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EFFECTIVE COMMUNICATION TO TEACHERS OF INFORMATION RELATED TO STUDENTS

by
Paul Thomas Threlkeld

A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Doctoral Committee:

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ABSTRACT

EFFECTIVE COMMUNICATION TO TEACHERS OF
INFORMATION RELATED TO STUDENTS

by
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This research attempted to deal with the problem of communicating information about students to teachers. The focus of the study was on the method by which information was presented to teachers. The school district involved had collected information on its students in order to help the teachers in knowing more about the individual needs of each student. The problem came into view when many of the kindergarten school faculty expressed concern that the information collected on students in the school program was not effectively communicated to the teachers.

The subjects in this experiment consisted of forty-two teachers. They represented all of the first, second, and third grade teachers in the school district. The factorial design used to analyze the results of a questionnaire administered to the teachers was a fixed-effects three way analysis of variance with independent replications.

The experiment consisted of seven unique conditions. Five groups of teachers received enrichment while the remaining two control groups did not receive enrichment. One control group was exactly the same condition as was normally found in the school district. In this condition all student data were placed in a folder and kept in the school office. A second control group was identical to the first control group except that the folders were delivered to the teachers in the second group. A third condition consisted of writing an explanation

of the data and presenting it on an index card for each student. This condition focused on making the information more meaningful for the teachers. A fourth condition consisted of a matrix type sheet which summarized all of the data available on the students in each class. This condition focused on helping teachers to make comparisons between students and within different types of information on the same student. Conditions five, six, and seven were identical to conditions two, three, and four except that in conditions five, six and seven the experimenter personally disucssed the student information with each teacher on an individual basis.

It was hypothesized that information on students which was presented to teachers on cards would be better recalled than information presented in the folders. A second hypothesis was that information on students which was presented to teachers on a matrix type summary page would be better recalled than information presented in the folders. A final hypothesis was that teachers who were prepared to receive and understand the information on students by having its meaning and possible uses discussed with the experimenter would recall more of the information presented to them, regardless of the form of presentation, than teachers who were not prepared to receive the information.

The three experimental hypotheses were supported by the results. In addition, the results also showed that there was no difference between particular types of enrichment only that the various enrichments were additive in that each bit of enrichment increased the teachers' familiarity with the information. The least effective means of communicating the information was the folder presentation. The card presentation, the matirx presentation, or enriching the folder condition by adding a verbal explanantion each proved to be an effective means of

communication. The most effective presentation was a combination of either the card or matrix along with a verbal explanation of the information.

It was concluded that such enrichments as described above were necessary in order that information collected on students could be made more meaningful for the teachers. In other words, some type of enrichment was necessary, various types were acceptable, and the more enrichment experiences available to the teachers, the more effectively was the information communicated to them.

PREFACE

It would be impossible to acknowledge the efforts of all the people who have helped me in the writing of this dissertation. I would like to thank the members of my committee: Donald Brown, Howard McClusky, Mark Chesler, and David Drantz for their advice and help. Special appreciation goes to my wife, Roberta, for her help and encouragement. Invaluable help and support has also come from my parents and brother. I also appreciate being able to use the facilities at Michigan Migrant Primary Interdisciplinary Project. I thank Linda Peterson and Richard Benjamin for their critiques and suggestions, and Diane Kaslow for typing the thesis. The interest and encouragement from the school district in which the dissertation was carried out are much appreciated and their wish to remain anonymous at this time will be respected.

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CHAPTER ONE

INTRODUCTION

The basic problem with which this research deals is that of communicating information to teachers. The focus of the study is on the method by which information about students is presented to teachers.

BACKGROUND FOR THE STUDY

The impetus for studying the present problem came from comments by teachers who were disenchanted with the way in which information relating to their students was being communicated or really not communicated to them. These teachers were part of a school district which has undergone some basic changes from traditional school systems as a result of an Elementary and Secondary Education Act Title III Project. For instance, in this particular school district, all of the kindergarten children are bussed from throughout the entire school system to one building. This building houses only the kindergarten pupils. After completing kindergarten, the pupils enter what is called the primary block of classes which consists of what is usually referred to as the first, second, and third grades. In the kindergarten and primary block, children are not graded and do not fail. They receive periodic progress reports and are appropriately placed in classes according to their level of development. Each classroom has a teacher and a teacher aid. The primary block classes are housed in six elementary schools in the district and each child attends the school nearest his home. Only the kindergarten pupils are bussed to school. After successfully completing the primary block,

the children enter the regular school program at the fourth grade level where they begin to receive grades and report cards and consequently pass or fail according to their grades.

A primary goal of a school program like this is to fulfill the individual needs of its students by focusing on special pupil groupings based on individual levels of student development rather than grade placement. In a situation such as this, the teachers must have information available about their pupils which can aide them in designing such programs to fit these individual needs. Therefore, the kindergarten and primary block programs, even more than most school systems, have actively engaged in collecting information which is considered helpful to the teachers in knowing more about the individual needs of each child. The data collected includes information concerning: intelligence, achievement readiness in reading, spelling, and arithmetic, reading ability, placement with regard to national percentiles for intelligence and reading, visual-motor coordination, attendance, the child's dominant hand, who the child lives with, the child's social development, any health problems a child might have, and any other special problems which might be facing the child.

THE PROBLEM

The problem came into view when many of the kindergarten school faculty expressed concern that the information collected on students in the school program was not effectively communicated to the teachers. The information on students was obtained through the combined efforts of all school personnel and was considered to be potentially helpful for the teachers in dealing with the special needs of the students if communicated to the teachers in a meaningful way. The vehicle of communication in the school district has been a separate folder on each child in which all available information on the child is placed. The folders are then kept in the school office. