of eating and drinking being told to cure his plight by eating more food.\(^1\) Therefore, it was necessary to limit the scope of the literature which would be considered. First consideration was given to the development of classroom observation as a research technique. Secondly, because of the inextricable bond between student classroom behavior (the focus of this study) and teacher classroom behavior, a study was made of some of the most recent major research in teacher behavior. Finally, reports of research of student classroom behavior were considered.

\(^1\)A commentary on the present state of theorizing and research in education was made by Arnold Nash when he said, "The search for more facts as the cure for our present ills in the social sciences is like suggesting that the remedy for indigestion is more food, or, for a drowning man, more water." Arnold Nash, The University and the Modern World (New York: Macmillan, 1943), p. 139.
Uses of Classroom Observation

The introduction of education to the possibilities of change based on research came at a time when the natural sciences, which had evolved with the scientific method, were already achieving a high degree of sophistication in instrumentation and theory. Concurrently, education and other social sciences began to view themselves in increasingly strict professional terms which demanded that those practitioners of the educative arts adhere, or strive to adhere, to the same standards of excellence which had developed through the centuries in other areas of specialization. Regardless of the differences in objectives, subjects of inquiry, or relevance of technique, educational researchers elected to try a developmental shortcut in search of substantive results by attempting tight little experiments with narrowly defined objectives or broad survey-type research with little rigor. This strategy, coupled with the general dispersion of information and lack of synthesis in overview retarded immediately applicable results. The more moderate approach to direct observation of the instructional milieu of teachers teaching and students learning was only rarely used as a research method. When observation procedures were used they developed as an unsophisticated process for looking into a classroom to find out "something," usually not clearly defined.
Supervision

Observations were indispensable for the principal or supervisor charged with responsibility for keeping tabs on the "goings on" in the school. These early visits were general account-taking trips whereby the administrator arrived unannounced and sometimes unaware of any real, i.e., pre-planned, objective other than making an appearance. However, the better prepared or more conscientious leader had certain judgments to make about the adherence to rules, efficiency of the teacher's discipline, the evidences of adequate preparation by the teacher, the attentiveness of the students, etc., which gradually came to form an informal checklist for those charged with administering a given educational institution.

During the early part of the twentieth century the ascendency of "objective" or "standardized" tests placed the subjective observation technique in somewhat questionable light; as a result, fewer claims were made for the accuracy of observer judgment. However, there is no evidence to support the claim that fewer decisions resulted from observer-based decisions.

In 1917, Henry Suzzallo, in an introduction to C. R. Maxwell's manual on observation, noted the need for a systematic approach to observation. But the primary purpose of the observation was believed to be the judgment of good and poor teaching, whether the observer was superintendent,
special supervisor, principal, or training school teacher. In reaction to the newly developing interest in the use of standardized tests of efficiency in many subjects, Mr. Suzzallo concluded that however accurate tests might be they would never be an adequate substitute "for the intimate personal observations of a competent supervisor who lives in the classroom and scans the whole of the educative life found there."^2

Maxwell suggested ten different foci for observation and provided outline aids to observation for each one. Of interest here was the very general nature of the items in the outline. The teacher's personal appearance, social efficiency and professional attitude were equally as important as his teaching ability which the judge rated in terms of selection, analysis and mastery of subject matter, skill in arousing thought, formation of habits, assignment and questioning, discipline, planning, preparation, attention to language, attention to individual differences of pupils and results.^3

Observation of the pupils required no less omniscience on the part of the observer. Besides noting the grade, number in the class, appearance ("nativeness" being one


^3 Ibid., pp. 41-43.
criterion), types, i.e., normal, above normal, and sub-normal intelligence, and attitude, a quantitative and qualitative analysis of responses and participation by students was suggested.4

In support of the use of observation in the assessment of teachers over one thousand studies have been reported by Domas and Tiedeman5 and Barr.6 Even though accurate judgments on the basis of supervisor observations are difficult to make without considerable preparation with techniques of observation, evaluation of teaching proficiency continues to follow the time-honored pattern by most supervisors and administrators. The results of study after study show that ratings of teacher effectiveness have no discernible relationship to effectiveness as measured in terms of changes in student knowledge and behavior.7


7Comparison of the results reported in the studies listed below will show an unusual unanimity in findings.


R. E. Gotham, "Personality and Teaching Efficiency,"
Teacher preparation

Informal observation was early used as the major means for familiarizing pre-service teachers with teaching and for collection of data in child study courses. W. I. B. Beveridge has cautioned against confusing spontaneous or passive observations which are unexpected with induced or active observations which are deliberately planned and executed.  

Accurate observation of complex situations is extremely difficult and observers usually make many errors of which they are not conscious. Effective observation involves noticing something and giving it significance by relating it to something else noticed or already known; thus it contains an element of sense-perception and a mental element.  

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*Experimental Education, XIV* (December, 1945), 165.


9Ibid., p. 105.
Observations of early childhood have been a primary tool in the study of child psychology and child development. Particular emphasis has been placed on "seeing" the whole child. As Cohen and Stern have pointed out, children communicate in many ways, "through their eyes, the quality of their voices, their body postures, their gestures, their jumping up and down, their listlessness."\(^{10}\) It might be added that adults do the same things. However, adult signs of communication tend to be less open, possibly because of the regimentation of formal school and certainly as a result of cultural expectations and prohibitions on behavior. Nevertheless, observation of behavior at any age level necessitates attention to all the modes of communication if any comprehensive picture of behavior is to be realized.

Beyond the modes of communication, studies of child development have emphasized that one must also be aware of his own biases and prejudices. Cohen and Stern have spoken to this point.

Apparently people do not see children with unbiased eyes, or everybody would see the same Johnny. We need to examine these biases, or personal involvements, if we are to have some degree of accuracy in our record-taking.\(^{11}\)

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\(^{11}\) Ibid., p. 3.
A trained observer deliberately looks for specific things, but he is still faced with the problem of discrimination at many points. Then he must rely on his own judgment. As Remmers has noted, the rater, not the record of his response, is the instrument whose reliability is in question.\textsuperscript{12}

Recently there has been a growing concern over the effectiveness of observation in the initial preparation of teachers and in in-service training of teachers. Wedberg has made a study of the value of observation as an instructional tool. It has long been an accepted part of teacher preparation programs, but it has usually been used with little or no evaluation. The finding relevant to this study was the lack of preparation of the students by their instructors for the observation experience.\textsuperscript{13} This criticism of a common use of the observation technique calls in question the use made of the technique and not the value of the technique itself. However, the initial exposure of future teachers or teachers-in-service to observations so ill-planned as to be confusing or meaningless may be expected to undermine their confidence in


\textsuperscript{13}Desmond P. Wedberg, "A Comparative Investigation of the Instructional and Administrative Efficiency of Various Observational Techniques in the Introductory Course in Education," Los Angeles: University of Southern California, School of Education, Department of Instructional Technology, 1963, p. 47. (Title VII, Project Number 685.)
it when used in other situations. The superficial nature of the procedures often used may be seen in the types of questions asked on one observation checklist. Three taken from different sections of the checklist will serve as examples.

1. Did the students work with purpose toward their goals?
2. Was the teacher friendly to the students while maintaining the role of an adult?
3. Did the arrangement of furniture allow for ease of traffic, flexibility of working groups, and for friendly informal relationships?14

The diverse range of purpose in this type checklist, the necessity of making assessments of complex situations, and the difficulty encountered in making judgments about composite sets of behaviors covering disparate time periods make such a list unwieldy, if not impossible, to interpret with any degree of reliability.

Informal observation and observation designed to rate teachers are not merely ancient historical phenomena as may be seen in the report by Helen Heffernan in the 1965 ASCD Yearbook. In a survey of the uses made of their time, principals were found to spend the largest single percentage of their time as implementers-of-curriculum in visiting classrooms.15

14Ibid., pp. 60-61.
Not only are the administrators and supervisors spending a large portion of their time in observing, but increasingly classroom teachers on released time or internship programs are including visitation observations of other teachers in their refresher course. "Master teachers" are most frequently the object of this type observation. The inclusion of such diverse activity under the general heading of "observation" indicates the need for careful selection of the observation procedures to fit the objectives of the observation.

A research tool

One of the first rigorous attempts to use observation as a research tool in the social sciences was begun in the early 1930's by Thomas, Loomis, Arrington, and Isbell.16 Because the studies were made by sociologists concerned with the observation of social interaction rather than instructional processes, difficulty was experienced in finding subjects or situations in which subjects could be observed at the upper age levels. They generally restricted their observations to recreation activity groups which compounded the problems associated with the development of observational

16 Dorothy S. Thomas, Alice M. Loomis, Ruth E. Arrington, and Eleanor C. Isbell, Observational Studies of Social Behaviors, I (New Haven: Institute of Human Relations, Yale University, 1933).
techniques because of the great amount of activity occurring in each situation. However, they demonstrated that systematic errors of observation are an important factor in variability, that the observational error varies with the situation observed; that observer-inconsistency probably plays a definite role; that, with [their] technique, timing and interpretation errors are at present almost inextricably inter-related; and that distortion of 'reality' quite clearly occurs in observational records. 17

The use of observational techniques have concerned researchers in fields other than education, also. O. L. Peterson and others studied the general practice of medicine by using participant observers. A resident was trained to observe and analyze whatever the physician to whom he was assigned did in the normal course of his practice. The results indicated that general practitioners spend a large proportion of their time on duties which do not require the specialized training they receive to prepare them to be doctors of medicine. 18

Similar studies of teachers and Air Force technicians provided an evaluation of the use the teachers and technicians make of their time in the normal course of a day’s activity at school and in handling complex computing machines. Simple

17Ibid., p. 246.

observation procedures indicated that a large proportion of their time was spent on "housekeeping" duties. 19

**Student behavior**

The development of sociograms provided more structure for observation of student behavior, but they were often limited to a graphic representation of the group structures in terms of the expressed interests of attractions of students. Even when they were based on the frequency of individual responses to other individuals, the result has been a linear, single-dimension picture of a constellation of attitudes. In such cases the place of the teacher, the source of motivation, or the reliability of the judgment were usually overlooked.

As has been suggested, the development of standardized tests brought a concomitant emphasis on their use in the evaluation of teacher effectiveness in terms of the changes in student behaviors or student "learning." The complex nature of the assessment problem was highlighted by Ackerman when he said, "A teacher is effective when he does things or behaves in ways that engender the learning skills, understandings, work habits, desirable attitudes and adequate personal adjustment on the part of the pupils or students." 20

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19Ibid.

Such a concept of student change and teacher effectiveness must emphasize the interrelationship of the two forms of behavior. This leads to a further complication when techniques for assessment are designed.

Such a concept of change must employ more than gains or losses on achievement tests as criteria of teacher effectiveness. Change must include all-around pupil growth. The achievement of skills and knowledge is not necessarily a measure of understanding, interpretation, application, appreciation or reasoning. It certainly is not an index of personality growth, social adjustment or other equally important non-intellective functions. . . . The development of instruments to measure the many aspects of change must then be a major focus for future research in this area.21

Theory testing

Elizabeth Maccia has noted that the observational technique may also be used as a tool for testing the adequacy of a theory. The necessity of formal coherence as a test of the adequacy of a scientific theory is generally conceded. However, the role of observation is less widely accepted. A theory has formal coherence if its statements are systematically related. Each part of the theory fits in the total. Maccia suggests that "observational verification" and "observational predictiveness" are two additional criteria a theory must exhibit to make it an adequate scientific theory.

A theory has observational verification, if its statements correspond to that which can be experienced. It is true in terms of observations. When possible, the observations are made under controlled situations which

21Ibid.
permit precision and ease of observing. Experimentation, however, is not always possible. A theory has observational predictiveness if statements about what will happen in experience can be derived from it. It permits marking off other observations to be made.22

It is possible to trace the use of observation as a tool for educators from the practical to the theoretical. It has been used widely for diverse reasons and with equally diverse results.

Problems in Use of Observation

A number of factors have combined to retard the steady development of observation as a research tool. One of the most persistent has been a false understanding of the meaning of objectivity. With the development of more sophisticated observation instruments which minimize the necessity for observer judgments and decisions at the time of data collection, plus the acknowledgment of the role that observer bias plays in the collection of data, this objection has been faced, if not completely resolved.

The expensive nature of observation techniques in terms of money, time and professional skills demanded on the part of the observers has been another leading factor in the retardation of the use of observation in educational research. This, of course, has not been the only instance of rejection of a procedure for such a cause. That it has been found to

22Maccia, op. cit., p. 95.
provide a greater flexibility with the saving of time and
money in the long run is often not realized. A similar
pattern of argument was discovered by Overly in a comparative
study of reading tests and informal reading inventories. 23
The difficulty of preparing persons to conduct observations
or informal reading inventories is a poor excuse for shelving
a technique which is potentially very valuable in educational
studies. But the ideal is not realized on the basis of its
desirability. It may be argued that a part of the standard
preparation of all teachers and/or researchers should be a
familiarization with the techniques and procedures of current
research practices. Such a conceptualization of the scope
and function of teaching and teacher preparation may very
well add to the cost of adequate preparation; however, the
returns promise to be higher in terms of quantity and variety
of data available when research procedures become a part of
the on-going life in the classroom and when the teacher is
broadly prepared to function in an omnibus capacity rather
than as a mere purveyor of information about a particular
subject area. Furthermore, Medley and Mitzel attack the cost
argument against observation by pointing out that the per
unit cost of data could be appreciably lowered by greater

23 Norman V. Overly, "A Comparison of the Adequacy of a
Formal and Informal High School Reading Test" (unpublished
Master's thesis, Department of Elementary Education, Kent
State University, 1957).
use of the most powerful statistical methods and more
thorough gleaning of data, once collected, for a variety of
purposes. It appears, therefore, that the economic argu-
ment against direct observation techniques is less effective
than normally supposed. It may also be assumed that the
expenditure of more time and energy in special preparation
and observation of teachers may result in more effective
overall teaching.

Other factors proffered as rationalization for not
making use of the observation technique are claims that they
constitute an invasion of privacy which is resented by both
administrators and teachers; that the presence of an observer
in the classroom interjects an element which makes typical
behavior highly unlikely; and, that because observations in
the past have not been successful in producing information
which increases our knowledge of teaching and learning, they
are not apt to be different now.

The initial reaction of many, if not most, teachers and
administrators is one of honest questioning of the value and
use of information gathered from observations in their class-
rooms. Because direct observation of classroom behavior was
initially used and misused as a tool of supervisors and

24 Donald M. Medley and Harold E. Mitzel, "Measuring
Classroom Behavior by Systematic Observation," Handbook of
Research on Teaching, ed. N. L. Gage (Chicago: Rand McNally
administrators and later in research on teacher effectiveness the teacher often has a legitimate suspicion and therefore a right to question the purpose of any "invasion" of his classroom. It is now recognized that teacher effectiveness can only be defined in terms of effects on pupils, more specifically, in terms of changes in pupil behavior. It is demonstrable that a trained supervisor or administrative expert is not in a position with the current state of our knowledge about effectiveness to assess the effectiveness of a teacher by watching him teach.

The proper role of direct observation in research on teacher effectiveness would seem to be as a means of learning something about the teaching process and its relationship to pupil learning. In most cases, though, the effects of teaching on pupils cannot be observed directly in normal classroom behavior, but must be assessed by other means. It is thus theoretically possible to distinguish effective teachers from less effective ones without observing them while they teach.\textsuperscript{25}

Direct observation of classroom activity can yield a wealth of information about the teaching act through recordings of teacher behavior which in turn may be combined with the results of information gathered about changes in student behaviors. In turn, some judgments may be possible about the effectiveness of particular teacher strategies, behaviors, or patterns of behaviors. The expansion of the objectives of classroom observations, as well as changing foci, has assisted in overcoming the earlier defensiveness of the teaching

\textsuperscript{25}Ibid., p. 249.
profession, particularly the classroom teachers. The growing tendency to have intern experiences and the common requirement of student teaching experiences under direct supervision tend to make many younger teachers less reluctant to admit observers to their classrooms. The increasing frequency with which observation techniques have been used in research indicates that admission to the classroom is not an insurmountable problem and that cooperation is forthcoming once a case is made for the soundness and value of the study.

Different procedures have been followed by researchers in the past in gaining admittance to the classroom, but a minimum requirement would seem to be (1) as complete familiarization as possible of the participants with the objectives of the study, (2) clarification of the use to be made of the information collected, and (3) a guarantee that the anonymity of the participants will be maintained.

The argument that observers bias teacher and student behavior is very difficult to refute. The effect can be ameliorated by frequent observations and familiarization of the teacher and students with the observers. A room with a one-way observation window is an additional measure of great expense which may catch the observed off-guard. However, there is no sure way to know the exact effect of observers on the behavior of those being observed. But, as has been pointed out, "To know how teachers and pupils behave while
they are under observation seems better than to know nothing at all about how teachers and pupils behave." 26

**Early Observation Procedures**

Anderson and Brewer undertook one of the first comprehensive studies of classroom behaviors of both students and teachers. They emphasized the dominative and integrative aspects of the classroom interaction. Through a series of projects they succeeded in incorporating a number of refinements in their instrument and formulated a series of helpful suggestions regarding procedures for conducting observations and collecting data.

A five-minute observation blank was designed for recording in certain defined categories the behavior of one child at a time and simultaneously all the dominative and socially integrative contacts of the teacher which were directed toward that child either as an individual or as a member of a group.

Space was provided in which to note such identifying information as school, grade, date, teacher, observer, the child observed, the time the observation began, and the activity of the room during the time of observation. At the left-hand side were symbols for categories of teacher contacts. In the first column were recorded the teacher's group contacts with the child as a member of a group of two or more children. In the second column were recorded the teacher's individual contacts with the child being observed. To the right of the center of the blank were the symbols for child behavior and space for recording it in the respective categories.

Observers sat at the side of the classroom and near the front in order to see the faces of the children and to be near the reading groups, which were held at the front of the room. The observers tried to

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be as inconspicuous as possible, taking part in the schoolroom activity only on infrequent occasions and only when directly requested.27

However, the major "teaching" factors in their instrument were subsumed under the categories, "Lecture method: statements" and "Lecture method: questions." While they admit that they experienced considerable difficulty in distinguishing between these two categories, they did not address themselves to the task of resolving what was a very tentative approach to the problem of analyzing cognitive behaviors.28

Undoubtedly, the scope of their sample, primarily the lower levels of elementary school, made such a broad rubric adequate for the behaviors they observed. Observations at the high school level might have necessitated more attention being given to these two categories. However, they should not be faulted for this deficiency since their objective was to investigate the psychological aspects of teachers' personalities.

The earliest attempts at objective classroom observation appear to have concentrated the attention of the observer on a very few types of behavior. As Medley and Mitzel have

27Harold H. Anderson and Joseph E. Brewer, Studies of Teachers' Classroom Personalities, II (Stanford, California: Stanford University Press, 1946), 34.

28Ibid., p. 22.
pointed out, the crucial function of the observer is to serve as an abstractor.\textsuperscript{29} As early as 1914 Horn suggested using a circle placed in the appropriate space on a seating chart for each time a student recited or was requested to recite and a square for each student response which involved doing something. The distribution of student participation in the lesson was determined in this way.\textsuperscript{30} Harrington, in a study of the role of smiling as a measure of teacher effectiveness, carried abstraction to its ultimate limits by concentrating on a single behavior—the number of times a teacher smiled during the course of the lesson presentation.\textsuperscript{31} This approach permits the greatest degree of interjudge reliability among observers since they must be aware of only one behavior; likewise, it limits the amount of information obtained.

Experienced scientists soon discovered that it was not necessary to limit the scope of their observations so severely. Puckett, working from the scheme initiated by Horn, developed an elaborate set of symbols which permitted the observer to

\textsuperscript{29}Medley and Mitzel, \textit{op. cit.}, p. 251.

\textsuperscript{30}Ernest Horn, \textit{Distribution of Opportunity for Participation Among the Various Pupils in Classroom Recitations. Teachers College Contributions to Education, No. 67} (New York: Teachers College, Columbia University, 1914).

record fourteen different pupil behaviors on a seating plan.\textsuperscript{32} While the plan was extremely clever and economical of motion in marking, it has been of limited value because the information supplied by it was of a narrow dimension. Adaptation to more significant types of information for other objectives should not be difficult. The system itself is very easy to score and should prove easy to learn.

Work by Wrightstone,\textsuperscript{33} Ryans,\textsuperscript{34} Openshaw\textsuperscript{35} and others have demonstrated that much more complex instruments may be used if sufficient training is given to those who are to use them. At the same time, it should be noted that more attention to the techniques of data collection and instrument development might provide a greater supply of data and more reliable results.

As was noted earlier, the use of observation as a tool in determining teacher effectiveness has been a long-used but

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\item \textsuperscript{35}Openshaw, \textit{op. cit.}
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seldom critically evaluated procedure. In 1929 Barr\textsuperscript{36} undertook a comprehensive pioneer effort in an attempt to identify the crucial teacher behaviors, recorded them and scored them as a measure of effectiveness in the teaching process. Six types of data were collected: (1) general observations; (2) attention scores using Morrison's chart; (3) time chart; (4) stenographic report; (5) checklist; and (6) time-distribution study. Barr's procedures are not made clear. It would appear that some behaviors were coded as observed while others were recorded in stenographic form and categorization done from that raw data.

The results of the study were severely limited by the weak criterion of effectiveness which was based on supervisory judgment rather than on a series of pre- and post-tests administered to the students. However, sufficient data were presented to permit the identification of categories of behavior which occur most frequently and which give evidence of being discriminating in terms of the criterion measures used.

Two more developmental studies conducted in 1945 by Jayne\textsuperscript{37} and in 1956 by Morsh\textsuperscript{38} extended the horizon of


\textsuperscript{37}Jayne, loc. cit.

observation techniques. Jayne used sound recordings of lessons taught by 38 teachers. These were transcribed for analysis. A search was made for observable items contained on a list of 184 categories predetermined for each of the 38 lessons. Eighty-four items survived the initial survey in terms of frequency of appearance. These items were then arranged into related scales which showed promise of significance in relationship to the classroom outcomes. Two scales developed in this study were called the "Index of Meaningful Discussion" and the "Index of Immediate Recall."

Morsh attempted to develop an objective instrument which unskilled airmen could use without previous training or experience in rating their instructors. He was successful in maintaining a high degree of objectivity or "observability," but his results were limited by his inattention to Barr's findings in 1929. Medley and Mitzel summarize this weakness as follows:

When stability coefficients as low as .30 are permitted, what advantage is there in insisting on observer agreements of at least .70? The instability of behavior from one lesson to another, as Ball long ago pointed out, is the dominant component in the unreliability of observations, and the limiting factor on validity. . . . It is by no means certain that the items observed most accurately are the ones most likely to prove valid or important.\(^{39}\)

\(^{39}\)Medley and Mitzel, *op. cit.*, p. 263.
Observations of Teacher Behavior

The major emphasis of those using the observation approach as a research tool in investigations of teacher behavior has been in the area of assessing psychological climate and social interaction. Closely related to it and frequently paralleling it chronologically has been the assessment of teacher effectiveness in the classroom. While any effort to divide the investigations to date into comparable classes is fraught with pitfalls because of the frequent overlap which exists in types of objectives sought and data collected, three categories were used for ease of consideration. They were: (1) those focusing primarily on psychological climate or sociological patterns of relationships; (2) those focusing primarily on behaviors as they occur in quantitative terms; \(^{40}\) and (3) those focusing primarily on content and/or procedural objectives.

Studies of Classroom Climate

The work of Thomas and associates were initial efforts in the sociological field. \(^{41}\) Also related to these were laboratory studies of democratic, authoritarian and laissez

\(^{40}\)While measure of classroom behavior per se, may appear to be undertaken without relationship to a value system or underlying theory, review of the studies revealed implicit value orientation and theories which provided a frame of reference for each study.

\(^{41}\)Cf. *supra*, p. 25.
faire patterns of small group leadership conducted by Lewin, Lippett, and White\textsuperscript{42} in 1943. This line of research has been pursued by Adorno\textsuperscript{43} in 1950, McGee\textsuperscript{44} in 1955, and others. McGee used classroom observation and F-Scale scores for comparison. He selected the behavior categories for observation on the basis of hypotheses as to how the specific behaviors in the classroom might be connected with generalized authoritarian trends.

Harold Anderson and a group of associates have reported a series of studies on teacher characteristics. Besides the dominative-integrative dichotomy used by Anderson and Helen Brewer for categorizing teacher behaviors, Joseph Brewer, in a later study, defined twenty-nine categories of child behavior in which he could record the classroom behavior of the children. He demonstrated that the behaviors of both children and teachers could be recorded


\textsuperscript{44}Henry M. McGee, "Measurement of Authoritarianism and its Relation to Teachers' Classroom Behavior," \textit{Genetic Psychological Monograph}, LII (August, 1955), 89-146.
with a high degree of reliability. As in the earlier studies, however, heavy emphasis was placed on the psychological aspects of behavior and little effort was made to make the categories parallel. Examples of the category headings include: nervous habits, looking up, playing with a foreign object, child domination of other children, social contributions by the child. It will be noted that various degrees of interpretation at differing levels of abstraction were required in order for the observer to make the categorization.

From the very first studies by Anderson and associates, care was taken to assess the reliability of the observers. In the first study simultaneous independent observations were made by two observers. The reliability of their observations was determined in three ways: "(1) correlation of scores obtained by two observers; (2) percentage of agreement; and (3) comparison of the means of two observers."
In determining the dominative-integrative ratio the following five categories of teacher behavior were established: (1) domination, with evidence of conflict; (2) domination, with no evidence of conflict; (3) domination, with evidence of working together; (4) integration, with no evidence of working together; (5) integration with evidence of working together.\(^{48}\)

These studies demonstrated a tendency toward more open, spontaneous social behavior on the part of students with more integrative teachers and more conformation to teacher domination and more caused distractions with the more dominative teachers. The problem of causation was not answered satisfactorily, however, and the dynamic element in the classroom eluded them.

Lippitt and White chose as their focus the social interaction of children's groups. Eight types of records were kept with at least one observer specializing in each type of record keeping. The four main types were:

1. A quantitative running account of the social interactions of the five children and the leader, in terms of symbols for directive, complaint, and objective (fact-minded) approaches and responses, including a category of purposeful refusal to respond to a social problem.

2. A minute-by-minute group-structure analysis giving a record of activity subgroupings, the activity goal of each subgroup, whether the goal was initiated by the leader or spontaneously formed by the children, and rating on degree of unity of each subgrouping.

\(^{48}\)Anderson, Brewer, and Reed, II, op. cit., 88.
(3) An interpretive running account of strikingly significant member actions and changes in the atmosphere of the group as a whole. This was the basis of the most significant interaction data—difficult to quantify but extremely suggestive as to the underlying dynamic factors involved.

(4) Continuous stenographic records of all conversation. This was the basis of the most significant data.\(^49\)

Two significant factors in experimental design and methodology were suggested by Lippitt and White on the basis of their studies. They suggested that the data must be quantitatively adequate in terms of appropriateness to the questions being asked and the procedures should be open enough to permit the researcher to make use of new concepts and hypotheses as they emerge from the context of the experimental situation and the researcher's interaction with it.\(^50\)

A portion of Ryan's massive study of teachers used observations of teachers' classroom behaviors as a source of data. However, the primary importance for this study was his determination by statistical methods of the clustering of observed teacher characteristics into identifiable patterns. Because of the complex data-gathering procedures and multiple objectives for the study, it is difficult, on the basis


\(^{50}\)Ibid., p. 486.
of the published reports, to understand the specifics of the observational procedures. However, the comprehensive Teacher Characteristics Schedule provides a great variety of suggestions for categories to be included in an instrument designed for observation alone.

Each investigator has contributed his part to the developing use of the technique, but each has maintained a strict adherence to the need for observer agreement which Medley and Mitzel have shown to be of less statistical significance than the interpretation of the data once it is collected.

The polarization of teaching styles as defined by Anderson and his co-investigators has been an attractive lure for researchers to the present. Flander's work follows closely in this tradition. Withall used the I-D Index of Anderson and elaborated it into a scale which he called the Social-Emotional Climate. Emphasis was placed on the behavior of the teacher alone and even more narrowly defined to be a categorization of typewritten transcripts of sound recordings of classroom behaviors. This was a further limitation on the categorization developed by Anderson. Withall's seven categories were:

1. Learner-supportive statements that have the intent of reassuring or commending the pupil.
2. Acceptant and clarifying statements having an intent to convey to the pupil the feeling that was understood and help him elucidate his ideas and feelings.
3. **Problem-structuring** statements or questions which proffer information or raise questions about the problem in an objective manner with intent to facilitate learner's problem-solving.

4. Neutral statements which compose polite formalities, administrative comments, verbatim repetition of something that has already been said. No intent inferable.

5. **Directive or hortative** statements with intent to have pupil follow a recommended course of action.

6. Reproving or deprecating remarks intended to deter pupil from continued indulgence in present "unacceptable" behavior.

7. **Teacher self-supporting** remarks intended to sustain or justify the teacher's position or course of action.51

Mitzel and Rabinowitz52 used the Withall categories with live classroom observation when they found their records with sound taping or stenographic records lacked clarity and completeness. Bales supported this finding, but still believed there was a place for various types of transcription of classroom behavior.

There is no doubt that a certain loss of content results when the observer attempts to depend upon sound recording alone, and still another loss as the sound record is converted into a written transcript. Even sound motion pictures are inferior to the original interaction, to say nothing of their almost prohibitive cost. However, there are many sorts of


problems for which an analysis of the sound
recording or written transcript should prove quite
adequate. 53

Flanders was one who worked directly with the actual
classroom situation. While investigating the relationship of
teacher influence, pupil attitudes and achievement, he devel-
oped a very sophisticated technique for maintaining the
sequence of communication behavior which is important to any
complete picture of the interactive process.54 However, his
scale is limited by the assumptions of similar value on all
aspects of teacher and pupil talk within each category and
the requirement that the observer interpret the teacher
behavior in terms of the categories. While an accurate
picture of the flow of teacher behavior may be recorded, the
interpretation of the picture is still open to some question.

Again, this research developed out of the original
studies by Withall and a preliminary study by Flanders in
1951 of teacher-centered and student-centered behaviors.
The findings were consistent with the assumptions. The sys-
tem of categories was designed for situations in which the
teacher and the students were actively discussing school

53 Robert F. Bales, Interaction Process Analysis
(Cambridge, Mass.: Addison-Wesley, 1950), pp. 4-5.

54 Ned A. Flanders, Teacher Influence, Pupil Attitudes,
and Achievement, U.S. Office of Education Cooperative
Research Project 397 (Minneapolis: University of Minnesota,
1960).
work. It is an inappropriate tool when the verbal communication is discontinuous.

Louis Heil,\textsuperscript{55} working at Brooklyn College, has undertaken a study of the significance of teacher personality in determining teacher effectiveness. This study had a psychological emphasis and depended upon a combination of methodology involving live observations and psychological case-history type records of observer impressions. No effort was made to define the major criteria in terms of specific behaviors. Rather, the criteria were left on a global level. They included the following categories which formed a general guide for the observer in taking notes which required considerable interpretation of specific behaviors: structure, teaching method, clarity of goals and expectations, interaction and communication, integration of authority role, personality aspects and classroom atmosphere. The clinical procedures used in this observation necessitated the inference of personality characteristic which were confirmed in nearly all cases by the behavior of the teachers. The wide divergence of reporting procedures and types of data call the results of this study in serious question. It may be that in assessing the "emotional-social" aspect of teacher behavior it is only possible to handle it on a person-to-person basis.

but the formulation of corrective programs on such highly subjective measures may tend to close the door to further study of the relationship of the "emotional-social" behavior to the total behavior of the teacher. Furthermore, it provides little forward impetus in the search for procedures and results which will be usable with large groups and provide a basis for the improvement of teacher education programs on a macrocosmic plane.

Comprehensive Observations

Multiple dimensions of classroom behavior were investigated by Cornell, Lindvall, and Saupe.\footnote{Francis G. Cornell, Carl M. Lindvall, and Joe L. Saupe, \textit{An Exploratory Measurement of Individualities of Schools and Classrooms} (Urbana: Bureau of Educational Research, University of Illinois, 1953).} They made no effort to study effective teacher behaviors or the effect of a particular psychological theory. Rather, they attempted to measure classroom behavior, per se. Insofar as possible they made quantitative descriptions of classrooms to "measure differences in classrooms as a means of characterizing differences of school systems."\footnote{\textit{Ibid.}, p. 20.} The lack of consistency in formulation of the items was the greatest draw-back to their instrument. Some items were in the past tense, some in the present or continuing tense; some requested information
related to pre-planning or equipment usage, others, interpretation of pupil or teacher behavior.

The most detailed study of observation methods has been made by Medley and Mitzel in the development of their instrument which they call the OScAR, the Observation Schedule and Record. Variations and modifications of the Withall and Anderson instruments were used. One result of their work was the identification of a relationship between the indexes of emotional climate and efforts at teacher assessment.

Medley and Mitzel relied heavily upon the work of Cornell, Lindvali, and Saupe as well as Withall in developing their OScAR. It was constructed by modifying and combining items presented in the earlier studies in order to provide an instrument requiring fewer observer judgments and less training of observers. As finally designed, the OScAR is to be used by a single observer visiting a classroom by himself. This is more economical and provides a wider sampling of behaviors with the same expenditure of observation hours. An even more significant variation on the techniques to this time was the effort to separate the process of scoring from the process of observing. The OScAR was designed to permit recording of as many possibly significant

aspects of what goes on in a classroom as possible, regardless of their relationship to any dimension or scale. However, the scope of the OSCAR was limited to the emotional climate, the verbal emphasis and the social organization of the classroom. The data collected with such an instrument provide a measure of the more obvious aspects of the classroom environment. An investigation of the cognitive dimension of the classroom interaction is less easily achieved.

A comprehensive system of categories for the classification of teacher classroom behaviors was developed by Marie Hughes and associates in an effort to develop a model of good teaching. They premised their research on the position that teaching is interaction with the teacher-pupil relationship being one of a superior to a subordinate. The function of the teacher in the classroom was used as the unit of analysis for this study. It was used synonymously with the word, "act." The function was determined in relationship to the total situation and identified in a given unit of verbal or non-verbal behavior as it was directed to a particular child, group, or class.

59 Medley and Mitzel, Handbook of Research on Teaching, p. 280.

60 Hughes, loc. cit.

In addition to the use made of the Withall investigations which preceded it, Hughes grouped the major categories of her instrument into dominative-integrative units after the pattern established by Anderson and associates in their earlier studies of teacher classroom personalities.

Shorthand transcriptions of live teaching situations provided the source of data for the Hughes' study. Only those behaviors which two observers making simultaneous records agreed upon after consultation were used in the development and testing of the instrument. Seven major categories were established with varying levels of delineation within each. The major functions occurring in all classrooms according to Hughes were: (1) controlling behaviors; (2) imposing behaviors; (3) facilitating behaviors; (4) content developing behaviors; (5) personal response behaviors; (6) positive affectivity behaviors; and (7) negative affectivity behaviors.

In using the Hughes' instrument, observers were instructed to code the observed behaviors from a learner's frame of reference. That is, the observer was to attempt to view teacher behavior as if he were a student. The coding was, therefore, assumed to provide a classification of the learner's perception of the functions of the teacher's behavior.

In a study growing out of research on needs conducted by McClelland, Atkinson, French, and others, Travers and associates attempted to discover the relationship between
four identified needs of teachers and the related categories of behavior in a classroom. The achievement need, the affiliation need, the need for control, and the need for recognition were measured by a projective instrument developed for the study by the investigators. A series of other measures of teacher preference, reactions to educational situations, and self-rating scales were also used as foci for prediction. In order to appraise and record teacher behavior in the classroom, two techniques were followed. First, a teacher-statements device was developed based on a modification of the Withall procedures. The verbal behavior of the teacher was sampled systematically. The record, thus obtained, was later classified into categories from which were derived scores indicating the extent to which the teacher was achievement oriented, showed affiliation or controlling behavior, and occupied himself with management activities. Medley and Mitzel's suggestion of separate observations was followed. Second, a rating scale was used by the observers to assess the characteristics of the teacher's behavior in the classroom.

The investigators in this project believed that the drawing technique used as an approach to the study of the

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pupil's perception of the classroom situation holds promise as a tool in research of this type. However, they cautioned that such devices may prove threatening to the teachers involved.\footnote{Norman E. Wallen and Robert M. W. Travers, "Analysis and Investigation of Teaching Methods," Handbook of Research on Teaching, ed. N. L. Gage (Chicago: Rand McNally & Co., 1963), p. 469.} A major inference they made from the data collected was that the perceptions of the pupils differ considerably from those of adult visitors to the classrooms. This is a difficult problem in research of classroom interaction and behavior. It has not been satisfactorily met, as will be seen in the later research of Bellack and others. Furthermore, Travers noted that affiliation behavior of teachers does not show up on records limited to verbal behaviors. They suggest that it is more likely to be manifest in such behaviors as a nod of agreement, a smile of encouragement, brief, inaudible private conferences with the pupil or a pat on the back.

Observation of class sessions by at least two investigators and tape recording and analysis of verbal classroom behaviors played a minor part in a study of "teachability" groupings by Thelen.\footnote{Herbert A. Thelen, "Classroom Grouping of Students," School Review, LXVII, No. 1 (Spring, 1959), 60-78.} Besides the recorded data collected during the observations and the categorization of the taped
materials, the observers were subsequently used as interviewers. In this way they could make maximum use of their observation experiences.

Observation of Cognitive Behaviors

Within the last decade the cognitive dimension of classroom behavior has become a major focus of studies of teacher behavior. Smith and Meux undertook a study of the logic of classroom discourse which they first reported in 1959. From a foundation of magnetic tape recordings of 17 classes distributed among four subjects and between grades nine through twelve a transcript was prepared. This was supplemented by a running commentary of notes made by an observer in the classroom at the time of the recording session. The transcripts were carefully analyzed in terms of two basic units of discourse: (1) the episode, defined as the unit "beginning with an expression which triggers a verbal exchange about a topic and ending with a completion of the discussion of that topic," and (2) the monolog, defined as the unit "in which there is one and only one speaker."65

Following identification of the basic units to be classified, attention was then focused on the portion of the unit which was to provide the basis for the classification scheme. After consideration of the alternatives and the problems involved in each possibility, it was determined to use the opening phase or "entry" rather than the continuing or closing phases because they consistently contain a "verbal" move which evokes at least one, but more often a series of related verbal exchanges.66 Thirteen categories were developed for this purpose. Since the study was built on the current tendency in psychology to apply the procedures and guidelines of logicians to the study of behavior, it was natural that the categories adhere to established forms of logic and include conventional categories of logic. The major rubrics were: Defining, Describing, Designating, Stating, Reporting, Substituting, Valuating, Opining, Classifying, Comparing and Contrasting, Conditional Inferring, Explaining, and Directing and Managing Classroom.67 For classification purposes reference was made to the ideal student responses required by the teacher's verbal behavior rather than the actual responses made in the situation.

A continuation of the logic of teaching study has led Smith and associates to a re-examination of their data from

66 Ibid., p. 29.
a new perspective. The "strategy" has been accepted as the basic verbal unit for investigation. This concept was introduced in the initial study but only tentatively explicated as being equal to the procedures of instruction used by the teacher. These, in turn, were viewed as being equal to the logical operations and/or an unknown which form a "pattern of acts that serve to attain certain outcomes and to guard against certain others." The "episode" and "monolog," the units of the logical operations used in the initial formulation, were subsumed in a more recent study under the concept of a strategy. This move extended the scope of the investigation to include the goals set by teachers and their behavior in achieving these goals. A strategy has now been defined as "a set of verbal actions that serves to attain certain results and to guard against others."  

The work by Smith has led to increasingly detailed and refined delineation of the logical patterns of classroom discourse as they relate to the cognitive aspects of teacher behavior. The efforts to date hold much promise for the development of a theory of instruction based on a logical analysis of teacher behavior.

68 Ibid., p. 3.

Wright and Proctor\textsuperscript{70} approached the cognitive dimension of classroom behavior from a position not too dissimilar from that taken by Smith and associates. However, they extended the perimeter of their considerations to include the psychological processes and the even broader and more nebulous aspects of the sociological attitude. In their view, the observation of the classroom must account for content within the framework of these psychological processes and sociological attitudes. The key assumption of this study was that the mastery of particular subject matter is the main function of classroom discourse; therefore, the essential element in the classroom is verbal behavior. Furthermore, for the purposes of this study they had to be concerned with mathematical matters. Non-verbal behaviors and non-mathematical behaviors were classified as neutral behaviors. In fact, non-verbal behaviors were not even recorded.

The Wright-Proctor instrument included the three major areas of concern divided into sub-categories which appear to have been based on the logical expectations of behaviors focused on the realization of subject matter centered goals. The authors noted that distinctive patterns in

the areas of Mathematical Content, Psychological Process and Sociological Attitude were established for the four combinations of teacher rigor and student participation in the classrooms investigated. "These distinctions were noted in terms of single categories within each area, by combinations of categories within Content and Process and by triple combinations of categories across the three areas simultaneously."\textsuperscript{71}

One is led to speculate that considerable difficulty would be experienced by anyone attempting to use this instrument because of the heavy reliance placed on the observer's ability to infer mental processes from overt verbal behaviors. However, the importance they placed on the "ultimate raw encounter of learner and subject matter" makes this instrument of importance at this time because of the increasing interest in the subject matter content of the school curriculum. But it should be cautioned that this emphasis is maintained only by relegating psychological processes and sociological attitudes to ancillary positions.

An innovation in the Wright and Proctor study was the time-sampling arrangement used. A 15-second interval was identified by a stopwatch held by each observer. After observing behavior for 15 seconds, the following 15-second interval was used for making the categorization of the

\textsuperscript{71}Ibid., p. 137.
interactions observed. During the third 15-second interval, observations were again made and during the fourth they were categorized. This procedure was followed for each 45-minute observation. Thus, 90 classifications were available for each class session.

Another investigation of the linguistic patterns of teacher and student behavior has been conducted under the direction of Arno Bellack. Two reports of his efforts have been published.\textsuperscript{72} The purpose of his research was to find out who speaks, about what, how much, when, under what conditions, and with what effect in the actual classroom situation. As in the studies by Smith and Hughes, tape recordings and verbatim transcriptions of class sessions provided the basic data. Abstract theoretical concepts taken from contemporary philosophers and psychologists were adapted, revised and modified on the basis of the empirical data collected in the study. "The task was one of working out the empirical referents of existing concepts and developing new

concepts to describe significant characteristics of classroom discourse for which adequate concepts were not available. 73

Four dimensions of the language of the classroom were categorized. First, the speaker was identified. Second, the pedagogical significance of the utterance was identified. This closely paralleled the idea of "function" as used by Marie Hughes. The content of the statement formed the third consideration and the feeling tone or emotional meaning was the final judgment made. The idea of "language games" referred to by Wittgenstein74 provided the framework of analysis within which operational definitions could be developed for the various dimensions of meaning.

The basic verbal actions, labeled "pedagogical moves," were classified according to the pedagogical functions they performed in the classroom. These included: Structuring, Soliciting, Responding, and Reacting.

The four types of meanings found to be communicated by teachers and students were: (1) substantive with associated, (2) substantive-logical, (3) instructional with associated, and (4) instructional-logical. "Substantive" meanings had reference to the subject matter of the particular class. "Instructional" meanings were related to matters of assignments, use of materials, and routine classroom procedures or

73 Bellack, 1, 2.

management. The logical aspects of the subject matter meanings were an outgrowth of the work of Smith and Meux and referred to the cognitive processes. The logical category of the instructional meanings referred to the "distinctively didactic verbal processes such as those involved in positive and negative evaluating, explaining procedures, and giving directions."  

The emotional meaning provided the most difficulty for the investigators in this study. The dimensions of meaning set forth by Osgood, Suci and Tannenbaum were used in characterizing the overall emotional style; they were: (a) valence, (b) potency or strength, and (c) activity. However, after making a strong effort at finding a valid method for determining the "feeling tone," the authors had to conclude that this area, vital as it is, still requires extensive attention and investigation.

Taba and associates conducted a study designed "to examine the development of thought under the optimum training conditions." A series of teaching strategies and

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75 Bellack, I, 8-9.
training sessions were developed and conducted along with tests and observations of classroom situations to assess the influence of curriculum and specialized teacher preparation on the achievement of advanced level thinking by elementary children.

Teaching was viewed as a set of complex strategies which necessitated consideration of the combinations, sequences, and patterns of the teacher acts as well as the frequency of identifiable acts. Consideration was given to the assessment of growth in each cognitive area as a part of the observation instrument. However, in order to maintain the logic of operations and sequence of the three cognitive tasks (classification, interpretation, and application), each cognitive task was treated as a separate unit in the coding and the problem of change across cognitive tasks was handled in the analysis of the data.

The unit of coding selected was a "thought unit." It was defined as "a remark or series of remarks which expresses a more or less complete idea, serves a specified function and can be classified by a level of thought." As a result of this broad definition of the unit to be coded, the observers had some difficulty in establishing reliability of judgment.

In order to provide a multi-dimensional description of the interaction, the verbal transactions were coded according to three different sets of categories. The "designation"

78 Ibid., p. 115.
described the source of the thought unit in terms of its emanation from the student or from the teacher and whether the individual was providing or requesting information. The "function" described the pedagogical functions of the thought unit in the context of the situation. Two major distinctions were made in this category:

1) questions or statements made by the teacher or the students which are psychological or managerial in their function and are unrelated either to the logic of the content or to the level of thought. Statements of this type express the following:

(A) - agreement
(AP) - approval
(D) - disagreement
(DP) - disapproval
(M) - management
(R) - reiteration

2) teacher or student statements which function to give direction to discussion, but which, at the same time, can be coded according to the level of thought and the logic of content. Such codings include:

(F) - focusing
(FR) - refocusing
(FC) - change of focus
(FD) - deviating from focus
(C) - controlling thought
(X) - extending thought on the same level
(L) - lifting thought to a higher level

The "level of thought" provided a sequential description of the level of thought on a hierarchical basis from lower to higher and specified the logical quality of both the students' and teacher's verbal behavior.

79 Ibid., pp. 116-117.
A special program for analysis of the data provided by multi-dimensional coding was designed explicitly for this study. However, the complexity of the patterns in both teaching acts and student responses caused considerable difficulty in analysis. Nevertheless, the authors found several advantages to the multi-dimensional approach. The combination of a description of teacher acts in terms of explicit function with an assessment of the logical quality of student responses made it possible to evaluate the effectiveness of the teacher behavior in terms of its productivity. Furthermore, this approach went beyond the usual procedure of recording only the frequency of teaching acts to allow the projection of certain patterns or combinations of separate acts as well as the pacing of the flow of activity. Taba viewed this as the point of transition from a consideration of teaching acts to that of teaching strategies.

Finally, the pattern of inference of effect on the basis of assumed consequences of noted frequencies of certain types of behavior was replaced by an examination of the consequence of specific teaching strategies in terms of "a measurable change in a specified outcome," i.e., levels of thinking.

A study somewhat paralleling the work of Taba and associates, but independently growing out of the work of Marie Hughes, was made by George Miller at the University
of Utah. This study was based on a partial theory of instruction which established desirable classroom teaching behaviors and the manner in which they were to be realized. The theory holds that teacher behavior in the classroom has consequences which will be manifest in the student's behavior. Furthermore, the student behavior will be predictable from a description of the actions of the teacher. Two primary teaching responsibilities were identified as: (1) working on the content or task and (2) maintenance of social order. According to Miller, the first responsibility is discharged by providing focus for the student's attention and efforts, by providing for the development of the object in focus, by providing information directly and by appraising pupils' efforts.\textsuperscript{80}

Maintaining social order is realized "by setting expectations to guide, standardize, or regularize pupil behavior in the classroom, by implementing action which actually regulates or controls pupil behavior in the interactive flow of classroom living and appraising pupil effort."

\textsuperscript{80}George L. Miller, An Investigation of Teaching Behavior and Pupil Thinking, Utah State Board of Education Research and Experimentation Funds Section 53-7-4 U.C.A. 4622 (Salt Lake City: University of Utah, William M. Stewart School, 1964), p. 40. Appendix A, "The Responsive-Directive Scale for the Analysis of Teaching: Working on Content or Task," contains a complete description of the instrument and definition of terms and examples of each category.
along this dimension.\textsuperscript{81} By using typescripts prepared from audio tapes of the actual classroom teaching, the adherence of the teachers to the "responsive" procedures, hypothesized as being desirable, could be evaluated on the basis of classification of behaviors according to the Responsive-Directive Scale.

The levels of student comments were classified in one of four categories of understanding (recognition or recall, first level of inference, second level of inference or third level of inference), erroneous response, or response unrelated to understanding of the content. It was imperative that the coders have a clear understanding of the lesson and familiarize themselves with the whole recording of the class session before beginning to classify the student behaviors. The coders were then instructed to infer from the observed behavior (in this case the typescripts) the mental activity involved.

The author concluded that the results of his study clearly demonstrated the usefulness of both the Responsive-Directive Scale as a measure of classroom teaching behavior and the Scale for Assessing Levels of Understanding as a measure of student linguistic behavior in the classroom. A

\textsuperscript{81}Ibid., p. 42. Appendix B, "Assessing Pupil Mental Activity in Classroom Discussion: A Manual for Coding Pupil Comments," contains a complete description of the instrument, a definition of terms and examples of each category.
number of unresolved questions germane to the assumptions and the theoretical framework used in this study remain to be answered through further investigation. But within the acknowledged limitations for an initial study of this type, this may be the most fruitful approach to assessment of theoretically grounded study of classroom behavior and instructional change put forth to date.

The synthesis of findings which was attempted by Openshaw, Cyphert, and Overly was early found to be impossible at the present time because of the wide divergence of interests and concerns reflected in the separate research efforts. The overview of research presented above provides ample evidence of the difficulty inherent in an attempt to place completed studies in a consistent system of categories. A commonality of research method (observation in most cases) was not adequate for the development of a single comprehensive system. The intervening variables of one study were found to be the dependent or consequent variables in another and the independent or antecedent variables in yet a third study.

The work of Openshaw and associates made every effort to keep their conception of the nature of teaching and the system of categories they developed for viewing teaching as value-free as possible. No specific hypotheses or effectiveness constructs were used. The purpose was to develop a system of categories which would permit the classification
of all observable teacher classroom behaviors—good or bad, logical or illogical, directive or integrative. At its most global level, teaching was viewed as a process of interaction having four dimensions: (1) a source dimension, (2) a direction dimension, (3) a function dimension, and (4) a sign dimension. Major emphasis in this study was placed on the "function" dimension which constituted the behaviors teachers engaged in while accomplishing three main tasks or objectives. These objectives were identified as content tasks, interpersonal relations tasks and facilitation of learning tasks.

The specimen record or basic component of teacher behavior classified in this study was referred to as an encounter. An encounter was defined as a unit of teacher behavior that served a discernible function within a teaching situation. The Function Dimension was divided into five major categories, each containing several subsidiary rubrics. The categories and sub-categories were defined as follows:

IV. Function Dimension - Indicates the purpose of the behavior within an encounter.

A. Structure - Set the context and focus of subsequent subject matter and/or process.

1. Initiate - Introduce and launch an activity, task, or area for study.

2. Order - Arrange elements of subject matter and/or process in a systematic manner.

3. Assign - Designate required activity.

B. Develop - Elaborate and extend within an established structure.

1. Inform - State facts, ideas, concepts, etc.
2. Explain - Show relationship between ideas, objects, principles, etc.
3. Check - Request information concerning understanding.
4. Elicit - Solicit a verbal response that states facts, ideas, concepts, etc.
5. Test - Conduct a written quiz or examination—dictate questions, supply answers, without explanation.
6. Reinforce - Confirm or sustain an idea, approach, or method through reiteration.
7. Summarize - Restate principal points in brief form.
8. Stimulate - Foster student involvement and participation.

C. Administer - Execute tasks of classroom routine and procedure.

1. Manipulate - Arrange elements of the classroom environment, personal and physical. (Cause others to do something.)

2. Manage Materiel - Provide or coordinate use of media, supplies, or materials.
3. Routine - Request information regarding compliance with individual, class or school expectations (regulations).
4. Proctor - Monitor classroom during group activity, testing, student teacher performance, etc.

D. Regulate - Establish and maintain interpersonal relations.

1. Set Standard - Impose or guide development of standards of behavior.
2. Support - Express confidence, commendation, or empathy.
3. Restrict - Reprimand, threaten, punish, etc.
4. Assist - Provide personal help; does for.
5. Inquire - Ascertain student involvement.
   (Check own understanding.)

E. Evaluate - Ascertained the relevance or correctness of subject matter and/or process.

1. Appraise - Verify by appeal to external evidence or authority.

2. Opine - Judge on the basis of personal values and beliefs.

3. Stereotype - React without stated reference to criteria or person.82

The Openshaw procedures were developmental. The resulting instrument proved adequate for a global view of teacher classroom behavior, but more detailed investigations of the sub-categories of the Function Dimension will be necessary before the hope of substantive results usable in predicting student responses can be realized.

As was noted earlier, the present study grew directly from the Taxonomy Project. More will be said of this relationship in the discussion of the resolution of problems in development of the present study.

Observation of Student Behaviors

While periodicals for the last several decades have been full of articles and reports of research involving observation of the teacher in the classroom, or, more generally, classroom teaching, little has been done in the area

82Openshaw, op. cit., pp. 54-55.
of student observation in the area of instruction. Traditionally, observation of student behavior has been the province of student personnel services, clinical psychologists, or child development specialists. Typical of the studies found are those of Michael and Meyerson\(^3\) in guidance and counseling, Cantor\(^4\) and associates in clinical practices, and Millie Almy in child study.\(^5\) The first two areas of student observation have little relationship to instructional research. The relevance of child study use of observation has been greatest because much of the observation is in an instruction situation.

A fairly simple type of observation is a check on the frequency of class participation. Slightly more elaborate procedures, such as a flow-chart which shows not only the frequency of participation but also the sequence of

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participation, have been used by some in studying child communication patterns. Often the teacher's role is also charted with those of the students. Appraisal of student progress is another basis for observation in the classroom. This is used especially in assessing reading progress.86 However, in all of the instances cited above, the teacher has been the responsible observer. Because of his position and responsibilities in the classroom he necessarily is limited in the objectives of his observation. The kinds of evidence the classroom teacher, or the clinical psychologist, or the guidance counselor seeks is not the type of evidence generally sought by educational researchers. Furthermore, the methods of observation used by the foregoing observers are only tangentially related to those required for instructional research.

The work of Cohen and Stern provided an introduction to observation methods usable in the observation of behavior in a classroom. They gave specific suggestions for study of the young child, and also provided help with how to record, summarize, and interpret.87

The ways in which observation has been used as a research tool in the area of student behavior are no less confusing than in the area of teacher behavior. In fact,

86 Overly, _loc. cit._
87 Cohen and Stern, _loc. cit._
many of the studies reviewed under the heading of teacher behavior observation contained elements of student classroom observation, but no constant pattern of categorization has emerged.

The Anderson and Brewer studies, while focusing on teacher classroom personality, required fairly extensive observation of student behavior patterns as they related to the three degrees of teacher domination—domination with evidence of conflict; domination with no evidence of conflict; and domination with evidence of working together—or the three degrees of integrative behavior—integration with evidence of conflict; integration with no evidence of working together; and integration with evidence of working together. Student behavior was recorded in one of eleven general headings. Perusal of these categories indicates that there was no overarching theory of child behavior which served to provide form for the categories; they were: nervous habits, looking up, leaves seat, undetermined child-child contacts, plays with foreign objects, dominates other children, conforming, non-conforming, response in recitation, problem solving, and social contributions.  

88 Obviously, several combinations of these behaviors could conceivably occur at the same time. No indication is provided of how the observers coped with this and similar problems. Fifty-

88Anderson and Brewer, II, 84.
one children were included in the sample. Fifteen were observed for ten minutes each; the others were observed for five minutes each. The total time for all student observations was 330 minutes.  

An analysis of their results indicated a high rate of consistency of both teacher and student behaviors if students were taken as a group in terms of frequency of behaviors as well as tendency toward the same behavior patterns. However, they concluded that it was not possible to predict the behavior of individual children unless very lengthy samples were taken. 

The most comprehensive and firmly theoretically grounded study of student classroom behaviors to date was undertaken by Aschner and Gallagher. They viewed language as a form of active behavior in a group setting. This action is governed by various "rules" and conventions. One of the most basic conventions is that "words and statements uttered in speech or written down are part of and not separable from the act of utterance." Meaning, therefore, must take into consideration the situation and the circumstances of the utterance. Meaning is inseparable from "doing" at a particular

89 Ibid., p. 45.

90 Ibid., p. 63.

time and place. Strawson has stated the premise upon which their conception is based as follows:

. . . the context of utterance is of an importance which it is almost impossible to exaggerate; and by 'context' I mean, at least, the time, the place, the situation, the identity of the speaker, the subjects which form the immediate focus of interest and the personal histories of both the speaker and those he is addressing.92

Aschner takes particular note of the difficulty of maintaining an unbiased description of interplay in the classroom because of the natural interweaving of verbal and non-verbal behaviors. An utterance may be made in speech, in gesture, in signal code, or in writing. She believes it is a confusing fiction which causes us to treat wordless behavior as a non-verbal phenomenon. She has noted that innumerable gestures, physical movements and sounds in oral discourse are taken as equivalent to saying or telling in words. Shaking the head in silence, or mumbling "Huh-uh" are fully accepted ways of saying "No." In summary, she points out two aspects of the definition of verbal behavior used by Gallagher and herself which distinguish it from other definitions currently used in empirical research.

First is its generic trait of address--it is action performed with direction and address. Second, verbal behavior is differentiated from all other

forms of addressed action by limitation to acts of saying or telling—whether these be spoken, signalled, written, or wordless.93

While recognizing the intricacies of communication, the scope of the investigation in this study has been limited in an effort to maintain a degree of clarity in the results not possible when the broader, Skinnerian concept is used.94

The objective of the Aschner-Gallagher studies was to classify instances of discussion behavior of students in terms of the thinking operations they reflect. At the same time they worked on an analysis of the same performances in terms of the products they may represent. This was a part of a four-year longitudinal study of gifted children conducted at the institute for Research on Exceptional Children at the University of Illinois. However, their long-range objective was to incorporate the elements of the study which survived the rigors of experimental testing into improved programs of preparation for classroom teachers of children, not the gifted alone.

Heavy reliance was placed on Guilford's95 theory of thinking operations in the development of four of the five

93Aschner, Language and Concepts in Education, 118.


95Joy P. Guilford and Philip R. Merrifield, The
primary categories included in their system of categorization. These were Cognitive-Memory, Convergent Thinking, Divergent Thinking, and Evaluative Thinking. A fifth category, called "Routine" encompassed the "typical and familiar in-class give and take, along with various interpersonal maneuverings and other features of discussion behavior in which we [were] interested." Typical of the categories and subcategories included in this instrument were Management (M), Structuring (St), Verdict-Impersonal (Ver), Verdict-personal (Verp), Humor (Hu), Agreement (Agr), Self-reference (S), Dunno (Du), Muddled (Mu) under the primary category "Routine" (R). Cognitive-Memory (C-M) included four secondary categories each with its own symbol and sub-script symbols. For example, Recapitulation (Re) subsumed such classroom activities as quoting (Re_q), repetition (Re_p), recounting (Re_c) and review (Re_v). A similar pattern of sub-scripts were used for the other three primary categories.

Tape recordings were made of approximately 260 junior high students in two schools. Tapescripts were duplicated

Structure of Intellect Model: Its Uses and Implications, Report No. 24; Reports from the Psychological Laboratory of the University of Southern California (April, 1960).

Mary Jane McCue Aschner, Theory and Research . . ., p. 59.
and prepared for later coding and tabulation. This process entailed breaking down each speaker's performance into its constituent "thought units." A "thought unit" may encompass a single utterance or merely a part of an utterance. Whenever a distinct shift in the speaker's performance from one category or sub-category to another occurred, a mark was made to indicate the shift on the tapescript. "Overly fine distinctions [were] avoided in order to include in one unit whatever [could] be taken as representing no marked shift into another category." The authors believed that they had achieved a satisfactory level of interjudge agreements on the coding at the subcategory level. Furthermore, while "problem cases" will continue to arise, it was their judgment that no new categories needed to be created. As Aschner noted, "Language has its built-in and inevitable ambiguities."  

Another study by Aschner with Arthur Wise examined the amount and kinds of intellectual initiative observed in

97 Aschner emphasized that "thought units" should not be confused with either episode or monolog units developed by B. O. Smith to demark serial instances of speaker-speaker(s) interaction or individual performance. The Aschner-Gallagher units form a part of individual performances which may be incorporated in the larger interaction units, episodes or monologues.

98 Aschner, Theory and Research . . . , p. 67.

99 Ibid., p. 69.
students in the classroom. They made use of some categories of the Aschner-Gallagher Category System and eliminated others as not germane to the study. Teacher performances were not classified unless directly solicited or permitted to occur by student initiative. Instances of student initiative were classified in the following forms: (1) completely unsolicited and "spontaneous" performances; (2) responses that "go beyond the call of duty" in their ways of dealing with the task at hand; (3) responses offered in context where initiative is invited but not required; (4) responses addressed to questions demanding initiative.

Leaders in the area of education of the gifted child have expressed interest and guarded hope for functional results from attempts to measure the sequential interaction of teacher-student and student-student activity in the regular classroom as well as in more structured experimental situations.

These approaches measuring the progressive development of ideas and concepts in the educational environment may, if adequately grounded in psychological and sociological theory, be useful in suggesting the types of teacher behavior, or environmental modification, or group membership, etc., most conducive to productive work or whatever the classroom goal is for gifted children.100

The attempts to bridge the gap between intellect and personality through investigations of cognitive styles have provided an indication of more needed research. Gallagher emphasized the need for more effective instrumentation and sounder theoretical structures from which researchers may extend their efforts.

A large scale research program designed to assess the psychological impact of differing kinds of school experiences on children in grade four has been undertaken at the Bank Street College of Education. The goal of one aspect of their research was a set of narrative records with sufficient behavioral detail set in the context of the normal stream of events in the classroom to provide a basis for study of children in a naturalistic setting.

Records were made on a formal schedule by three observers rotating among the four schools selected for participation in the project. The range of activities covered included gym, assemblies, academic periods, discussions, etc. Observations were carried out over a two-year period which permitted collection of a great variety of data. A Narrative-description method of recording was used in order to provide data relevant to many topics. Observational guides which had been organized into broad categories provided the framework for record-taking. They also established the "dimensions of significance" for the study and detailed the kinds of
material the observers were to focus on in different situations.\footnote{Edna Shapiro, "Study of Children Through Observation of Classroom Behavior," \textit{Theory and Research in Teaching}, ed. Arno A. Bellack (New York: Bureau of Publications, Teachers College, Columbia University, 1963), p. 93.}

For analysis, the total record was determined to be the most appropriate unit instead of an episode or "thought unit." Each record was analyzed in terms of the teacher's structuring of the child's cognitive experiences, and in terms of the child's cognitive behavior in relationship to the group in learning situations. While an effort was made to keep the subvariables rooted in behavioral terms, some were found to require inferential judgment by the observer.

The children's cognitive behavior was analyzed according to involvement in work, learning, and ongoing activities on a five point scale. An extensive "cue list" including such factors as content of child-child interaction, amount of time in actual work, desire to participate, content of participation, etc., was used to assist the observer in making his decision. Assessment of the "thinking" of the children was restricted to what the children said. Contributions were evaluated on the basis of "relevance of their statements, and quality of their thinking, especially with respect
to evidence of relationship thinking." Essentially, the procedures followed in this study were those of coding by predetermined, mutually exclusive categories and then rating on the basis of more inferential dimensions.

Martin Kohn and associates have been developing a method for describing two kindergarten classrooms and assessing the mental health of each. Observations were made on a non-selective basis; a "focus of activity" was used to orient the observers. They were instructed to report meaningful detail at the molar level, to report meaningful sequences from beginning to end, to report on the quality of the behavior and to note the time at approximately five-minute intervals.

Seven units of class time were identified as follows: arrival, easel, milk, rest, playground, music, and art. These units were subsequently analyzed by using the following general topics:

Structuring: extent to which the teacher structured for general overall goals; extent to which she structured in a step-by-step fashion in terms of sub-aims of the activity; extent to which she structured for specificity of details, etc.

Assistance: extent to which the teacher volunteered assistance; extent to which she gave or refused assistance in response to children's request for it, etc.

Evaluation: extent to which the teacher made approving or disapproving statements, extent to which the approving statements were superficial or meaningful; extent to which the disapproving statements were constructive or destructive.

\[^{102}\text{Ibid.}, \text{p. 100.}\]
Child selectivity and initiative: extent to which the children freely varied the timing of the next step, either initiating the activity, terminating it, or proceeding freely within it; extent to which the teacher intervened when the child so proceeded.

Child-child interactions: extent to which the children interacted with each other; whether they structure for each other, evaluated each other, assisted each other, worked or played with each other in a cooperative way.

Children's involvement: extent to which the children gave evidence of being involved in classroom activities in a positive way, that is, showed signs of pleasure or interest, or in a negative way, showing signs of tensions or restlessness; extent to which the children gave evidence of experiencing difficulty.103

The absence of any explanation of the duration of the unit used in determining frequency in the report herein referred to made it difficult to assess the reliability of the measure. Certainly this type of measure is far removed from the descriptive studies of teacher behavior already reported. The work of Flanders104 and Bellack105 are but two examples of researches already reported which have as much, if not more, significance to the study of factors related to instruction.


104 Flanders, op. cit.

and learning as do the studies being done under the National Institute of Mental Health.\textsuperscript{106}

A combination observation and interview technique was used by Eleanor Leacock and others in a study of classroom processes aimed at yielding deeper insight into the nature of activity in the classroom. Both student and teacher behaviors were investigated. The primary student related purpose was the desire to discover "the way in which the curriculum challenges . . . the interest of children and the extent to which it does . . . have meaning for them."\textsuperscript{107} Narrative records were used for collection of observation data because of the exploratory nature of the study and the wide variety of approaches considered. Two observers kept narrative records which were collated to provide a single running account.

The "Outline for the Characterization of a Classroom" developed from this study provided only a global analysis of the dimensions of behavior affecting classroom processes. Very general guidelines were set forth; much more detailed and

\textsuperscript{106}This research as well as that reported by Shapiro, op. cit. and Eleanor Leacock, "Classroom Processes Study," Theory and Research in Teaching, ed. Arno A. Bellack (New York: Bureau of Publications, Teachers College, Columbia University, 1963), was supported by the National Institute of Mental Health, U.S. Public Health Service.

\textsuperscript{107}Leacock, op. cit., p. 112.
concise rubrics and observation techniques must be developed before definitive statements about classroom processes can be made.

Summary of the Literature

The focus of classroom research in the past decade has become what actually happens in the classroom when instruction is being carried on. Attempts are now being made to analyze systematically the behavior of the teacher while teaching and, to a lesser extent, the behavior of the student or students in the learning situation. The use of observation techniques of various types has become the primary method of data collection in all studies seeking to discover "actual" conditions for learning and teaching in the classroom. The manner of categorization of classroom behavior appears to depend upon what the individual investigator believes to be important about teaching. Seldom is a theory of teaching explicated, but each instrument is constructed on an implied theory of instruction. At present there is no widely recognized, organized methodology or theory which undergirds all the research in this area. However, the necessity of a theoretical basis for research of this type is beginning to be recognized. Openshaw, Cyphert, and Overly have explicated a number of the implicit and/or partially formulated theories upon which many of the studies reviewed above were based.108

108 Openshaw, op. cit., pp. 36-38.
Medley and Mitzel have presented their summary of the methodological implications of many of the same studies.¹⁰⁹ There are two basic steps in the process of measuring classroom behavior. First, a record of a sample of the behaviors to be measured must be secured. Second, the record, once obtained, must be quantified. The collection of data has been handled in various ways depending on what the investigator perceived to be the most important types of behaviors to be included in the source material. Flanders and Openshaw, on the other hand, made direct categorizations of live behavior. However, kinescopes of unstaged teaching situations were used in the latter study. This permitted familiarization with the classroom situation before categorization began; thus a more detailed instrument could be used. The kinescopic technique has been the topic of a detailed proposal by Howsam.¹¹⁰ This technique has many advantages (i.e., economy, unobtrusiveness, constancy of record), but at the same time it has drawbacks which make the use of typescripts necessary for specific types of observation, as noted in the Openshaw findings. Withall, Smith, Bellack, Hughes, and Aschner used audio-taped recordings. It appears that only general guidelines may be developed and that methodology must correspond

¹⁰⁹ Medley and Mitzel, Handbook of Research on Teaching, p. 298.

to the requirements of the specific research. Even though methodological suggestions may be presented in a dogmatic manner, they should be viewed as hypotheses requiring further investigation rather than as established rules.

The "shotgun" approach to identification of behaviors has been followed by persons such as Jayne\textsuperscript{111} and Morsh\textsuperscript{112} because they lacked a theory-grounded rationale which could indicate for them the precise nature of the behaviors for which they were searching. On the other hand, Flanders was led by theory to look at frequency of interactions and to classify them according to direct or indirect influence. Smith looked at the logic of language, Withall at teacher statements, Bellack at communicated meanings, etc. Each recent effort has been guided by the view of teaching and, in some cases, the view of instruction espoused by the major investigator. The more complete the theory, the more substantive have been the results.

Each researcher has developed his own instrument or made changes in existing instruments. While the products reflect a common orientation toward descriptive research, they also indicate a wide variance in theoretical assumptions. For example, the investigators' value system is most frequently the determining factor in establishment of an instrument to evaluate teaching.

\textsuperscript{111}Jayne, op. cit.

\textsuperscript{112}Morsh, op. cit.
As research has continued into teacher classroom behavior and evaluation of teacher performance, attention has focused on the role the teacher plays and his function in the instructional situation. Efforts at synthesizing dispersed data into a meaningful whole have led further to the investigation of theories of instruction. The increasingly popular cosmic view of curriculum and research has brought researchers face to face with the role of the student in the complex, flowing classroom situation in which instruction is carried on.

Relationship of Recent Research to This Study

During a consideration of the problems of curriculum theory, the author found it necessary to successively define and refine parts of the general whole which some have called curriculum. Following the lead of Macdonald, the global concern of the Taba structure was divided into areas of focus called curriculum and instruction. They were viewed as overlapping but distinct foci of educational concern. In a preliminary attempt at theorizing about curriculum, reference was made to Weiner's\textsuperscript{113} work in cybernetics which led to attempts to develop a system-approach to curriculum analysis. While the results of the exploration into curriculum theory were not totally satisfying in terms of resolving the

problems involved, or providing a comprehensive system, work on the Taxonomy Project expanded the area of concern into the instructional system. The studies in interaction analysis and other quests for the dynamic involved in the teaching-learning process have formed a natural background for this study. While not rejecting Smith's idea of the separability of teaching and learning, the position is taken that the most significant aspect of instruction for future investigation is the give and take—the feedback emitted by both students and teachers. Many researchers recognize this interaction and the necessity of ecological considerations in any complete understanding of the instructional process, but still they persist in splintered, narrowly refined investigation of parts of a total process without an overview with an ultimate objective. Nevertheless, narrow scope research is valid if an awareness is maintained that the results are not directly generalizable to the dynamic encounter. The development of a way of looking at teacher behavior "in situ" has provided guidelines for looking at student behavior from a perspective similar to that pointed out by Aschner. This study attempts to make the relationship of teacher "in situ" and student as learner "in situ" more explicit than previously attempted.

Bellack, Smith, Hughes, and Miller, among others, have looked at language patterns because they are the most frequent and predominant kind of classroom behavior. Yet there is no
evidence to show that they are most important. On the contrary, if the classroom situation is one of interaction, then each individual must be viewed as an active agent and only occasionally "reactive"; in turn, the participants in the interaction must "read" many unspoken speeches. The symbolic languages we learn are more numerous than commonly imagined--facial expressions, gestures, performances, etc. As teachers, as preachers, as lecturers, in many roles, the responses of others are read and interpreted as a basis for personal action.

Bellack and others have fairly firmly established that teacher talk dominates the classroom; likewise, Hughes's view that the teacher has a position which is used to dominate, seems established in practice. Even in the most permissive classes the teacher role is a controlling, authoritative role in which he attempts to establish, or assumes that there is already established, a relationship between himself and each student. Such a relationship need not and usually does not exist between pupils. Therefore, the common denominator in the usual class is a teacher-teaching and a student, or students-learning. Some assumptions are inherent in such a statement which must be explicated and challenged.

1. What teacher does is teaching.
2. What student does is learning.

While these two statements may be true, they are not self-evident. Assumption two may be most easily challenged by
those who critically recall instances of student misbehavior, failure to achieve according to expectations, or incomprehension of either content or teacher intent. Learning is believed to require some element of student desire and ultimate change, either in "knowledge level" or behavior. However, the first assumption may be challenged on the same grounds, namely, that what the teacher does may not be teaching unless it has an effect on the student. This is not to say that learning must take place, however. The critical element in the equation of teacher and student acting in the classroom toward learning outcomes is the interaction. Interaction is not possible without some minimal degree of learning when learning is viewed as a change in behavior. It should be noted that this remains outside the question of values in learning.

Attempts have been made to view student and teacher behavior from the position of the teacher, another teacher, a student, or a disinterested body in the room. The latter is impossible because there is no frame of reference for interpretation and categorization of what is seen. The other positions provide viable positions for hypothesis formulation and theory construction.

This study is not primarily concerned with improving individual learning ability—good as that objective might be—nor is it concerned with assessing teacher ability.
Rather, the underlying concern is to understand the elements which provide a teacher with ability to teach most effec-
tively. Interaction with students forms a part of a teacher's role. He cannot interact unless he sees the actions of
others. The observers in the role of teacher observers, will see certain things. With two observers more may be seen than
with one teacher, and at the same time there may be less chance of missing what a given teacher sees. This is the
only position open to fairly consistent observation when the observers have been teachers and are familiar with the con-
tent and purpose of the course. They cannot play students without it becoming "play." Primary concern is to see stu-
dents' behavior as teacher sees it in an effort to further the goal of communicating understanding of concepts, subject
matter, facts, ideals, etc. The first question for the teacher is: "Is some level of communication being attained?"
The only clue for the teacher in the dynamic situation is the response behavior of the students. If the foregoing rationale
is accepted, research to date points to the necessity of an attempt to identify, classify, quantify and analyze the responsive behaviors of students to selected teacher behavior in the classroom situation.

It is necessary to identify and describe possible student responses to teacher behaviors in the teaching-learning interaction before ways can be suggested to effectively con-
trol, change, or ameliorate the conditions which prove more or less conducive to learning, the ultimate aim of education.

Learning may be described in terms of subject matter comprehension, ability to recall, or changes (short- or long-term) in student behavior, etc. But in any case, it would appear that an attempt to influence and improve teaching-learning effectiveness is dependent upon an understanding of what is to be (1) achieved, (2) possible ways to achieve it, (3) effective means for its realization, and (4) any subsidiary considerations which might indicate the undesirability of a procedure on more than a "results" basis. Variables in teaching behavior and student response must be identified and described before concepts and principles for control of them may be established.

Preliminary research has already indicated that the variables are like the Devil--their names are Legion. It is, therefore, imperative that some system of classification or organization of the different types of behaviors be established to permit analysis of behaviors and further experimentation designed to provide an empirical base for preparation of teachers and improvement of teaching and learning in the instructional situation.
CHAPTER III
DESIGN OF THE STUDY

Outline of Procedures

The aims of this research were to develop a procedure for observing and categorizing student response behaviors in the classroom. To accomplish these purposes the following steps were taken: (1) related research and theoretical studies were analyzed in some detail; (2) a preliminary system of categories was compiled on the basis of other studies and observations of kinescopes and classroom situation; (3) the instrument developed in step two was empirically tested and modified. Computation of observer reliability and instrument adequacy was begun after an extensive period of observation demonstrated a very low incidence of unique student behaviors. The basic design of the study was patterned after the Taxonomy Project on which the author had worked for two years.

Step I: Research investigation

A review of related literature was made to obtain information relevant to this study. Particular attention was devoted to the problems of behavioral research and the observation techniques developed by others in an attempt to make use of the strong points and overcome the major weaknesses of previous research. This activity was specifically directed
toward providing background for the dual aims of the research. An investigation of the procedures and results of research in teacher behavior was made with special attention given to the identification of selected behaviors which might be anticipated to be demonstrated most frequently when the discovery approach was used in presentation of the subject matter. Finally, the procedures, rationales and theoretical framework, if any, in student behaviors research were reviewed in an attempt to incorporate relevant aspects of previous work in the instrument being developed.

The author made use of a series of working papers prepared by the project staff of USOE Cooperative Research Project 2288 and notes made during study sessions and discussions with specialists in the field of teacher education. The latter contacts and consultations were made through USOE Cooperative Research Project F-015.

**Step II: Instrument and procedure development**

This step required the compilation of a list of potential categories from the works of earlier investigators such as Bellack, Aschner, Anderson, and Smith, the distillation of terms to eliminate redundancy, ambiguity, and gaps which could be discovered by logically relating the various categories of differing systems and subsuming the specific under the more general. As initial categories evolved, reference was made
to kinescopes and live classroom observations in order to verify the existence and distinctiveness of the concepts being used. At the same time, such observations provided evidence of behaviors which had not been considered, and pointed to the necessity of additional rubrics, more carefully delineated rubrics, or expanded rubrics.

After the initial set of categories had been developed, attention was given to refining observation forms, techniques, and equipment. Validation of the Openshaw instrument had shown the desirability of having a typed transcript of verbal behavior, carefully designed data collection forms, and refined observation techniques which would facilitate the recording of the maximum amount of data with the greatest speed and efficiency. Recording equipment of various types was used in differing situations in an effort to determine the best combination of equipment for maximum reproduction of sound. These were checked in the classrooms which were to be used in the reliability and adequacy observations in order to familiarize both the students and teachers, as well as the observers and recorders, with the procedures for making tapes of observations. Since recording equipment had to be transported and used in a variety of rooms with an extensive range of acoustical levels, it was necessary to make modifications in the recording equipment and procedures throughout the period of data collection.
Step III: Data collection and analysis

This phase of the study was designed to test empirically the sufficiency of the instrument and provide a basis for subsequent modification of the instrument and procedures. It was divided into two main sections: (1) the collection of data and (2) the analysis of the data.

Sources of Data

The data used in checking observer reliability and instrument sufficiency were collected from ten classrooms in eight school systems located in Northeastern and Central Ohio. All of the schools were participating in the Social Studies Curriculum Project based at The Ohio State University. Arrangements for selection of the schools were made through the Social Studies Project. The data collection was conducted in conjunction with the evaluation phase of the Social Studies Project. Staff from the two projects assisted each other in data collection and the data was made available for both purposes. Schools in the group represented a cross-section of the total Ohio school population in terms of school size, socioeconomic level of the communities, etc.

The amount of teacher preparation, years teaching experience, and type of preparation and experience also varied widely. Two teachers were in their first year of teaching; two were in their third year; and one was in his
twentieth year. The median years of experiences was six years; the mean was 6.7 years.

Each classroom teacher was contacted to explain the special need for taping of sessions and his support was elicited in providing supplementary information about the degree of participation of students in classroom interaction. All teachers were very cooperative and expressed willingness to comply in any reasonable manner with the observations.

Each teacher was asked to identify twelve students in his class for inclusion in the group for concentrated observation. They were identified on the following basis:

1) Two boys and two girls believed to be very frequent responders to the teacher's behavior.

2) Two boys and two girls believed to be most average responders to the teacher's behavior.

3) Two boys and two girls believed to be very infrequent responders to the teacher's behavior.

The identifications were made after the fifth week of school. The lists of students thus identified were then compared to the frequency of response lists made by two of the observers on two or more observations of the classes. A composite rating of students was made on the basis of teacher judgment and observer assessment. The names of the students to be observed were selected from the composite rating.

In the final observations, however, all students in each class were included because the observers discovered that they were able to make as complete an identification of
student behaviors as required by the instrument being used for fifteen students as they would for six.

All observations were made of classes at the ninth-grade level. Each class was studying the new curriculum materials being developed by the Social Studies Curriculum Project in Economics. One teacher had used the materials in a pilot project one year previously. The rest of the teachers were using the materials for the first time. Special training sessions were held for the teachers before they began to use the materials and the curriculum project director served as a consultant to the teachers in order to resolve any questions or difficulties that arose in connection with understandings of the materials and methods of presentation.

The discipline-approach, as explicated by Elizabeth Maccia, formed the basis of the organization of materials and the process of instruction set forth as desirable for project participants. Two important concepts were stressed in the instructions to the teachers: (1) the structure of economics and (2) the discovery-approach to presentation. Both of these terms have highly refined and specialized meanings as used in the economics project. It was not the concern of this study to comment on these terms and the rationale behind their usage, but some minimal definition is in order to permit the reader to realize the expectation involved in selection of these particular classes.
The presence of structure\(^1\) in the presentation of a lesson involved the identification and explication of the major and subsidiary concepts of the lesson situations and provision of a linkage to the previous lesson and to the major concepts of the unit and over-all structure of economics as delineated in the instructions to the teachers.\(^2\)

The discovery approach was characterized by degrees of openness and the expectation that group discussion, role playing, or organized situations would permit the development, formulation, and explication of concepts by the students themselves. The anticipation of a higher than normal incidence of student participation and, therefore, higher than normal rates of student response behaviors were instrumental in the selection of these particular classes for this study.

In all cases the observers met with the principal of each school and occasionally with the entire social studies staff to discuss the procedures for data collection. Table 1 shows the training (degrees and majors) and experience of the participating teachers. Table 2 shows the breakdown by sex and class of the total sample included in this study.

\(^{1}\)Care should be taken not to confuse this use of the term "structure" with its use as a category in the Openshaw Classification System. Cf. supra, p. 69.

### TABLE 1

**TRAINING, AGE, AND EXPERIENCE OF PARTICIPATING TEACHERS**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Degree</th>
<th>Major</th>
<th>Age in Years</th>
<th>Years Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B.S.</td>
<td>Social Studies</td>
<td>47</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>M.A.</td>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A.B.</td>
<td>History</td>
<td>39</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>B.A.</td>
<td>Social Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.A.</td>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>B.S.</td>
<td>Social Studies</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>M.Ed.</td>
<td>Educational Admin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>A.B.</td>
<td>Government</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>B.S.</td>
<td>History</td>
<td>48</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>M.A.</td>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>B.S.</td>
<td>Accounting</td>
<td>31</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>B.A.</td>
<td>Social Studies</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>B.S.</td>
<td>Social Studies</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>B.S.</td>
<td>History &amp; Government</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>B.A.</td>
<td>History &amp; Geography</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>M.A.</td>
<td>History</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## TABLE 2

### THE STUDY SAMPLE BY SEX AND CLASS

<table>
<thead>
<tr>
<th>Class</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>15</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>14</td>
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<tr>
<td>8</td>
<td>12</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>14</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>105</td>
<td>239</td>
</tr>
</tbody>
</table>

## TABLE 3

### TIME OF CLASS MEETINGS AND DURATION OF SESSIONS

<table>
<thead>
<tr>
<th>Class</th>
<th>Period of Day</th>
<th>Minutes Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6th</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>3rd</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>5th</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>2nd</td>
<td>55</td>
</tr>
<tr>
<td>5</td>
<td>6th</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>3rd</td>
<td>45</td>
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<td>7</td>
<td>1st</td>
<td>43</td>
</tr>
<tr>
<td>8</td>
<td>6th</td>
<td>55</td>
</tr>
<tr>
<td>9</td>
<td>4th</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>3rd</td>
<td>55</td>
</tr>
</tbody>
</table>
Description of Data-Gathering Process

A schedule was developed whereby the team of four observers visited the ten participating classrooms five or six times. Since each class was conducted at a specific time each day there was no way to stagger the time of presentation for an individual class. However, the different classes met at various times during the day to provide a wide range of meeting times. Some met at 8 a.m., some at mid-morning, and others in the afternoon. Table 3 provides a compilation of information related to the time of the class meetings and the duration of the sessions.

The first observation was a general familiarization visit in each classroom and took place during the month of October. The observers were introduced to the classes and the purposes of the visits were explained as being related to collection of data for evaluation of the subject matter. Usually the class was told that tape recordings would be made at some future meeting. Seating charts were made of each room for future reference in placing microphones and identifying students.

During the second visit to the classrooms, preliminary data-collection was begun by all observers while observers $Q_T$ and $Q_N$ recorded the frequency of student response to teacher behavior.
Recordings were begun on the third visit and in some cases on the second visit. The first efforts at recording served three purposes. (1) They helped acquaint the technicians with the recording equipment; (2) they provided opportunity to evaluate the quality of sound reproduction in each classroom; and (3) they introduced the students to the phenomenon of having their verbal behavior recorded. In order to remain as unobtrusive as possible, the observers remained at the back of the room during the initial observations and recording sessions. As the students became used to having the observers in the room, the observers took seats to one side of the room when movable seats were available. This afforded a better opportunity for observing and recording non-verbal behavior.

Data to be used in the validation and reliability checks were collected on the fourth and fifth visits. At this time two observers recorded the non-verbal response behaviors in descriptive terms at 15-second intervals. The Source, Direction, and Sign Dimensions of all behaviors were also noted at this time. As time allowed, instances of complex speech patterns were also noted. A third observer identified each student's oral behavior by a pre-coded number, and the fourth observer monitored and supervised the recording.
The tapes of live classroom sessions were then transcribed in shorthand and a rough draft of the typescript was prepared. A synchronized time notation was added to the typescripts at 15-second intervals. One of the observers then corrected the typescript while listening to the tape and inserted the observers' notations of non-verbal behaviors at the appropriate points. These were returned to the typist who prepared a final draft of the composite record of the observation. The composite typescripts formed the basic data given to the coders for categorization.

**Description of Data-Gathering Instruments and Procedures**

Form A was a simple seating chart on which the names of the students were typed and pre-coded with sequential numbers for identification purposes. When certain students were being observed in detail, a special mark denoted this fact for ease of location and identification by the observer.

During recording of frequency of verbal response, a simple diagonal (/) denoted each response. An "R" was used to distinguish reading behavior from other verbal responses when the behavior was in response to a teacher direction to read something.

Three of the four dimensions of the final instrument were recorded on a grid composed of the student-time factor.

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3A copy of Forms A and B are included in Appendix B.
and the behavior description of the Source, Direction and Sign Dimensions. This was called Form B. A minimum number of changes of sheets was found to be advisable since some behaviors occurred rapidly.\(^4\) As a student behavior was observed, the time, identification of the student, and Source, Direction, and Sign Dimensions of the behavior were noted. A simple check in the appropriate intersection of the grid was used to indicate the category within each dimension. The code number of the student provided the means of student identification.

The time was noted by decimal notations with .1 equaling the first 15 seconds, .2 the second 15 seconds, .3 the third, .4 the fourth, 1.1 the fifth, etc. The number before the decimal denoted the total elapsed time in minutes and the number after the decimal the sequential fifteen-second intervals. The two observers made reference to a common timepiece with a sweeping second hand. It was started at the same time as the recording tape to permit later synchronization of hand-recorded observation data and taped data.

The final categorization of the data was done on the master typescripts prepared from the tapes and information collected on Forms A and B. The outline code designation of the appropriate category of the Function Dimension was placed

\(^4\)The printing of Form B used in the collection process was longer than the sample included in Appendix B to allow recording of as much of a single class session on a sheet as possible.
below the encounter which had been marked off by underlining a given encounter with a continuous line. Each coder worked independently, recording his classification marks on the typescript. The original tape recording was also available for reference when a particular section of behavior seemed difficult to categorize. Each person was permitted to listen to the tapes as often as desired.

Upon completion of the first coding of a typescript sequence by each coder, the two members of each team reviewed the results of their efforts and conferred about any confusions, difficult passages or differences in codings. If possible, differences were resolved and a notation was made of the resolution. Each person followed the same schedule in coding the sheets. However, the members of Team One had worked together on the Openshaw project, had been observers in the live classroom situation, and had collected the data in steps one and two of this project. For them, therefore, the classification process required less time and they completed the categorization more quickly than Team Two. Again, however, the sequence of consideration of initial codings were the same for both teams.

The results of the initial codings and the conference codings were then compared and analyzed for different coding patterns which would indicate a weakness in the adequacy of the instrument. Finally, the percentages of intra-team and inter-team agreement were computed.
The two persons responsible for recording data on Forms A and B were experienced in data-collection of this type and had worked as a team for three months in making observations of live teaching situations prior to beginning this project. They also served as Team One for the coding phase of this research. Team Two was composed of two experienced teachers who undertook a training program with Team One prior to beginning the coding. Each person familiarized himself with the materials being used in the classes by studying the Teacher's Guide to the Economics Project Materials. Two kinescopes were used as an introduction to observation procedures and familiarization with the instrument under development at that time. Discussions were held about the particular examples of behavior seen in the films. Because of the poor reproduction of student speech in the kinescopes, this method of training was abandoned in favor of practice sessions with typescripts prepared from an early taping session. All four coders categorized the behaviors on a short passage from the typescript. Specific behaviors were then discussed by the whole group with each giving reasons for his choice and making suggestions about possible confusions. These discussions served to point out weaknesses in the definitions of categories and prompted some revisions. When an individual showed a tendency to consistently overlook an aspect of a definition, this was discussed and an attempt
was made to obviate the source of the confusion. After the individuals began to feel some confidence in their judgments, the two teams were formed and a sample exercise was performed. The teams then met separately to continue to practice coding, using the instrument. When trial categorizations indicated that the members of each team had attained a fair degree of consistency in observation and categorization, the adequacy and reliability checks were begun. Each coder spent about two hours a day in training for a period of two weeks.

**Summary-Rationale for This Design**

Earlier efforts at development of systems of classification of student classroom behavior have been designed to yield data about specific hypotheses. They have been proposed with a psychological or philosophical orientation which served to focus the study on the narrow band of a spectrum not inclusive of the total range of classroom behaviors. While this study did not attempt a verification of a global concept of classroom activity, it did attempt to develop a global, all-inclusive theory of classroom instruction within which specific aspects were identified for initial investigation. It was a natural outgrowth of the author's work on the Taxonomy Project. However, the close relationship between the pattern of teacher and student behavior was not anticipated. Even at the theoretical level the complementary nature of the teacher behavior and student behavior was
acknowledged without realizing the cyclical, similarity of the two behaviors. Each, it is premised, plays a very similar role with differing loci of action and values or weights of motivation. The Taxonomy report presents an analysis and discussion of the theoretical framework and paradigms of several studies of teacher behaviors. These include Smith, Bellack, and Hughes. The work of Bales\textsuperscript{5} and Halpin\textsuperscript{6} presents models from related fields which have significance for investigation of student behaviors in the classroom. An adaptation of the Halpin Research Paradigm to the Study of Student Behavior is included in Figure 1.

The conceptualization of instruction, as included in this study, is indebted to many of the concepts used by others in developing theories of teaching, learning, curriculum, and instruction. But, as noted before, little or no effort has been made in the past to keep the basic position free of a particular value system. This is not to suggest that the attempt has been to make the system value-less but rather to develop a system of classification which would be open enough to be used in collecting data for any of many different and possibly conflicting value systems. Specific hypotheses which set forth criteria of effectiveness,

\textsuperscript{5}Bales, \textit{op. cit.}

Fig. 1. Adaptation of Halpin Paradigm to the study of student behavior. (The model should be interpreted in terms of a single student at a single time.)
"oughtness," goodness, etc., limit the scope of the resulting classification system in a manner which proscribes the results. The frame of reference within which this study was developed and the perspective from which an attempt was made to look at student behavior comes from an overarching attempt to conceive curriculum in its totality and subsequently identify and study its components. The following chapter provides more detail on the process of development of the basic rationale for the study. What follows is the rationale itself in brief form.

Education is an institutionalized process with roots in the basic soil of American society. Since the development of the public school concept, education has been surrounded by a definite attitude of societal concern for, if not control of, its very life processes. As a result of this organizational pattern and the growing universality of public education in America, more and more attention has focused on what American education is and what it should be. This, coupled with the burst of energy in the pure sciences and related fields has led educators to seek proofs to support their theories and inaugurate programs of research for a great variety of reasons, not all of which may stand the challenges of historical criticism. Within this maze of theory, practice, and research, an attempt was herein made to bring some order in an effort to increase understanding of the phenomenon of
our society called public education. A rough approximation of an approach to the gross components of education is offered in Figure 2. A more refined view of a single component, the Curriculum System is presented in Figure 3. However, there are still many major sub-systems not yet explored sufficiently to present a complete picture. The delineation of these systems and sub-systems still requires the development of the connecting and integrating processes which link the smaller units into a functioning whole. It was to one of the points of interaction between the Learning system and the implementation aspect of the Teaching system that this research attempted to shed some light. The assumption was made that instruction takes place in a social context with some modicum of give and take among the participants. It may be more or less active and passive for the individuals involved. Sufficient research by Flanders et al. has provided evidence to support this position. More recently, efforts have been addressed to considering the verbal content of this interaction.

An as yet unplummed dimension was the function or purpose dimension of the separable components of this encounter of participants in the instructional situation. Inevitably, the rationale for this study was grounded in a conception of teaching whose sources are many, and may be found in the investigations preceding it. Indeed, a conscious effort was
Fig. 2. Systems-analysis of the major components of American education.
Fig. 3. A systems-analysis of the curriculum, a subsystem of the educational system.
made to incorporate as many findings as possible that were relevant.

One significant departure from previous studies should be made explicit, that is, in this study an effort was made to keep conceptions about the nature of teaching and learning and the system of categories for viewing student response behaviors (not to be equated with learning behaviors at this time) as value-free as possible. No specific hypothesis or effectiveness constructs were used. The purpose was to develop a system of categories which would permit the classification of all observable student response behaviors in the instructional situation—logical or illogical, directive or integrative, good or bad.

At its most generalized level, student response behavior was viewed as the complement of the teacher behaviors in the instructional process. It is an observable occurrence as denoted by arrow A of Figure 2 and distinct from arrow B, teacher behavior. In simpler form, the interaction may be diagrammed thus:

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Teacher in Classroom ←----- Process of Behavior ←----- Student Goal Learning
                          ↓                                        ↓
                          Fig. 4.--Teaching as interaction.
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The broken arrow indicates the feedback control for the teacher which was the primary focus of this study.
By making use of the research completed in teacher behavior and student behavior studies and preliminary observations of live classroom situations, descriptive categories of student classroom behaviors were evolved and tested through further observations.

From the study of teacher behaviors it had been concluded that teaching is governed by the expectation that learning will result from the teaching acts; further, a complete picture of teaching is possible only when a description of the student's behavior is included as a possible source of a given teacher behavior.

Teaching implies interaction among persons within a superior-subordinate relationship. Usually the presence of a teacher and a student or students is required, although it is recognized that books and other instructional media may also "teach." Teaching is the interaction between a projector entity called "teacher" and receptor entities within a classroom situation. The receptor entities include students as individuals, in small groups, and as a whole class, as well as inanimate objects with which the teacher interacts. While it is recognized that the behaving entities and the receiving entities, through the process of interaction are interdependent and may even interchange roles, the teacher as teacher behaves in a manner distinct from the behavior of the

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7Hughes, Report of Research.
teacher as learner or receiver of instruction. Likewise, one student as learner may step out of his role as learner and perform as teacher or implementer of instruction. The identification and classification of the nature of the receptor entities provided the Direction Dimension of student behavior in this study.

The broad aim of classifying all observable student response behavior in the classroom was further restricted by the general delimitation of behaviors to those which were purposeful in nature. This limitation excluded from consideration those behaviors of a personal nature not directly related to the role of the student as learner-receptor in the classroom. The assumption was made that the students' primary purpose in the classroom was to learn something. For the most part, behaviors that were categorized were those that fulfilled a response function to the teacher-teaching behavior.

Function was determined by the purpose a behavior served in teaching. A variety of goals has been established for the schools by our society. While a given set of goals or objectives may contain more or fewer statements than another, the teacher's role in meeting them may be conceptualized as involving three essential tasks. One task the teacher must attempt to achieve is related to subject matter or content. Content may be comprised of facts, names, concepts, etc., that deal with fields of organized knowledge per se, but it
might also deal with beliefs, attitudes, ways of organizing, skills, and processes of instruction. A second major responsibility of teaching is that of establishing and maintaining interpersonal relations among persons within the classroom. The third is the task of facilitation of the learning processes. Behaviors engaged in by the teacher to accomplish these three tasks constitute the Function Dimension of teaching as defined in the Openshaw project.

The student role is somewhat different, because it is basically a passive role in the majority of classrooms; in the most permissive atmosphere the expectation is still there for a degree of difference in the types of behaviors and frequency of behaviors which will be tolerated. That is to say, the student and teacher each recognize the special prerogatives and responsibilities of his role. The student-learner may be no different from the student-seat-holder or the student-disrupter or the student-comatose to the casual observer. Any measure of the presence of learning or degree of learning is not usually possible from observation. Therefore, there is no claim made that the purpose of this study was to develop an instrument to categorize learning behaviors. Learning must be measured by means of pre- and post-tests or application situations. Rather, the student in the classroom is a responder to and interactor with the teacher who is the recognized and duly constituted director of the classroom.
activity, be it learning activity or other. But germane to the instructional process, especially when it is grounded on the premises of interaction, is the "reading" that teachers make of the effect of their teaching behavior on the recipients of it. Teachers are dependent to a great extent on their ability to identify student reactions and actions and interpret them within the instructional situation. Student behaviors are, as it were, recorded on a barometer which must be read and interpreted.

In order for a behavior to be observed it must be communicated in some way. Communication takes several avenues and a given function may require more than one mode of expression. Teachers may elect to use more than one mode of expression in fulfilling a given function. Likewise, the student may elect to use more than one mode of expression fulfilling his response function. In fact, he may elect to withdraw and not respond at all. The mode of behavior observed makes up the Sign Dimension of both teacher and student behavior.

Figure 5 illustrates the relationship among the four dimensions of student classroom response behavior.
Fig. 5.—Dimensions of student classroom response behavior.

The stimulation which causes a given student behavior may be either explicit or implicit, overt or covert. When the source is explicit or overt to an observer the student is said to be responding to someone or something. When it is implicit, the behavior is said to have originated with the student. The former was coded "Respond" and the latter "Originate." The source of the behavior controls the other dimensions of teacher behavior. (The solid arrows denote controlling relationships.) However, in the case of response behaviors they were so categorized on the basis of the observer's recognition of the target (i.e., student, teacher, teaching aid, visitor, etc.) upon which the student was focusing. This was determined on the basis of eye or body movement, the language pattern or nature of the current environment. The focus of the student on a target was the basis for determining the Direction Dimension. The direction, in turn, takes precedence in determining the mode and purpose of
the student’s behavior. The purpose of behavior indicates
the meaning it has for the receptor.

The mode of communication, called the Sign Dimension,
were selected on the basis of the identified target, and with
the hope of communicating a response function. Some signs
may limit the range of possibility of purpose, i.e., neither
a gesture nor silence would usually be means of explanation.
Likewise, supportive behavior is seldom performed by reading
or writing in the normal classroom. The sign and function are
not sequentially determinable, but they do affect each
other; therefore, broken arrows are used to indicate the mu-
tual influence. The double direction indicates the lack of
established sequence in determining these dimensions.

This paradigm gives a false impression if it is per-
ceived in a static form. A generalized model developed by
Mooney\(^8\) presents a dynamic pattern for characterizing the
complicated process of student behavior. It not only per-
mits the depiction of the system developed in this study but
also provides for expansion as further developments in re-
search technology and discovery permit.

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\(^8\) Ross L. Mooney, "Nurturing the Educational Researcher
as a Creative Artist," Occasional Paper 64-172, Prepared for
the Phi Delta Kappa Symposium on The Training and Nurture
of Educational Researchers, The Ohio State University,
November 16-17, 1964, pp. 12-18. (Mimeographed.)
Fig. 6.—Paradigm of self-perceived student behavior.

The circle represents the student as an entity. The breaks in the circle indicate the openness of the student in accommodating the influence of forces outside the student. The wedge-shaped portions which intrude into the student's entity arise from the total situation in which the behavior occurs. The relevance of a given behavior is ascertained by the import of that behavior within the situation. The infinity sign suggests the continuous nature of student behaviors as the student interacts with his environment in the classroom situation. The rectangle represents a point in time at which the student behavior may be arrested for purposes of observation, in this case, self-perception. The student sees himself as student and, thus, feeds on his own judgment of the degree to which he has fulfilled the purposes or functions established for that particular act, behavior, or encounter. In the limited observation established for this study relevance was established in terms of the student
success or failure in responding to the teacher behavior. "Selective fittings" must take place in each of the major dimensions. There is no significance to the proportion of space occupied by the separate wedges. The influence of each will vary from student to student and situation to situation. Increased refinement of research instruments and technology as well as application of techniques other than observation will provide additional breakdowns within the area labeled "unknown" in this paradigm.

The four named dimensions (Source, Sign, Direction and Function) included in the wedge-shaped divisions are sufficient for the observable aspects of student behavior, but they do not include student personality variables, student mental age variables, student preparation variables, etc., which are not open to observation. These unknown variables play an undefined role in the student behavior process as observed here. Previous and continuing research has addressed itself to these problems.

As the student continues to interact in the situation he makes the "selective fittings" in the four major dimensions of responding behavior identified below. The teacher makes comparable, but not necessarily identical, fittings as he perceives the behavior. Non-teacher receptors, the researchers in this instance, fill a "teacher-like" role but because of the "unknowns" impinging upon the teacher entity, and the observer-researcher entity, that role cannot be said
Fig. 7.—Paradigm of observer perception of student behavior.

to be identical. The researcher as receptor sees the same behavior that the teacher as receptor sees, but his special role in the situation is to make classifications of what he sees rather than to react or to modify his own behavior toward the achievement of some goal, as in the case of teacher receptors. The researcher as observer-receptor then "arrests" behaviors for the purpose of classifying the exhibited dimensions of teaching. He is involved in the process of interaction on restricted terms. The record he makes is influenced by unknowns impinging upon him just as there are unknowns influencing the teacher and the students. The process of categorizing is similar in nature to receiving feedback by the teacher. Judgments are made as to the purpose or function the behavior serves and its admittance or rejection is determined on this basis. While the observer may make a judgment of value of behavior for himself, he must record
only the judgment of purpose, i.e., the function the behavior serves. Having observed a function in a given student behavior, its source, direction and mode are then classified.
CHAPTER IV

DEVELOPMENT OF THE STUDY

In Chapter I reference was made to those elements in the author's experience which gave rise to the basic idea for the proposal. The initial formulation was directed toward a "product goal" as distinct from a "process goal." This was in keeping with the usual orientation of doctoral dissertations. The implicit assumption was accepted that the result of inquiry by candidates for the doctoral degree will be a worth-while product, of use to others as well as the author.

The inclusion of a dissertation as a part of the required program for preparation of students for advanced degrees lends substance to the argument that the major value of the dissertation is what its preparation does for the student, claims of original contributions to knowledge, notwithstanding. It demands a disciplined approach to a topic which has some significance to the special area of competence of the student whether the product will be significant or not.

Proposal Development

The primary inhibiting factor in the formulation of a specific proposal was the subconscious control of a personal expectation that the development of the proposal topic should include some mystical guarantee that the product would be
significant. In effect, the traditional printed requirements played a confining role which tended to inhibit the fruition of a large measure of personal freedom in selection of the subject for the dissertation. In turn, while strongly believing that personal growth and development in dealing with a problem was the primary desired objective of the dissertation requirement, the author found it virtually impossible to free himself from the proscriptive nature of the formal criteria. However, discussions with professors being considered for the reading committee provided encouragement toward establishment of a more flexible framework for the proposal which involved the analysis of the process as well as development of a product.

Two other forces which exerted considerable influence on the development of the proposal were closely related. One was a financial consideration and the other was the sampling consideration. The type of study being considered required the collection of a fairly extensive body of data. Previous research of this kind had demonstrated that it was a very costly process. Furthermore, gaining admittance to a number of classrooms on several occasions to collect detailed data of actual student and teacher behavior required considerable preliminary investigation of a number of systems in terms of their openness to outside investigations and involvement in their program, the number of restraints placed upon visita-
tions, the socioeconomic background of the community, the preparation of teachers, etc. In meeting these two hurdles, an adequate sample was available. The Social Studies Curriculum Project in Economics being developed on The Ohio State University campus was familiar to the author and offered a natural group of schools in which to collect data. Further, the data thus collected promised to be of value for use in evaluation of the Economics Project materials. Preliminary investigation of this possibility was made with the director of the Economics Project. The suggestion was made that in return for services rendered in collecting data for evaluation of that project, necessary supplies and services for collection and preparation of data for this study might be provided. However, before this arrangement was explored in detail and final understandings established, the director took a new position and it became necessary to explore again the possibilities of a cooperative venture with a new project director.

Of primary importance was the determination that cooperation with another project would not jeopardize or warp the objectives of this study. Before presenting the request for inclusion in the evaluation aspect of the Economics Project, the direction of the evaluation to be undertaken by that project was recast because of some critical questions raised relevant to the proposed conceptualization of idealized models of good and bad, or sufficient and insufficient,
adherence to the discovery criteria established as a pattern for teacher behavior in the Economics Project. This change in approach made it possible to broaden the basis of the selection of teacher behavior beyond the specific group of teacher behaviors fitting a special value orientation. Furthermore, the director of the Economics Project and the author were able to negotiate a mutually satisfactory arrangement for sharing data and expenses.

The most difficult concept to internalize was the idea that this dissertation was to be a final report of the process of conducting a study, rather than a report of the results of experimentation. The compromise statement finally accepted—in the sense that the author gave acknowledged assent to it—was that the dissertation would be a final report of the activity engaged in as a developmental study and a presentation of the instrument as developed.

**Inherent Procedures**

The establishment of a problem area and specific objectives for a study usually contain some inherent procedures or at least an indication of the direction one should move in developing procedures. The problem defined for this study was to identify the responsive behaviors of junior high school students to selected teacher behaviors and to develop a system for classifying such student behaviors. Questions
to be answered included:

1. Are the samples of student response behaviors adequate for the establishment of a comprehensive system of categories of possible response behaviors?

2. Is the classification system adequate?

3. Are observer records reliable, i.e., does each observer record a given behavior in the same way, and does each observer record a given group of behaviors in the same way over a period of time?

Certain steps are immediately obvious in such a statement of objectives. An instrument must be developed for classifying behaviors, a method of data collection must be devised for checking the instrument, and procedures for establishing the reliability and sufficiency of the system must be formulated. The sequence is not automatic, however. Some activities may be undertaken concurrently, while others are prerequisites to later steps. Furthermore, certain prerequisites must be fulfilled before the major steps inherent in the objective may be realized.

Review of Literature

A natural place to begin was with the review of literature. Such a review formed a necessary basis for all other phases of the study. However, the anticipation that the writing of the review of related research section of the final report would be completed early in the time schedule became impossible because of the necessity of meeting calendar deadlines for observation of specific classes. Since most of the
related research had been surveyed by the author prior to writing the proposal, it was possible to proceed with instrument development and to establish the procedures while spending a minimum amount of time on compiling the review of research section of the dissertation. This strategy made the writing of the review of literature a more arduous task because the necessity of formulating a position regarding related studies as a basis for the system of categories removed the primary motivation for the review. The time lapse between the initial study of the related research and the writing necessitated much repetition of effort. Also, results of new studies being completed during that time could not be included in the development of the instrument.

**Instrument Development**

Because of the work done on the system of classification of teacher classroom behavior for the Taxonomy Project, it was natural for the author's thoughts to coalesce about similar rubrics. Initially, an explicit effort was made to develop a focus other than that used for viewing teacher behavior because it was assumed that student behavior was significantly and fundamentally different from teacher behavior.
Dimensions of student behavior

Student behavior in the classroom was viewed in global terms. The question was asked, "What does the student do?" He was observed to exist. He is. Therefore, his individuality had to be considered. He behaves. He is, at times, the source of behaviors which are observed. However, he does not usually behave without reference to other beings, conditions or elements within the situation. He relates to his surroundings. This observation led to the idea that the student behaves "in the situation" rather than "in a vacuum." Two dimensions of behavior were identified in this way. The Source of a student's behavior was conceived in terms of its origination with the individual student or in terms of his response to identifiable aspects of the situation. Furthermore, behavior occurs for the benefit of someone or something. It is directed toward oneself, others or objects. Thus behavior is also characterized by a Direction Dimension.

It soon became obvious to the observers that behavior was occurring in different forms or under different types of locomotion. The observers were acting as receptors of different stimuli, clues or signs. The means of behavior was thus called the Sign Dimension of student behavior.

The original question of what the student does was answered in three ways: in terms of (1) who instigated the behavior, (2) where the behavior was directed and (3) how it
was being performed. But this provided an incomplete picture of total behavior in terms of what was being accomplished or why it was being done. The purpose of the behavior was, as yet, unidentifiable.

As observed, behavior in the classroom was not usually disintegrative; it was integrative. How did this occur and why did this occur? The "how" was answered tentatively by the Sign dimension. The "why" was more difficult to determine.

Students play a variety of roles in the classroom. They fill, at times, one or all of several roles including those of classmate, seat filler, teacher nemesis, peer entertainer, learner, teacher, etc. For the purposes of this study primary interest was focused on the student as learner since this is the intended role and commonly accepted general expectation of a student in the classroom.

Before this concept became apparent, considerable effort was expended in an attempt to categorize student behavior in terms of teacher questions and student answers since much of the meaningful behavior in the classroom was assumed to be verbal. This assumption is commonly made and explicated as the focus of study by researchers such as Bellack and Smith.

At this point the need for an approach similar to that used in developing the broad rubrics of the Taxonomy of Teacher Classroom Behavior appeared to provide direction for
study. It was decided that the categorization of student behavior could not be limited to the primary function or purpose of students in a classroom as had been the case with teacher behavior. While the primary role of the student is as learner, the investigation of learning, in particular the relationship of student behavior to learning, was to be only a subsidiary focus of this study. Learning was conceived as an internalized, personal "something" for which basic perimeters were being sought.

Arbitrarily, strictly personal behaviors such as combing hair, doodling, nervous mannerisms, etc. were omitted. A relevant-irrelevant dichotomy was considered. Relevant behaviors were defined in terms of evidence of planned responses vs. extemporaneous responses. Investigation of this dichotomy was found to be unfruitful for the observer because he had to judge relevance after the fact and then impute value to a given behavior on the basis of an idealized response or observed teacher response to student response. Judgments of relevance of student behavior were recognized as indispensibly a part of teacher behavior and teaching but not germane to a delineation of the "why" of student behavior.

An attempt was then made to explore student behavior in terms of "fittings" students were observed to be seeking within a situation. The concept of "fittings" proved helpful in clarifying the flow of communication, both verbal and
non-verbal, in the interactive situation of the classroom. At this point the generalized model of interaction developed by Mooney\textsuperscript{1} was used as a basis for conceptualizing the totality of an encounter between teacher and student, student and student, or student and object. This exploration led to the insight that the similarity between teacher and student behavior was not as different as originally assumed when viewed in terms of major rubrics. Reference was again made to the concept of function used by Hughes, Miller, Openshaw and others in their work. The higher order integrative system being sought seemed to coalesce around this concept. No matter what role a person plays he performs some function. It was in terms then of student function or purpose in the classroom while filling the "learner's" role which became the focus for detailed consideration of learner behavior. It was called the Function Dimension.

**Unit of observation**

The primary effort of this study was directed toward developing a system of categories into which observable student behavior could be classified. The specimen record or basic component of student behavior classified in this study was referred to as an encounter.

An encounter was defined as a unit of student behavior that serves a discernible function within an instructional

\footnote{\textit{Supra}, p. 124.}
situation. The four dimensions of student behavior change in sequence (pattern and order) during the student performance. Each change in dimension indicates a new encounter. For classification purposes, the critical dimension was the Function Dimension of the interaction. Each encounter must have a function. Behaviors without a discernible purpose were not recorded.

An encounter begins when a function is observed and ends when that behavior has no function, when a shift to another function dimension of behavior is observed, or when the subject of observation changes. For example, a student may begin by explaining something orally. He may continue to explain by writing and reading in sequence while supporting this "explaining" behavior with gestures and/or performance of some nature. This is a single encounter. But if a question develops following the explanation, it is categorized as another function; likewise, if a different student speaks or an interruption occurs, it is automatically accompanied by a change in the Function Dimension; thus, one encounter ends and another begins. A shift in the Direction Dimension also denotes a new encounter if a new function is observed. The term "encounter" was chosen to emphasize the concept that a person's behavior has meaning to the degree that such behavior is perceived and acted upon by another person. In the classroom setting the persons involved are typically the students and the teacher.
A given encounter is categorized in each of the four dimensions. As indicated above, each encounter may have shifts within the **Sign Dimension**, but any change in the **Source** and **Direction Dimension** indicates a new encounter.

The instrument

The instrument as finally revised is presented in brief form below.²

Outline of the Instrument for Categorization of Student Classroom Behavior

1. **SOURCE OF BEHAVIOR** - Indicates the origin or stimulation of a behavior.
   
   A. Originate - The event, behavior or activity which triggered the observed student behavior is not immediately discernible by direct observation.
   
   B. Respond - The source of the student behavior is triggered by some observable occurrence, condition or activity occurring within the classroom setting. The response may be to:
   
   1. Teacher
   
   2. Student(s)
      
      (a) Single
      
      (b) Multiple
   
   3. Visitor

²See Appendix E for examples of typescripts with codings.
4. Mechanical Device
   (a) A.V. aid
   (b) Bell, Clock, etc.

5. Physical Conditions
   (a) Temperature
   (b) Lights
   (c) Odors, et.

II. DIRECTION OF BEHAVIOR - Indicates the target to which the behavior is directed.
   A. Teacher - Behavior focused on the recognized teaching figure in the classroom.
   B. Student - Behavior focused on one peer.
   C. Group - Behavior focused on more than one person but less than the total class.
   D. Class - Behavior focused on the whole class.
   E. Object - Behavior focused on inanimate element in physical environment.
   F. Visitor - Behavior focused on a person who is present in the classroom for a special purpose, i.e., principal, message carrier, observer, etc.
   G. Self - Behavior focused on one's self, i.e., personal note taking, talking to oneself, combing hair, etc.

III. SIGN OF BEHAVIOR - Indicates the mode of communication of the behavior.
   A. Speak - Behavior characterized by audible oral expression.
B. Read - Behavior characterized by oral or silent directed reading of (printed) written matter.

C. Laugh - Behavior characterized by inarticulate sound of mirth or derision.

D. Gesture - Behavior characterized by purposive body movement.

E. Perform - Behavior characterized by demonstration, non-verbal illustration (drawing), singing, etc., erase chalkboard, hand out papers, etc. (executing directed activity).

F. Write and Erase - Behavior characterized by desk work such as note-taking, dictation, taking tests, etc., or chalkboard presentation, excluding drawing. However, "erase" specifically excludes clearing the chalkboard for additional presentations. This is Perform.

G. Silence - Behavior characterized by failure to respond with an overt behavior in relation to a direct stimulus.

H. Watch - Behavior characterized by directed observation of another's presentation, visual aids, etc.

IV. Function of Behavior - Indicates the purpose of a behavior within an encounter.

A. Follow Direction - to carry out directions given to others.
1. Report - to provide a formal presentation.
2. Record - to take notes or dictation for one's self.
3. Examine - to peruse orally or silently; to view, feel, smell, etc.
4. Exercise - to role play, work assignments, demonstrate activity.
5. Clerk - to provide secretarial services, i.e., take attendance, deliver messages, etc.
6. Manage Material - to distribute or collect materials, supplies etc.
7. Execute - to comply with manipulative commands.

B. Attract Attention - to seek recognition of others.
1. Call - to utter a name or make noise in such a way as to attract or attempt to attract the notice of others (often accompanied by Wave).
2. Wave - to move in such a way as to attract or attempt to attract the notice of another.

C. Answer - to provide a response to solicitous behavior of others.
1. State - to reply with a short, direct answer related to a single idea without comment.
2. Explain - to show relationship of ideas by means of explication.
3. Summarize - to restate principal points in brief form.
4. Inquire - to seek clarification of a solicitation or elaboration of presentation.

5. Agree - to give assent to the idea or concept presented in the solicitation or previous response to solicitation.

6. Challenge - to call in question the solicitation or its basis.

7. Appraise - to verify an idea or concept by appeal to external evidence or authority.

8. Opine - to evaluate on the basis of personal values and beliefs.

9. Mute - to exhibit no discernible response.

10. Monitor-self - to interpret one's own behavior.

D. Volunteer - to interject a behavior, either question, comment, or activity.

1. Inform - to provide supplementary information or extemporaneous comments.

2. Request - to ask for information, elaboration of presentation, definition of terms, clarification of ideas.

3. Contradict - to call in question a statement or behavior of another.

4. Reject - to rebuff another's behavior (derisive laughter, finger pointing, negative comments, etc.).
5. Appreciate - to commend, applaud, or empathize with another (either his act or situation).
6. Assist - to do something for another (pick up pencil; repeat question, etc.).
7. Acknowledge - to recognize the results of one's own activity.

E. Garbled - to behave in an incomprehensible manner.

**Category and sub-category development**

The development of fine distinctions within each major dimension of behavior was primarily dependent upon observations of diverse classroom situations and the notation of unique behaviors. The **Source** dimension presented no unexpected behaviors and observers were able to make the distinctions required once they had become familiar with the definitions of the categories originally developed after the pattern established by the Taxonomy Project.

The first formulation of the **Direction Dimension** was found to be incomplete without taking into consideration the student himself, however. Initially it seemed logical, on the basis of irrelevance to learning or "learner-type" activity, to disregard personal behaviors such as combing hair, biting fingernails, and passing notes. However, the irrelevance of this type of behavior was not a valid criterion for development of categories because relevant and irrelevant
behaviors may be directed toward the same targets. Such obvious forms of personally directed learner behavior as "note taking" necessitated the addition of a personal direction category--SELF. Likewise, because of the possibility and observed instances of student behavior directed toward the observers and visiting administrative personnel, the category VISITOR was also added.

It was not possible to discern whether or not learning was taking place from direct observation. The sequence, recurrence, and patterns of specific behaviors assumed to be relevant to learning could be categorized readily according to the system established. But the system itself makes no claim of significant weight for a particular pattern, frequency, or sequence. The student in the classroom, while playing the role of learner, was herein seen to behave in an all encompassing manner. The determination of learning requires another type of device designed to evaluate the outcomes of behavior. The effect varies from student to student and instance to instance as indicated by variance in performance, growth, and acuity of students in different situations at different time intervals.

The Sign Dimension was developed along lines closely paralleling those of teacher behavior in the Taxonomy instrument. However, on the basis of informal observation the student was found to demonstrate less overt behavior than the
teacher. It was suggested that the student was listening during much if not all of the time. The use of the term LISTEN led to complicated problems of interpretation of other visual clues and was found to be only minimally satisfactory. The category SILENCE was found to be a more accurate, if less informative, basis for distinction of behaviors. During direct observation of classes, however, the introduction of audio-visual aids drew attention to the behavior of the student as an observer. It then became apparent that student observation, coded WATCH, could be observed and categorized on the basis of student behavior directed toward a performance, demonstration, or audio-visual presentation.

The development of a comprehensive, distinctive and clear system of categories for the Function dimension was the most difficult aspect of the instrument building process.

Individual behavior in the classroom obviously is concerned with substantive or cognitive content, either willingly or unwillingly. Likewise within every classroom managerial behaviors and interpersonal or psychological behaviors are operative. An attempt to separate and define these distinctions consumed an inordinate amount of time and energy before it became apparent that such distinctions, while being logical and determinable outcomes or results, were not identifiable on the basis of direct observation of student behavior. The three aspects of behavior are basic to all
rational behavior to some extent and are united in an as yet undelineated bond. Further, this was the point at which teacher behavior and student behavior were most distinctive. The teacher usually functions in an active manner while the student functions in a receptive manner. He may be, and ideally is, involved in the classroom situation, but his role is not the dominating role. Primarily he follows directions as an expected part of established procedure, steps out of the passive role to attract attention, responds in an active manner by answering the solicitation of others or he initiates behavior on his own.

Just as personal behaviors directed toward oneself were originally omitted from consideration, first attempts at categorizing the function of student behavior followed a similar direction in that those behaviors whose function seemed to be contrary to the role of the student as learner were deemed inappropriate for classification.

A pre-conception which formed a stumbling block to gaining a comprehensive view of student behavior was that all student behavior was responsive in nature. In a very strict sense it may be so interpreted. However, if the meaning of response is followed to its logical conclusion then all behavior in every situation is reactive or responsive and the term becomes valueless as a means of distinguishing among types of behavior, and creative or original behaviors are
denied. Therefore, a more limited definition of response was sought. This was cast in terms of a participating interaction with a teacher in the classroom situation when the teacher was fulfilling the expected leadership role.

The decision as to the type of behavior observed could then be made in relation to the purpose of such behavior within the situation. The direction of the behavior as well as pre- and post-behaviors by other participants in the situation provided legitimate clues to the function of a particular behavior.

Since this was a developmental study, the intent was not to establish a final system of categories and then adhere to them in a testing situation. Rather, the initial formulation was continually checked and discussed during the training process and during the collection of data through classroom observation. Additions, deletions, and modifications of category and sub-category definitions were made until the time that the reliability and sufficiency checks of the system of classification were to be made.

**Training Observers**

The training sessions for observers were begun before the system of categories for classifying student behavior had been developed completely. Informal discussions of the proposed dimensions were held with the observers. Each observer
was encouraged to suggest behaviors he might anticipate in each category.

The proposal suggested use of kinescopes of live classroom sessions as the next step in observer preparation. However, when kinescopes of teaching situations were used, the observers found it very difficult to follow the lessons because of the poor sound reproduction of student verbal behavior and the lack of consecutive footage showing non-verbal behaviors. Since the kinescopes were made for the purpose of showing teacher behavior only, this difficulty might have been anticipated. Since the primary purpose in using the kinescopes was to facilitate the training of observers, other procedures were substituted.

Typescripts of recordings of live classroom sessions were used as source material for checking understandings and judgments developed to that point. Little or no difficulty was experienced by the observers in this phase of the training. Because a similar procedure was to be followed in the actual reliability and sufficiency checks, no further effort was made to use kinescopic materials. Use was made of the original taped recordings to provide clues to intonation, phrasing, voice volume, etc., which were found to play an essential role in the determination of the function of verbal behavior. It also provided additional clues to the over-all atmosphere of the classroom.
The two observers charged with responsibility for collecting non-verbal information spent part of their training time in direct observation of actual classroom sessions. This practice also permitted the development of recording techniques for handling non-verbal behaviors.

The major difficulty encountered in the preparation of observers was the tendency on their part to develop private criteria for identification of behaviors which limited or extended the scope of a particular category. This was a special problem when terms were used which have common and familiar meanings. The specialized use made of some terms proved difficult to maintain in the initial stages. It was found that frequent reference to the larger, more general, categories helped observers increase the consistency of their judgments. If a given system of categories were to be used for an extensive period it might prove helpful to use code letters in place of words for category identification. However, the use of familiar words, regardless of the difficulties and confusions inherent in developing private meanings, does facilitate familiarization with the system of classification. The use of letters and/or numbers does not overcome the initial problem of establishing meanings for the code. Basically it is a problem of use of the English language. Since the language develops from needs and usage, any attempt to create a new system or impose a pattern of organization
upon an as-yet-unidentified phenomenon necessitates the creation of new words, new meanings for old words, or the synthesis and limitation of existing meanings into usable hybrid-terms.

Data Collection

The collection of data in a normal classroom setting is fraught with a variety of problems. Few classrooms are equipped with one-way mirrors for unobtrusive observation or with equipment to make reliable sound recordings or kinescopes of extemporaneous classroom behavior. Therefore, it becomes necessary to send observers into the room or to hold the class in special studio-classrooms equipped for these special purposes. Either alternative interjects a variable of unknown dimensions into the classroom situation. However, as Medley\(^3\) has pointed out, it is better to have some knowledge of what goes on in a classroom when these variables are at work than have no knowledge of classroom behavior at all.

There were no special studios available for this study. Thus data collection had to be by means of direct in-classroom observation or through use of sound recordings of in-classroom observation. Previous work on the Taxonomy Project, which made use of kinescopes, demonstrated that reliable coding was possible on a one observation basis; but it also showed that, especially for a developmental study,

\(^3\)Medley and Mitzel, *Handbook of Research...*, p. 248.
data retrievable in a variety of forms--oral, aural and visual--permits the greatest degree of reliability in coding.

While the decision to tape the sound portion of the classes was made early in the development of the proposal and investigation of the feasibility of pursuing this possibility had been made with specialists in audio-visual transcription techniques, the actual conditions for recording could not be determined until the individual classrooms had been visited. Not only were they not studios, they were often barely adequate as classrooms. The rooms varied from narrow, crowded cubicles with wooden floors and inadequate lighting to large, reverberating sound chambers with tile floors and whirling air conditioners. Initial efforts with recording equipment showed that more than expert advise was needed to achieve a usable recording. Floor microphones had to be used because observations were held periodically over an extended period of time in rooms which were used for different classes each hour of the day. Such a situation did not permit the installation of semi-permanent equipment suspended from the ceiling. Furthermore, the same equipment had to be used in all the schools which necessitated the use of portable equipment which could be set up and taken down quickly with a minimum amount of confusion and inconvenience to the teachers and classes being observed; the same basic equipment had to be used in all ten classrooms. Since all observations were of
students who rotated from one room to another throughout the
day with three to five minutes between classes, the set up
and dismantling time had to be confined within these periods.

Three microphones feeding into a single mixer were used
during the trial sessions. Each class session was recorded
with the microphones placed in different positions and using
varying volumes of input. The necessity of using long cords
from microphones to mixer and recorder plus the normal noise
made by foot and chair movement on the floors caused so much
interference that reproduction tended to be distorted too
much to use.

The trial recording sessions tended to familiarize the
class with the equipment and the observers and minimized the
effect of outside influences. They also provided opportuni-
ties for the observer to see the classes in a number of situ-
ations which made later observations easier in terms of
identification of students, direction of responses, etc.

For the final recording only two microphones were used
in some classrooms, thus cutting down the interference from
the mixer. The quantity of the behavior recorded was in-
creased further when the observers also discovered that they
often had time to write down portions of dialogue which they
anticipated would be too low in volume to be picked up.

Original plans were made to use a Uher recorder for
all phases of data collection and preparation. This proved
impossible since the Uher was not designed to permit adjustment of input signals. An Ampex proved best for the collection process, but since two Uher recorders were available with special equipment for listening to the tapes, they were used in preparing and checking the typescripts. Because the Uher will take only a five inch reel, all tapes had to be copied from the seven inch tape used on the Ampex to a Uher.

**Data Preparation**

The preparation of typescripts proved much more difficult than anticipated. A secretary transcribed and typed a rough draft. The draft was then corrected and additions made by one of the persons who had observed the class during the recording session. Synchronized timing notations were then added to permit the inclusion of non-verbal descriptive categorizations made of Source, Direction and Sign Dimensions by two observers.

Initially it was assumed that live observation limited to non-verbal behavior should be restricted to a maximum of six students for each of two observations. Experience with two of the smaller classes indicated that a larger number of students could be observed so long as the nature of the classroom activity was restricted predominantly to desk work. Therefore, the student sample for each room was divided evenly and each observer recorded the non-verbal behavior for half the students in each room. With very few exceptions (all in
the classes with more than 30 students) no more difficulty
was experienced in recording behavior of all students than in
recording behavior of a limited number of students.

The form used for noting non-verbal data was a modifi-
cation of the form developed for the Taxonomy Project (see
Appendix B, Form B).

**Time**

Time has been one of the most vexing problems connected
with research of this type. It has been handled in a variety
of ways by various researchers. Flanders' three-second coding
is the most concentrated observation and most direct attempt
to overcome this problem. However, he was only partially
successful, for his approach limited the type of results ob-
tained as well as limited the scope of the system of cate-
gories used.

In this study a clock with a sweeping second hand was
used for common reference by the observers while recording
non-verbal dimensions of student behavior. Confusion
resulted only when the angle from which the clock was viewed
differed too greatly. The position of the minutes was always
consistent and lapses in minute designation were resolved by
reference to the typescript or tape recording.

A more difficult problem to overcome was the deter-
mination of the duration of an encounter. Sampling of behavior

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4 Supra, p. 107.
is usually based upon the assumption that behavior tends to be consistent over a period of time. Thus, observation for a five hour, five minute, or five second period may be shown to present a picture of total behavior by subjecting the results of limited observation to statistical analysis. In such a study, the focus of inquiry is on "clock time." It has significance because the teacher and the learner are required to function within the confines of a normal school day which is defined as being composed of a certain number of minutes in class or number of hours per year spent in study of a particular subject. However, this basic division is created for convenience in organizing, developing, and standardizing the school curriculum. Research has removed the basis for the continued assumption that individuals will do similar things in similar ways. Just as students have been shown to follow different paths in achieving particular goals, they may also follow the same path with varying degrees of alacrity. There appears to be a naturalistic or organic time which plays a more fundamental role in the determination of individual behavior than does clock time. For example, because of the demonstrated variety in length of encounters being categorized as "explain," "inform," "report," etc., a unit of observation other than clock time was sought. The term "encounter" had been selected as a tentative unit because it suggested in a positive way the concept of interaction within a situation
which was assumed as basic to behavior in the classroom in which teaching-learning was occurring. Rather than assigning an arbitrary number of minutes to each function, the duration of the encounter was established on the basis of a combination of a given behavior and its function in the situation. All behavior was assumed to have some significance and thus some meaning in the situation. In order to reduce the ambiguity inherent in some situations, the termination of an encounter was defined as the point at which the original function was achieved, at which the original function was lost sight of because of a shift in function by the actor, or at which the source or direction of the encounter was changed. In this way an effort was made to develop an organic or inherent rhythm of behavior which could be identified in terms of meanings rather than frequency of occurrence within a given time period.

**Research Costs**

A major drawback to research of this type has long been the high cost of data collection. High priced equipment and trained personnel are required for recording of raw data. An even more costly job is the preparation of the data for analysis. Costs of paper and tapes add substantially to expenses when several duplications are required.

A number of avenues are open in meeting these expenses. One of the more popular today is the United States Office of
Education Small Grants Program. Philanthropic foundations such as Ford, Kellogg, and Carnegie are additional possibilities. However, failure in receiving assistance from one of these sources should not deter the investigator. Besides independent wealth (seldom a viable possibility for an educator), more use could be made of the investigator's own services which could serve a dual purpose. One pool of data may serve for several different types of research and the resources of the different projects could be made to complement each other. A caution should be added, however. Most effective use of resources and materials requires coordinated planning by all projects involved before data collection begins to insure that sufficient, usable and reliable data are collected. This is not to rule out the possibility of subsequent use of material already collected for purposes not originally intended. It is merely a caution against unwarranted expectation of specific data availability when special needs have not been taken into consideration during the collection phase. Increased work on data retrieval systems holds promise for additional benefits for future researchers.

Summary of Influences

A great number of influences provided a framework within which the major effort of this study reached fruition. Time and the use made of the product will be the final measure
of the success with which the various log-jams were cleared and the flow of ideas regulated.

New goals and new procedures were continually set and successively achieved or modified. Compromise was an inevitable and often valuable part of the experience of developing a dissertation. For the most part, the process and/or implementation problems necessitated further compromise and were farther removed from the author's control than were the theoretical problems. While both types of difficulties were open to creative solutions, the former were surrounded by greater proscriptions. The theoretical problems, on the other hand, were most difficult to resolve because the freedom of choice for courses of action were limited only by the author's competence.
CHAPTER V

PRESENTATION OF RESULTS

Reliability of Coding

The check for reliability of coding was conducted only for the Function Dimension because the categories used in the Source, Sign and Direction Dimensions were substantially the same as those developed for the Taxonomy for Teacher Classroom Behavior. The percentage of agreement was above 93 percent for the composite categorization of each of these dimensions with no significant sub-category differences below 70 percent. Since the observers responsible for the categorization of these dimensions in this study were members of the teams used in the reliability check for the Taxonomy Project, no further reliability test of these dimensions seemed necessary for the purposes of this study. Furthermore, because reliability in the Taxonomy Project was established on the basis of continuous coding of kinescopes of unstaged classroom sequences, it was assumed that the opportunity afforded the observers to reconsider and study the situation before determining the categories would only serve to increase the percentage of agreement. This assumption appears to have been warranted on the basis of the high reliability demonstrated in coding the Function Dimension.
In order to obtain an indication of the reliability in coding, one observation record of each of ten different classes was coded for the Function Dimension from a typescript prepared for that purpose. The results of this coding by two teams of two members each were examined to determine the agreement between members of each team (intra) and the agreement between the two teams (inter) for each category. As the codings were compared, disagreements were indicated by marking omissions and substitutions of one classification for another.

Intra-team reliability

Two teams of two members each were used for the coding; the members of each team listened to the tapes, checked the sequences, and categorized student behavior independently. As soon as a typescript had been coded, members of each team compared their coded sheets for disagreements. Instances of disagreements which could be resolved by listening to portions of tapes again or by discussion of the context, interpretation, etc., were noted as "agreements after consultation." Those which could not be resolved were left as "disagreements." Instances of disagreements which could be resolved were those caused by uncertainty of duration of encounter, failure to remember the context, or coder uncertainty in interpretation of the category.
After all codings had been completed, a comparison was made of the coded sheets of the members of each team—that is, coded sheets of member A were compared with those of member B of Team I, coded sheets of member C were compared with those of member D of Team II. Disagreements were marked on the coded sheets of member A of Team I and on the coded sheets of member C of Team II. Disagreement was defined as a substitution of a category in the coding of an encounter by a team member or as an omission of a coding instance by a member of either team. Agreement was defined as identical coding of a particular encounter by both team members. As the disagreements were noted, substitutions of one major category of behavior for another and/or one sub-category for another were indicated.

After all coded sheets had been checked, the total number of possible codings for the Function Dimension was calculated and the number of coded agreements was recorded. Percentage of agreement for each of the function categories was determined in the following manner: the coded sheets were examined to determine the disagreements between categories and sub-categories; colored markings were used on the coded sheets to indicate the points of disagreement; the total number of possible codings was determined by adding the incidences of agreement to the incidences of omissions and substitutions on each series of coded sheets. The number of
agreements was determined by counting the total number of encounters coded identically by any of the observers within each category and each sub-category. The number of instances of omission was determined by counting those cases in which member A omitted what member B coded and those cases in which member B omitted that which A coded. The same procedure was followed for analyzing the coded data of members C and D of Team II. In order to obtain the percentage of agreement, the number of agreements was divided by the total possible codings. The formula for this computation may be written

\[ P_a = \frac{A}{T_p} \]

\( P_a \) is the percentage of agreement. \( A \) is the total instance of agreement; \( T_p \) is the total instances of coding.

\[ T_p = A + (O_1 + S_1) + (O_{11} + S_{11}) \]

Again \( A \) is the total instances of agreement. \( O_1 \) is the total omissions by Team I; \( S_1 \) is the instance of substitution by Team I. \( O_{11} \) and \( S_{11} \) are the instances of omission and substitution by Team II respectively. Table 4 presents the distribution of the percentage of agreement by teams for categories of the Function Dimension. It will be noted that at no time did disagreement in determination of the five categories of the Function Dimension exceed 15 percent for either team. The over-all percentage of agreement between the two members of Team I was 95.3 percent; between the members of Team II, 93.5 percent. These percentages were computed on the basis of original agreements without consultation.
<table>
<thead>
<tr>
<th>Observation</th>
<th>Team I</th>
<th>Team II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Encounters</td>
<td>Agree</td>
</tr>
<tr>
<td>A</td>
<td>148</td>
<td>137</td>
</tr>
<tr>
<td>B</td>
<td>204</td>
<td>200</td>
</tr>
<tr>
<td>C</td>
<td>161</td>
<td>154</td>
</tr>
<tr>
<td>D</td>
<td>256</td>
<td>254</td>
</tr>
<tr>
<td>E</td>
<td>248</td>
<td>241</td>
</tr>
<tr>
<td>F</td>
<td>195</td>
<td>182</td>
</tr>
<tr>
<td>G</td>
<td>253</td>
<td>243</td>
</tr>
<tr>
<td>H</td>
<td>98</td>
<td>90</td>
</tr>
<tr>
<td>I</td>
<td>121</td>
<td>119</td>
</tr>
<tr>
<td>J</td>
<td>237</td>
<td>210</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1921</td>
<td>1830</td>
</tr>
</tbody>
</table>

The three observations, A, F and J, which yielded the lowest cumulative percentage were of class sessions which demonstrated lack of teacher direction, confusion of concepts by the teacher, an uncontrolled exploratory period, and open pupil hostility toward the teacher. This indicated that the instrument may be most reliable when used to analyze structured classroom situations.
A more detailed analysis of the reliability of the coding was conducted by comparing the inter-team percentage of agreement for coding at the sub-category level of the five categories of the Function Dimension. Results of this analysis are included in Table 5. The range for Team I before consultation was from 66.7 percent to 93.7 percent. Team II exhibited a range from 77.5 percent to 92.5 percent. The lower extreme was recorded by both teams for the same observation of a session in which the teacher had lost control of the class and the content of the lesson. Furthermore, several students exhibited open and veiled hostility toward the teacher which was difficult to categorize with reference to other observations of the class. The difficulty was overcome by both teams after relistening to the tape recording and discussion clarified the situation. The percentage of agreement after consultation was over 97 percent for both teams.

Inter-team reliability

In order to obtain a more extensive indication of the degree of reliability of the coding and the instrument, the results of the coding after consultation were compared on a team basis. Members of Team I had both participated in the collection of the data and five observations of each class prior to coding the behavior of the students. Members of
### TABLE 5

**PERCENTAGES OF INTRA-TEAM AGREEMENT WITH AND WITHOUT CONSULTATION ON SUB-CATEGORIES OF FUNCTION BY OBSERVATION**

<table>
<thead>
<tr>
<th>Observation</th>
<th>Percentage for Team I Before Consultation</th>
<th>After Consultation</th>
<th>Percentage for Team II Before Consultation</th>
<th>After Consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>82.4</td>
<td>99.3</td>
<td>86.3</td>
<td>96.7</td>
</tr>
<tr>
<td>B</td>
<td>92.6</td>
<td>100.0</td>
<td>91.9</td>
<td>99.1</td>
</tr>
<tr>
<td>C</td>
<td>88.8</td>
<td>98.8</td>
<td>92.5</td>
<td>98.8</td>
</tr>
<tr>
<td>D</td>
<td>91.4</td>
<td>99.6</td>
<td>91.2</td>
<td>99.6</td>
</tr>
<tr>
<td>E</td>
<td>83.1</td>
<td>99.6</td>
<td>84.4</td>
<td>95.5</td>
</tr>
<tr>
<td>F</td>
<td>88.7</td>
<td>99.0</td>
<td>80.8</td>
<td>99.0</td>
</tr>
<tr>
<td>G</td>
<td>93.7</td>
<td>100.0</td>
<td>91.7</td>
<td>98.8</td>
</tr>
<tr>
<td>H</td>
<td>90.8</td>
<td>100.0</td>
<td>81.2</td>
<td>95.0</td>
</tr>
<tr>
<td>I</td>
<td>90.9</td>
<td>99.2</td>
<td>89.3</td>
<td>95.9</td>
</tr>
<tr>
<td>J</td>
<td>66.7</td>
<td>97.5</td>
<td>77.5</td>
<td>97.1</td>
</tr>
</tbody>
</table>

Team II had not participated in the live classroom observations and had to rely on the single taped recordings of each class session.

The coded transcripts of member A of Team I were compared with the coded sheets of member C of Team II. Disagreements between members of each team had been indicated on these coded sheets. Subsequently the agreements, omissions, and substitutions between the team codings were noted on a single copy. Table 6 shows the inter-team distribution of percentages.
<table>
<thead>
<tr>
<th>Observation</th>
<th>Encounters</th>
<th>Agreements</th>
<th>Percentage of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>157</td>
<td>139</td>
<td>88.5</td>
</tr>
<tr>
<td>B</td>
<td>211</td>
<td>200</td>
<td>94.8</td>
</tr>
<tr>
<td>C</td>
<td>161</td>
<td>153</td>
<td>95.0</td>
</tr>
<tr>
<td>D</td>
<td>260</td>
<td>248</td>
<td>95.4</td>
</tr>
<tr>
<td>E</td>
<td>250</td>
<td>236</td>
<td>94.4</td>
</tr>
<tr>
<td>F</td>
<td>196</td>
<td>185</td>
<td>94.4</td>
</tr>
<tr>
<td>G</td>
<td>261</td>
<td>240</td>
<td>92.0</td>
</tr>
<tr>
<td>H</td>
<td>102</td>
<td>93</td>
<td>91.2</td>
</tr>
<tr>
<td>I</td>
<td>122</td>
<td>120</td>
<td>98.4</td>
</tr>
<tr>
<td>J</td>
<td>249</td>
<td>224</td>
<td>90.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1969</strong></td>
<td><strong>1838</strong></td>
<td><strong>93.3</strong></td>
</tr>
</tbody>
</table>

of agreement for categories of the Function Dimension. The range was from 88.5 percent to 98.4 percent. The over-all agreement out of 1969 possible codings was 1838 or 93.3 percent agreement.

When a comparison is made of the 26 sub-categories of the instrument, the over-all percentage of agreement remains very high at 86.1 percent. The range was from 73.9 percent to 95.1 percent. As with the intra-team analysis, the two observations comprising the lower extreme were of class
sessions providing a minimum amount of structure. A complete breakdown of the number of possible codings, agreements, substitutions and omissions by observation is included in Table 7. Table 11, Appendix D, shows the distribution of the substitutions made by each team for categorizations made by the other team. The low percentage (4.2 percent) of omissions of encounters by one team or another indicates a strong reliability in identification of the unit of behavior. Detailed analysis showed the types of behaviors omitted by one or the other teams clustered around five types of encounters. They were (1) a sequence of repetitious behaviors coded as one rather than as a multiple; (2) a long discourse by an individual interspersed with single words or phrases of agreement or encouragement by the teacher (often made simultaneously with or during the student behavior; (3) complex utterances containing shifts in functions; (4) compound behaviors in which two or more behaviors complimented each other; or (5) when silent responses were not noted in typing the transcript and were overlooked in listening to the tapes.

Consistency of coders judgment

A final check of the reliability of the observers recordings was made four months after completion of the initial coding exercise. One member of each team was given an unmarked copy of four randomly selected transcripts used in the first coding. Each observer was asked to code the
TABLE 7

DISTRIBUTION OF ENCOUNTERS, AGREEMENTS, DISAGREEMENTS, AND PERCENTAGES OF INTER-TEAM AGREEMENT ON SUB-CATEGORIES OF FUNCTION BY OBSERVATION

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Encounters</th>
<th>Agreements</th>
<th>Disagreements</th>
<th>Percentage of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Substitutions</td>
<td>Omissions</td>
</tr>
<tr>
<td>A</td>
<td>157</td>
<td>125</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>B</td>
<td>211</td>
<td>182</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>C</td>
<td>161</td>
<td>141</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>D</td>
<td>260</td>
<td>238</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>E</td>
<td>250</td>
<td>215</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>F</td>
<td>196</td>
<td>173</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>G</td>
<td>261</td>
<td>234</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>H</td>
<td>102</td>
<td>86</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>I</td>
<td>122</td>
<td>116</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>J</td>
<td>249</td>
<td>184</td>
<td>53</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>1969</td>
<td>1694</td>
<td>199</td>
<td>83</td>
</tr>
</tbody>
</table>

student behaviors again without reference to the earlier codings for the same transcripts. A summary of the frequency of agreements and disagreements, as well as a breakdown of the types of disagreements, is presented in Table 8. The consistency of coding within categories was 96.4 percent for Observer A and 94.2 percent for Observer C. At the sub-category level Observer A was consistent at the 91.2 percent level and observer C at the 89.7 percent level. The incidence
### TABLE 8

**AGREEMENTS AND DISAGREEMENTS BETWEEN INITIAL AND SUBSEQUENT CODINGS OF THE SAME TRANSCRIPTS FOR OBSERVERS A AND C**

<table>
<thead>
<tr>
<th>Observer</th>
<th>Possible Codings</th>
<th>Agreement</th>
<th>DISAGREEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Categories</td>
</tr>
<tr>
<td>A Total</td>
<td>786</td>
<td>717</td>
<td>22</td>
</tr>
<tr>
<td>C</td>
<td>161</td>
<td>147</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>256</td>
<td>239</td>
<td>8</td>
</tr>
<tr>
<td>E</td>
<td>248</td>
<td>220</td>
<td>7</td>
</tr>
<tr>
<td>I</td>
<td>121</td>
<td>111</td>
<td>2</td>
</tr>
</tbody>
</table>

| C Total  | 787             | 706       | 34             | 35             | 12        |

of disagreement at the category level were too limited to provide any indication of major difficulty. At the sub-category level Observer A exhibited no particular pattern of inconsistency. The 41 changes in sub-category coding were distributed over the whole range of behaviors. Instances of inconsistent coding did tend to appear in clusters around
encounters which had presented problems to the observers at
the initial coding. This would seem to indicate that the
cause of at least some of the inconsistency was the ambiguity
of the situations rather than the lack of reliability in
judgment of the observers or insufficient distinctions between
categories of the instrument.

Range of Student Behaviors

As originally conceived, this study was to focus on the
response behaviors. However, as the instrument evolved as a
result of observations and pilot efforts at categorizing stu-
dent behaviors, it became apparent that this focus was not
necessary at this stage of the research process. Rather than
being a help in the developmental task, it was a hinderance
since it led the author to anticipate fewer responses than
would be found in interaction with a teacher's total teaching
behavior.

The type of response the teacher generates to his
behavior or, more generally, the type of behavior exhibited
by the students appears to be more directly related to the
over-all classroom climate, including student-teacher rapport,
than to any logically defined system of instruction. Thus,
unsolicited contributions or interruptions are well within
the realm of possible student behaviors even if the teacher
behavior is serving a structuring function. If the class is
permitted and accustomed to a degree of freedom of behavior
in the classroom, the incidence of extemporaneous student behaviors is greater, even in teacher-structured situations. On the other hand, when the teacher has established a structured question--student response pattern for most of the class time, teacher efforts to stimulate student participation tend to result in short-answer, terminal behaviors. The continuation of the instructional process continually devolves upon the teacher or in a teacher-single student dialogue.

While all the teachers observed had had some special familiarization with a "discovery" approach to their subject and were dealing with subject matter materials specifically designed to facilitate use of the discovery approach, a wide spectrum of teacher behavior was exhibited. But no matter how divergent the patterns of teacher behavior, the range of student behavior remained about the same. Only the frequency of occurrence for specific behaviors fluctuated significantly.

No measure was taken of the proportion of time spent on one type of behavior in contrast to another. However, a quick glance at the typescripts was sufficient to support the findings of Bellack and others that the great bulk of every class session was filled with teacher behavior--primarily, teacher talk. The minor portion of the time filled with student behaviors was primarily filled with spoken behaviors. The students spent nearly all of their time at their desks.
In the Function Dimension, four of the five categories were represented in the behaviors of students in each class observed. However, the bulk of the behavior, 84.93 percent, fell within the ATTRACT ATTENTION and ANSWER categories. Table 9 presents a breakdown of the total incidents of behaviors for the ten observations.

**TABLE 9**

**INCIDENCE AND PERCENTAGE OF TOTAL STUDENT BEHAVIORS BY FUNCTION CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Encounters</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLLOW DIRECTION</td>
<td>44</td>
<td>2.5</td>
</tr>
<tr>
<td>ATTRACT ATTENTION</td>
<td>534</td>
<td>30.6</td>
</tr>
<tr>
<td>ANSWER</td>
<td>949</td>
<td>54.4</td>
</tr>
<tr>
<td>VOLUNTEER</td>
<td>173</td>
<td>9.9</td>
</tr>
<tr>
<td>GARbled</td>
<td>46</td>
<td>2.6</td>
</tr>
</tbody>
</table>

The fifth category, GARbled, was seen in nine of the ten class sessions; however, a detailed analysis showed that multiple incidents of incomprehensible behaviors were present in only five of the ten observations.

The similarities and dissimilarities of behaviors from classroom to classroom became most obvious when the frequency of behaviors was analyzed by sub-categories. The primary
behaviors clustered around "ATTRACT ATTENTION-Wave" and "ANSWER-State." The results are presented in Table 10.

The different classes showed a range of 9 to 17 different sub-categories of behavior out of 27, but in no case was the pattern of behavior identical.
## Table 10

### Frequency of Coding and Percentage of Total Coding of Student Behaviors by Sub-Categories According to Observations

<table>
<thead>
<tr>
<th>Code</th>
<th>Observations</th>
<th>Total</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>A 1*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 3</td>
<td>5</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>A 4</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 6</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A 7</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>B 1</td>
<td>46</td>
<td>74</td>
<td>60</td>
</tr>
<tr>
<td>B 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 1</td>
<td>34</td>
<td>87</td>
<td>61</td>
</tr>
<tr>
<td>C 2</td>
<td>14</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>C 3</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C 4</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>C 5</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>C 6</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C 7</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 9</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>C 10</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>D 1</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>D 2</td>
<td>8</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>D 3</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>D 4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D 5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D 6</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D 7</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>192</td>
<td>153</td>
</tr>
</tbody>
</table>

*An explanation of the coded categories and sub-categories is included in Chapter IV, pp. 141-144.
CHAPTER VI

ANALYSIS OF RESULTS

Adequacy of the Instrument

The plan for development of the system of classification had called for the cessation of adequacy testing when crucial additions or deletions to the system of classification were no longer mandated by student behaviors that could not be classified. This guide-line was established to eliminate the necessity of setting an arbitrary number of needed observations of classroom situations and also to provide a reasonable limitation to the number of observations needed.

Filmed sequences initially provided a wide range in grade level of students, subject matter areas, and methods of instruction for viewing a variety of behaviors. From this broad base observations of a limited scope were undertaken in ninth grade economics classes which were using common materials and supposedly common methods of instruction. The criterion of adequacy was to check to see if the system of classification was adequate for the purpose of classifying all observable dimensions of student behavior in the classroom situation. In other words, was it possible to categorize all observed behaviors without making additions or deletions to the classification system or paradigm.
During the viewing of the filmed sequences and the initial live observations, notes were made of unusual encounters or encounters difficult to categorize. An evaluation was made of these instances and of the types of difficulties encountered. Additions, deletions and modifications were made in the instrument following the viewing, coding and discussion of each filmed sequence.

It became obvious early in the study that not all films and observations were equally demanding of either coders or the system of categories. Since only student behavior was being classified, categorization was relatively easy when the teacher restricted student-directed activity. Furthermore, since the original system of classification was based on previous studies which had placed major emphasis on substantive verbal behaviors, those situations wherein the student behavior was predominantly non-verbal or directed toward non-content oriented activities provided the greatest number of instances of behavior not classifiable within the initial instrument. These gaps in the classification system were bridged by adding new categories or by the redefinition of existing ones. As the categories were checked out through additional classroom observations, this procedure made it possible to stop adequacy testing as planned without setting an arbitrary number of needed exposures.
Except for those behaviors which fell mainly into the non-verbal areas of the instrument, notations of behaviors difficult to categorize in the initial codings were due to a lack of understanding of the definitions for the categories. Greater familiarization with the instrument and discussions between coders and instrument developers removed many of the noted instances from the questionable realm. Nevertheless, unique examples of behaviors difficult to categorize were found even at the time of coding familiar typescripts. However, they were readily classified within the system of categories when and if the ambiguity in the encounter was clarified. The behaviors coded GARBLED, in the Function Dimension were used for incomplete utterances whose purposes were obscure or for blurred responses which could not be understood.

The Source Dimension as originally developed proved adequate for all situations except those few in which the behavior of the student was felt to be ambiguous or multifunctional. For example, the student would RESPOND to a teacher’s question and then continue in his spoken response to pursue a topic which seemed to be related to the question but went beyond the original question. In such instances, an evaluation of the student’s behavior in other contexts was sometimes necessary to determine if this was a normal RESPOND behavior or if it was an attempt to ORIGINATE a new focus. Again, judgment was made after consideration of the result of
the behavior. Usually the RESPOND category was maintained until an obvious change in encounter occurred. At such a time the Source Dimension was again categorized in terms of the new encounter.

The original intent in developing the system of categories was to focus on responsive behaviors to selected teacher behaviors. It was natural to include TEACHER in the list of targets of behavior included in the Taxonomy Instrument. When observations were begun, the first efforts at collecting data about the Source and Direction Dimensions indicated that considerable confusion would result from efforts to exclude some behaviors and include others since the data collection procedures being used required the making of comprehensive notations and categorizations for the Source, Direction and Sign Dimensions in an on-going situation. Therefore, behaviors directed to one's own person, which had been specifically omitted in the first draft of the Direction Dimension were included. Likewise, an occasional involvement of a classroom visitor in the instructional process necessitated the inclusion of the category VISITOR. However, because an effort was being made to record the behaviors of all students, whenever a rapid series of behaviors or large number of congruent behaviors occurred which made recording difficult, the detailed personal behaviors were omitted. Interestingly, instances of such complex behaviors were very few if doodling, staring into space, biting finger nails, and this type of
behavior are excluded as they were in this study. Nevertheless, if this type of data is desired, it may be included in the large category, SELF. Further development of this category would be necessary if this were the focus of the observation.

The **Sign Dimension** was adopted from the Teacher Taxonomy Instrument. Several modifications were necessary because the student's role in the classroom causes him to exhibit more passive behaviors which must be interpreted by others. Clarification was sought by elaborating on the specific types of behavior included under PERFORM and by extending the WRITE category to include erasures of portions of material as it was being written in order to make corrections.

The other addition found to be necessary in the **Sign Dimension** was WATCH. A significant portion of the student's time in class is spent in observation of something's behavior or someone's behavior. With increased usage being made of the multi-media approach it may be assumed that more, rather than less, time will be spent in passive observation unless other changes are made in techniques of presentation.

The categories included in this instrument proved completely adequate in terms of the behaviors observed. Most behaviors were in the categories SPEAK, GESTURE and WATCH. If a class demonstrated more performing behaviors, greater refinement might be necessary in the **Sign Dimension**. However,
very few opportunities were given for students to perform.

By far the most instances of behaviors found difficult or impossible to categorize fell within the Function Dimension. This was expected for two reasons: (1) this dimension required a greater interpretation on the part of the observer and coder and (2) the addition of sub-categories to each major category increased the complexity of decision making. The major categories appeared to have been well defined, for no examples of extra-categorical behavior were recorded. Some confusions arose between the two categories, ANSWER and VOLUNTEER. However, the majority of the difficulties in coding arose over deciding which sub-category best described the exhibited behavior.

One of the first student behaviors noted in the observations which had been omitted from the original formulation of sub-categories was the taking of notes during a teacher presentation. Sometimes this behavior was exhibited without specific instruction from the teacher. However, more frequently, the teacher called attention to the advisability of taking notes for specific purposes. It appeared that note taking was at least indirectly the result of directions given by others; therefore, it was included under the major rubric, FOLLOW DIRECTION, as the sub-category, Record.

The sub-category, Clerk, was observed in only one of the classes. It was purely by chance that this kind of be-
behavior appeared in one of the observations. Because of the limitations in the type of classes observed, it is possible that other infrequent behaviors may occur in different classroom situations which will necessitate the development of new or expanded categories. However, the results of the observations made in this study indicate that the classes observed provided a better picture of traditional classroom behavior than anticipated since the materials and procedures being used were supposed to adhere to the "discovery approach" to learning.

The isolated instances of behaviors difficult to categorize in the Function Dimension totaled 46 instances in which all four observers agreed. Since there were ten classes with 17 to 30 students in each class, and five of the observations contained two or fewer instances of incomprehensible behavior, it is obvious that the great majority of observed student behaviors were classifiable and presented no problems. An analysis of the specific problem areas showed that 35 of the 46 instances were due to noise on the tape which blurred the verbal behavior or multiple behaviors which could not be recorded in sufficient detail to permit analysis of functions. The remaining eleven instances of non-codable behaviors resulted either from insufficient response caused by teacher interruption of the student, incomplete recording of prior or subsequent teacher behavior which made it impossible to
determine the function of the student behavior in the context, or partial statements by students who appeared to be stalling for time. The latter type behavior was exhibited more than once in only one class. The teacher in this class had a habit of filling silences with a continuous elaboration of his questions. Some students in turn would immediately begin to talk when they were called on to respond to a teacher solicitation and continue to talk until they had formulated their answer. Others would say, "Well, . . ." or "Ah, . . ." in an effort to stall for time. When the teacher interrupted, the coders tended to mark the student behavior as incomprehensible because of insufficient information to warrant a Monitor-Self response. If the student succeeded in warding off the teacher interruption no difficulty was apparent in coder ability to classify the encounter.

The system of classification was deemed to be adequate on the basis of the lack of behaviors from the fifty observations which could not be classified, and on the basis of the sufficiency of the categories to account for those behaviors included in the paradigm.

A final adequacy check on the Function Dimension of the instrument was provided by an analysis of the types of substitutions made between categories and sub-categories within each category. The results of this analysis are presented in Table 11 in Appendix D. The analysis revealed areas of weaknesses requiring further refinement in the
system of classification. Some weaknesses were indicated in delineating the boundaries of the ANSWER and the VOLUNTEER categories; but the greatest weaknesses were evident in establishing some of the sub-categories within the major categories of this dimension.

A total of 52 instances of substitutions by one team or the other occurred between the ANSWER and VOLUNTEER categories. Thirty-three substitutions were made by Team II of ANSWER for VOLUNTEER. Team I made nineteen substitutions of the same type. As was the case in all substitutions, Team I, the more experienced team of coders, exhibited a much wider distribution of substitutions than did Team II. This would seem to indicate that finer distinctions were more apt to be made by coders more familiar with the instrument and procedures involved in this type study. This interpretation was borne out further by the higher number of substitutions found in the first efforts at coding and the marked decline in substitutions made in later categorizations. This problem was the result of difficulty in the establishment of the priority of the category over the sub-category. Because of the design of the instrument observers exhibited a tendency to look at small segments of behavior rather than a total encounter.

Two specific problems arose in this regard. First, the observers failed to maintain the major category distinction. When confusion developed between coding teams regarding categories it was usually related to a delayed response. If
student behavior was clearly unrelated to the flow of the class activity disagreement in coding was rare. But when several student behaviors intervened between the original solicitation and a delayed ANSWER, disagreements in coding resulted over whether or not the original teacher behavior had provided the stimulation.

A second problem was noted in the substitution of GARbled for ANSWER or VOLUNTEER during the early stages of the coding. It was discovered that these substitutions developed from a tendency to infer a behavior in terms of the situation or descriptive phrase provided by the data collectors rather than establishing the classification on the basis of the specific behavior in the particular situation. When the necessity of adhering to the particular categories and to meanings developed for the categories was clarified, substitutions between these categories diminished significantly.

Further instances of differences of judgment in coding specific behaviors as ANSWER and VOLUNTEER appeared to be related to the degree of orderliness or structure imposed on a situation by the teacher. When a pattern of orderliness or predicability was evident on the part of the teacher, the coding remained consistent from observation to observation by each coder, by each team, and for both teams. When a pattern was less obvious or difficult to discern, the temptation was to scatter the categorizations and/or read different interpretations into the situation with each viewing.
The behaviors of students were found to be of an exploratory nature when they were uncertain of the material with which they were dealing. In one class session occurring late in the observation schedule the teacher exhibited marked uncertainty about the meaning and direction of the lesson. The teacher behavior was marked by errors of fact and obvious insecurity. In this situation, the students demonstrated much more initiative than in any of the other classes observed. At the same time, there were more instances of coder confusion of the ANSWER and VOLUNTEER categories because the students themselves seemed confused and the functions of their behaviors were unclear. When the teacher's solicitation was vague or ambiguous the resultant student behavior often appeared to have no relationship to the solicitation. This led one team to code the behavior as VOLUNTEER because they thought the response was in disregard of the solicitation of the teacher. This type of ambiguity was usually cleared up after the observers had an opportunity to describe the original situation in greater detail than was possible with typescripts and tape recordings. However, since this was a developmental study and the team classifications were being used to determine coder reliability, no consultation was permitted in the coding process from which the above data were collected. The inability of the coders to interpret ambiguous behaviors in no way affected the adequacy of the system of classification to subsume all behaviors.
A second type problem observable only in isolated instances was more difficult to overcome and persisted to the last day of coding. In these instances a particular behavior did not seem to have a clear function. The purpose of the student was not clear. A check of the few encounters of this type indicated that while not all coders made special note of the same instances, when one coder was uncertain about the behavior and made a note of it, the other coders frequently differed with each other and even tended to change their coding of the behavior from observation to observation. From discussion of such encounters between coders the primary cause of confusion in coding such behaviors was hypothesized to be the inherent ambiguity of the encounter caused by uncertainty as to the student’s purpose. Not only were the observers uncertain about what they saw in terms of the Function Dimension, in the same situation the teacher evidenced inability to follow the students thought. Therefore, it is believed that such instances were examples of a strength of the instrument rather than a weakness. However, it is impossible at this stage in development of the instrument to emphasize this point with a great degree of certainty. Further investigation is necessary.

Thus far the discussion of substitutions related to the Function Dimension has been concerned with those occurring between categories of the dimension. These reflect areas of
weakness in the adequacy of the category definitions. A final area of concern was the degree of adequacy achieved for the sub-categories within each Function Dimension category.

There was a total of 83 extra-categorical substitutions. Of these, thirty were not coded by one team or the other for reasons stated above; nine were of single instances of substitution of one sub-category for another; the remaining substitutions clustered around VOLUNTEER-Inform and ANSWER-State or ANSWER-Explain in one grouping and around ANSWER-Inquire and VOLUNTEER-Request in the other. This would seem to indicate that the definitions of the sub-categories Inform, State and Explain in the first group and Inquire and Request in the second group are not adequate for the type of classification being attempted. This interpretation was supported by the analysis of substitutions within categories. Of 38 substitutions within the VOLUNTEER category, 32 of them involved the Inform sub-category. In the case of the ANSWER category, 63 of 79 substitutions involved the State sub-category.

Since 79 percent and 57 percent of all substitutions within the same category were made by the same team with a single sub-category and since over 50 percent of the substitutions across category lines were of the same type, the over-all adequacy was considered to be sufficient at the category level but in need of further refinement at the sub-category level. The percentage of substitutions within the
Inform and State sub-categories does not appear to be so great when it is realized that over 50 percent of the encounters unanimously classified by the four coders were in these sub-categories.

Adequacy of Procedures

The over-all procedures established in the proposal were followed essentially. However, minor variations were instigated as necessary in the sequence to maintain the time schedule for observations and coding. The only major deviation from the procedures as originally established was the abandonment of the restriction of observation to twelve pre-selected students in each classroom. This step was taken when trial observations demonstrated that the limitation served no special purpose and in no way enhanced the adequacy of the procedures. On the contrary, it was felt that the limitation would greatly restrict the amount of data available for consideration. A check of the effect of this decision on the amount of data showed that it increased the total amount of usable information about twofold.

The special procedures established for making observations and collecting data were minimally adequate in terms of the objectives for this study. If facilities could be made available for more observers to be present and for clear reproduction of verbal responses, many incidental confusions might have been avoided. Considering the time and financial
limitations within which the study was conducted, the method of recording, using a tape-recorder with three observers, proved adequate for the purposes of the study. If greater emphasis were to be placed on the affective aspects of student behavior, more attention would have to be placed on improving the means of collecting data on the finer non-verbal behaviors.

A minor change in structure of the coding teams, placing one observer on each team, might have provided more consistent coding results between the teams. However, the results of the coding by the two teams were not sufficiently different to jeopardize the evaluation of the instrument. Furthermore, the results demonstrated that while an extensive familiarity and practice in use of the instrument made some slight difference in ability to use the instrument, it was not necessary in terms of obtaining reliable and adequate information.

The improvement of recording and transcription equipment may appreciably improve the reproduction of typescripts from the tapes. The method for production of typescripts used in this study was extremely inefficient and taxing of the energies of those charged with responsibility for preparing them; but judged in terms of the proportion of the actual class session which was recorded in usable form, the procedures were very adequate.
CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

This study focused on the development of an instrument for the identification and categorization of the classroom behaviors of students in a learning situation. An additional objective was the analysis of the procedures for doing such a study. The present study was dependent upon the work of others in the field and formed a natural extension of the Taxonomy Project which was concerned to select, define, and order the purposeful teaching behaviors of the teacher in the classroom.

Using the classification schemes of previous studies, the initial instrument was projected as a logically consistent system for categorizing expected student responses to selected teacher behaviors. The selected teacher behaviors were primarily structuring and developing behaviors as defined by the Openshaw Classification System for categorizing teacher behaviors. The tentative system was checked and revised on the basis of suggestions made by consultants and as a result of observations of actual classroom situations.

The role of the student was perceived to be that of a participant in the classroom interaction; however, it was
anticipated that the student would be a participant whose activity would be limited by the common understanding and expectation that students should play a comparatively passive role in the classroom.

The subjects of the check for reliability and adequacy of the instrument were members of ten ninth grade classes in Northeastern and Central Ohio. Four observers visited each class a minimum of five times for the purposes of familiarizing themselves with the classes, collecting data and acquainting the students with the purposes and equipment being used in the study.

Two experienced observers kept detailed, timed records of the activities of each speaker and noted gross movements for all students as they occurred on special recording sheets prepared for that purpose. Taped recordings were made of the class sessions by the other two observers. One typescript was prepared for each class by transcribing the taped verbal behaviors and collating the taped material with the records of non-verbal behaviors made by the observers.

The resulting typescript formed the basic data for establishing the reliability and adequacy of the instrument and procedures. Two teams of two members each coded the student behavior recorded on the typescripts by using the instrument developed for that purpose. Prior to beginning the categorization process, each coder underwent a training
period lasting at least two weeks. During that time the trainees practiced coding trial typescripts, viewed kinescopes of actual classroom sessions, listened to taped recordings of classroom verbal behaviors, and discussed the results of observations of these activities with each other.

The results of the reliability check showed an exceptionally high percentage of agreement between members of the same team and between teams. Likewise, the coders demonstrated a high percentage of consistency in coding the same materials after a lapse of a period of four months.

In terms of ability to categorize all comprehensible behaviors, the instrument proved adequate. Also, the procedures were adequate for the purposes of this study. However, the hope of the author had been to move closer to the dynamic nature of the interaction which characterizes the flow of communication in the teaching-learning process. This study failed to illuminate this vital core of the instructional phenomenon.

Conclusions of Literature Review

A number of very specific conclusions have been reached as a result of previous research. Those with particular relevance to observation procedures and this study are listed below.

1. Observation procedures must be carefully selected to fit the objectives of the observation.
2. The use of observation in determining the effectiveness of teachers or the value of individuals as teachers has been shown consistently to have no discernible relationship to changes in student knowledge or behavior.

3. Observation has been and continues to be used as a practical tool for collecting data for administrative or instructional purposes; recently, its use has been extended to the verification of theory.

4. It is necessary to sample a single student's behavior extensively if predictive norms are to be developed.

Conclusions of the Study

1. On the basis of the limited types of observations conducted, students were observed to respond with a wide range of behaviors.

2. Even though the range of behaviors was great, the most frequently occurring behaviors clustered around ATTRACT ATTENTION-Wave and ANSWER-State. Practically no opportunity was provided by the teachers observed for the students to ANSWER-Summarize, ANSWER-Opine, or ANSWER-Appraise.

3. The patterns of student response reflected the patterns of teacher behavior.

4. The instrument was adequate in terms of the original proposal, that is, the student behaviors in response to structuring and developing teacher behaviors were easily and consistently classified within the categories of the instrument.
5. Student behaviors do not differ significantly in range with different teachers; however, the frequency of particular behaviors and the pattern of behaviors, that is, ordering or arrangement, exhibit significant variations from student to student. While it was anticipated that the overt participation of some students would be less than others, the extent of teacher enforced limitation in some classes was not anticipated.

6. Tables of probability of occurrence of specific student behaviors as a response to selected teacher behaviors must be based on the frequency of occurrence rather than on the range of the behaviors. The full range of various student behaviors appear to be possible as responses to most teacher behaviors.

7. A long training period for observers and coders does not appear to be necessary if instructions and procedures are clearly formulated. While experienced coders appeared to have fewer over-all disagreements, the pattern of disagreements was not consistent in all cases.

8. The procedures used for collection and preparation of data were satisfactory for the purposes of the study. Some minor changes in equipment for making recordings could improve the quality of sound reproduction, and familiarization of the typist with the content materials and subjects facilitates the transcription of the taped material.
9. A given behavior does not always serve the same function within the classroom. The meaning it communicates forms the only valid basis for determination of the purpose of the behavior. It is possible for observers to determine the purpose of the behavior on an "as-if" basis from a teacher's perspective if he familiarizes himself with the situation.

10. The classes were selected for observation in anticipation that students in them would exhibit sufficient behaviors of a responsive nature to provide an adequate sample of those specific behaviors. The vast majority of the behaviors observed were response-type behaviors.

Implications

Increasingly, attention has centered on the explication of the interaction in the classroom. Observation has been the procedure used to attack the shroud which envelopes the dynamic of the instructional phenomenon and continues to defy efforts to pierce it. An attempt was made to approach it on the level of visible or demonstrable behaviors. Nevertheless, the necessity of making inferences or judgments about the purpose or function of a given behavior was never fully resolved. The most obvious types of personal behaviors which tend to private meanings were disregarded; however, on the basis of the rationale developed for assessing the function of behavior, it was necessary to include some gross behaviors, such as raising the hand, under the assumption that this
activity had relevance to the teaching-learning situation. The only ultimate measure of the true relevance of the behavior in the situation, however, is in the "experience" of the individual.

The endeavor to capture the dynamic aspect of interaction in the teaching-learning situation was thwarted by the necessity of dealing only with the observable. Communication itself proceeds on the basis of the give and take "experiences" of the individuals involved. Since the attempt to standardize the categories and to make them reliable guides for observers leads to increased refinements in observing the observable, the question arises, "Can the dynamic of the classroom situation be captured by observation?" The suggestion presents itself that what is most desired or needed is a glimpse of, or understanding of, the inner events in the experiencing of the participants. It is through "experiencing" rather than "behaving" that communication moves or comes alive. "Behaving" has significance only as a carrier of inferences about "experiencing." The basic theory explaining the nature of communication, by its very nature a dynamic process rather than a static event, must be about the experiencing of individuals in action. From the explication of such a theory it should be possible to hypothesize a series of behaviors which will denote the attributes of the given "experiences." When such a theory is developed, behaviors may then be identified as manifestations of experience.
Even though the instrument does not provide the key for unlocking the dynamic of communicating experience, it does demonstrate the possibility of developing discriminating observation instruments. An observation system can be developed on the basis of a rationale or theory which establishes the scope and limits necessary for the system.

A comprehensive system is much more difficult and much more expensive to use than a system designed to observe and to record the presence or absence of a single behavior. The developmental expenses tend to be prohibitive for private development if the instrument is to be checked for adequacy and reliability. However, these steps are not usually necessary for the type of local observation being pursued. Furthermore, instruments may be used which have already been subjected to tests of adequacy and reliability.

Direct, live observation and coding is possible if the amount of information required is not too extensive. However, if the behavior of several students or multiple dimensions of behavior for a single student are to be classified, some form of reproducible record must be made to permit more extensive attention to the separable aspects of behavior.

Instruments should be developed or adapted for specific purposes. In many cases existing instruments may be adopted for special purposes with little or no modification. The instrument developed for this study was constructed for
broad usage. The study effectively demonstrated the usability of the instrument by persons with a background in classroom teaching after brief periods of special preparation. The equivalent of twenty hours training and practice with the instrument proved adequate for two coders completely unfamiliar with the background, rationale, or procedures. Experimenting with the methods of familiarization and presentation may appreciably lessen the time needed for training of coders and observers.

When used with the Openshaw system, the instrument developed in this study provides a basis for a comprehensive system for evaluating the success or failure in adherence of the teacher to a particular teaching approach. Such a use of the instruments is premised on the assumption that (1) an ideal pattern of behavior will be established as a criterion for evaluation or (2) a specific value will be assigned to certain categories of behavior so that a count of frequency of codings in those categories will indicate the extent of teacher adherence to his own objectives.

Likewise, when objectives are established in behavioral terms, the instrument developed in this study provides a vehicle for assessing individual achievement in the area of functional behavior. Students and teachers alike may be made aware of their success or failure in fulfilling established expectations.
Observation of classes in which there is less adherence to structure and less teacher direction, if such classes exist, should provide both an indication of the adequacy of the instrument for a broader base of behaviors and a check on the assumption that different types of teaching method or approach result in appreciably different student behavior. The one instance in this study in which there was a significant increase from the mean in frequency of student originated behaviors was in the class judged by the observers to be lacking in teacher understanding of the direction and purpose of the lesson.

Recommendations

Continued work in curriculum and communications theory should provide a basis for expanded use of the observation technique. The value of observation as a technique is tied to knowing the target or purpose of the observation. It is theory which suggests the objective for observation or the framework within which the observation takes on meaning.

The instrument for classifying student behaviors has been used in fairly restricted structured classroom situations. The primary example of unstructured presentation of materials in this study indicated that less purposeful student behavior resulted under unstructured conditions and that the coders experienced their greatest difficulty in using the categories of the instrument. However, the
unstructured nature of the lesson resulted from lack of planning and understanding on the part of the teacher rather than as a design for purposeful learning planned by the teacher. Additional observations in less structured classroom situations seem to be indicated to check the consistency of student behavior in markedly different classes.

Because of the extensive clustering of codings around two sub-categories in the ANSWER category and one sub-category of the ATTRACT ATTENTION category, additional observations and consideration should be directed toward the development of more discriminating distinctions within these sub-categories.
APPENDIX A

TEACHER'S GUIDE

Introduction

The basic approach in these materials is to demonstrate the value of structure in the teaching of economics. We believe that an emphasis on the structure of a subject will help the teacher and student in the following ways:

1. To recognize the value of a disciplined analysis.
2. To re-discover the economic concepts in an orderly unfolding.
3. To demonstrate reasoning about economics.
4. To retain the orientation.
5. To relate economic analysis to economic policy.

The purpose of the Teacher's Guide is not to serve as a textbook in economics, but to aid the teacher in recognizing the structure of economics and to indicate how such structure can be used for more effective communication of economic concepts and reasoning.

Robert Ribble (director), "A Course in Ninth Grade Economics," (Economics Curriculum Project of the Social Studies Curriculum Center, The Ohio State University, 1965), pp. 1-5. (Mimeographed.) This introduction to the materials and procedures was provided each teacher as part of the Economics Project material. Used by permission of Robert Ribble, Director of Curriculum Economics Project.
By the structure of economics is meant: (1) the division of the subject into its major categories and (2) the basic analytical themes which run through the entire subject. Economics may be divided into three groups of ideas: (1) scarcity and basic economic decisions; (2) the flow of goods and services and the flow of money; and (3) the coordination of economic activity. The basic analytical themes are: (1) marginal analysis and (2) institutions. The structure of economics may then be thought of as a grid. (the grid and subsequent explication of structure of economics has been omitted.)

Comments on Teacher's Role

Let us summarize the presentation in this Introduction by focusing upon the teacher's role.

1. The effectiveness of the approach of these materials depends upon the teacher's orientation and willingness to play the structure-and-discovery game.

2. Playing the game means continuous emphasis on the relation of ideas, that is, the structure, and stressing the unfolding or linking of concepts.

3. While ideas are sequenced, some are more difficult than others, so the learning situations will vary in length. Hence, in some units there are three learning situations, in some as many as five.
4. The model or structure of the units is one we have worked on very carefully. No doubt, others could exist, but variations should be as carefully weighed and developed as we have tried to do.

5. Some flexibility is possible in the use of materials. A teacher may want to use some of the learning situations as a lecture or perhaps introduce substitute situations, but again these alterations should be carefully worked out with regard to the structure and unfolding.

6. Discovery or re-discovery, we believe, will be stimulated by the recognition of structure and unfolding, but it is important that both the teacher and the student be involved in the discovery through a continuous questioning attitude.

7. Many teachers will want to know how the approach through structure and unfolding is related to grouping. There is an inclination to think that an abstract approach can be followed only by able students. We believe the structure and unfolding will enable less able students to see what the major ideas and relations are and the more able students will be provided a ready basis for further explorations.
8. The absentee problem, never easily handled, may appear to offer more difficulty in an approach emphasizing the continuity of concepts. However, because of the continuity, it should be easier to fit in the parts which the student may have missed.
APPENDIX B

Form A

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School
Teacher
Date

Form B
APPENDIX C

OPENSHPAW CLASSIFICATION SYSTEM

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1 Openshaw, op. cit.
APPENDIX D

TABLE 11

THE DISTRIBUTION OF SUB-CATEGORY SUBSTITUTIONS MADE BY TEAM I AND TEAM II IN THE FUNCTION CATEGORY

| Team II | A1* | A2 | A3 | A4 | A5 | A6 | A7 | B1 | B2 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | E |
|---------|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| A1*     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A2      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A3      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A4      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A5      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A6      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| A7      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| B1      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| B2      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C1      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C2      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 2 |
| C3      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C4      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C4      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C5      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 2 |
| C6      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C7      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C8      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C9      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| C10     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D1      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D2      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D3      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D4      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D5      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D6      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| D7      |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |
| E       |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 1 |

*An explanation of the coded categories and sub-categories is included in Chapter IV, pp. 141-144.
APPENDIX E

EXCERPTS OF CODED TYPESCRIPTS

Class C

T: All right. The pleasure from usefulness that we can get from goods and services is something we would call "utility." Now, "marginal." What do we mean by "marginal"? Ah, Number "16."

16: (Hand up) The amount of utility you get out of utility. \( b_z \)

T: Well, that's part . . .

11: (The last unit.) \( c_1 \)

T: The last unit. The amount of usefulness we can get or the amount of pleasure we can get out of the last unit. And of course by diminishing what do we mean?

16: Decreasing \( c_1 \)

T: Pardon.

16: Decreasing \( c_1 \)

T: All right. So, put them all together, diminishing, marginal, utility, and what do we have there? What do we have? How do we explain diminishing marginal utility?

17:

1: (Hands up) \( B_2 \)

T: Number "17."

17: With each item we had the willingness to be, ah, . . . \( c_1 \)

T: Pardon me.
17: Each item you get, your willingness to get more decreases. 

T: All--all right. There seems to be a decreasing amount of pleasure we get out of it, or usefulness we get out of it. We used the example of the ice cream cone. We had one ice cream cone and we were really--a lot of willingness involved here--we really wanted it, the next one, the second one was good, the third was average, the fourth was poor, the utility, or the amount of pleasure or usefulness we got out of it decreased with each--yes?

1: (Hand up) Well, I don't understand where we get this marginal--well, I don't understand where we go.

T: Well, we put in here, under willingness, we put the diminishing marginal utility under willingness. Why? Because we have learned from this period of diminishing marginal utility that our pleasure, the pleasure or amount of usefulness we get out of specific goods or services, or good or service, decreases.

1: Why would it decrease?

T: Well we used the example of the ice cream cone.

1: Yeah, I know but . . .

Class D

T: All right, let's go over it, one step at a time, GNP. First thing you did you multiplied one hundred times what? What's the unadjusted GNP in 1929?
T: 104.4 billion, right? So you multiplied this by this and divide it by what?

28: [56] $C_1$

T: Point four and your answer should be. You don't make very good grades in math, do you?

28: [Yes.] $C_1$

T: Oh, you do. That's what I thought you told me once before. You didn't do this?

28: [I don't get the point.] $C_1$

T: What did you do?

28: [I don't know.] $C_1$

T: "22," what did you get?

22: [I didn't get it.] $C_1$

(Said softly) (Laughs, faintly) $C_{10}$

T: See here, Mr. "X" is your math teacher, right? I'll tell him you need to practice up on these. What's the number?

28: (Laughs lightly) $C_{10}$

2: (Hand up) [181.88] $C_1$

T: 181.8, let's leave it here. 181.8 billion dollars. That's the adjusted. What about 1933, that first row over there? What is added to it, number "25"? One hundred times what?

13: (Hand up) $B_2$

25: [56] $C_1$

T: 56 divided by.

25: (Gives number but exact number is unclear) $C_1$. 
T: You came up with?

25: (Answer unclear) E

T: Now some of you probably are wondering in a four-year period this actually went down. Why? Number "24."

24: (Hand up), Depression, B₂ C₁

T: All right, the depression accounts for this four-year period. Very important. What about the second row for 1941. Number "20," what'd you get for that one?

20: 237.8 C₁

24: (Hand up) B₂

T: That's pretty close, I think. Something like 238.11 billion. How about '45. Let's see here, Number "18"?

18: (Hand up), 314.1 C₁

T: Why don't we have to compute 1954? Why don't we have to do that one, Number "7"?

7: That's the base year of 100, C₁

T: That's the base year, right? This is the year that we are using as our comparison point. What about 1961? Number "12."

24: (Hand up) B₂

12: It's 446 point something, (I'm not sure) C₁

T: I think it's 448.8 billion. And what about 1964?

Number "4."

4: 618.1 C₁

T: How much?

4: 618.1 C₁
T: I don't think that's right. I think your mathematics are off.

20: \( \frac{618}{C_1} \)

20: \( \frac{64}{C_4} \)


20: Ah, just about \( 520 / 12 \) and a little over. \( C_1 \)

T: That's more like it, about 527. Now all these numbers are given as a comparison to 1954. You all had trouble doing this? Why? Number "18" didn't have any?

18: (Smile), \( D_7 \)

**Class E**

T: Savings. He's a single proprietor. All the margin and all the profits go to him and he saved the profits. Now, I don't say all of the profits, he did save much of the profits and when it came time to think of expansion at least he had money to work with. He could borrow money from the bank, couldn't he? How much would they allow him?

31: (Hand up), \( B_3 \)

27: \( $100,000 \), \( C_1 \)

T: \$100,000. So, together he had \$150,000 and to expand he needed three hundred fifty, therefore he had to pick up \$200,000 which way?

18: Selling stock, \( C_1 \)

T: Selling stock, and we find that he did it and he was successful. Now, when it came to further expansion
concerning his $150 camera he had to think in terms of getting money again. How was he to get money to expand and build this $150 camera? How was he to get the money for that particular camera? Do you remember? Number "12."

12: He saved.\textsuperscript{C1}

19: (Raises hand.).\textsuperscript{B2}

T: Hold it, hold it. Number "19," go ahead.

19: Sell more stock.\textsuperscript{C1}

T: Sell more stock. Is that what he had to do, Number "19"? Number "24"?

24: Every year he'd set aside a certain amount of money to make up for the deficiency that he lost with machinery because each year it depreciated and he used that money to \textit{missed} the camera.\textsuperscript{C2}

T: Uh-huh. Number "12."

12: He set aside so much of the profits, too, so he wouldn't have to borrow such a large sum of money.\textsuperscript{C2}

T: Uh-huh. Two ways, you see we're dealing with two things that businesses do in order to take care of expansion. What are two things they do to take care of an expansion if they must expand?

10: They could save some of the profits or they could borrow.\textsuperscript{C1}

T: They save profits or they do what else?

??: Sell for profits.\textsuperscript{C1}

T: Well, they do. In dealing with this particular company
he did two things. He set aside money for profit and he set aside money for what?

??: Machinery. $C_1$

18: To replace machines. $C_1$

Class J

13: Is it going to cost more? $C_1$

T: No, it'll cost less. That's the one that'll cost less is what they advertised.

13: Well then, that means it's going to cost less, last longer than the new one. What's the difference, I mean why buy a new one? $D_1$

T: Or you mean hand made.

All: (Laugh) $D_4$

13: Yeah. $C_5$

T: I thought you were talking about this one over here. Who was it said that the higher priced one always lasts longer? Now is it true in this case?

3: No. $C_1$

T: Is it true in this case? We're thinking of advertisement as being, ah, true and actual proven tests.

3: I didn't say all of them. $D_4$

T: No. O.K. Then this is just one case, we'll say, where actually higher priced ones probably will not last as long as the lower priced one. Number "7."

7: I think lots of people buy TV from the company that's noted for, I mean that has a good record. $D_1$
T: Yes, it has a good reputation.

7: Yeah. $D_1$

T: O.K.

7: Like R.C.A. for instance, I mean they really got a good reputation there. $D_1$

T: Um. O.K. Number "8"?

8: (Hand up) On the commercials they might swing over some people, but I think the majority like you said buy for looks or price or reputation but most of them don't care that much about printed or hand-made circuits. $D_1$

T: You don't think so?

8: No. I don't think so. $C_1$

15: People just don't go around asking was that television hand made or is it the other one. $D_1$

All: (Laugh) $D_5$

T: All right. Go ahead because people do this.

All: (Remarks) $E$

16: (Hand up) Do you do that? $D_2$

7: That's mostly men, I mean. $C_{10}$

T: Well, who is the one that usually has to dish the money out to buy the television set?

7: Men. $C_1$

T: All right, tell you what you do. Ask your mother or father, ah, not necessarily tonight. Next time you're in conversation with them. Ask them how much they shop. What I mean by shop, you know.
T: Check out a product, buy a television set, is it a
printed circuit, what is the guarantee on it, how many
days free service they'll get with it. Check with them
and see if this, if they, if they use these techniques
in buying. I think you'll be surprised. Number "16"?

5: (Hand up) \( \mathcal{D}_6 \)

16: (Hand up) Well, when we got our television, ah, our old
one was being fixed at the fix-it shop so, and mom wanted
to watch a show and got the guy to bring one over. And
he told her about the television she'd like to buy. \( \mathcal{D}_7 \)

T: Well, alright, I'm not saying that it's definitely true
that everyone is going to go shopping. Do you understand
what I mean? I was just wondering how many of them do
this, Number "13"?

13: (Hand up) Wouldn't the salesman, wouldn't he tell you
that, I mean and then you... \( \mathcal{C}_4 \)
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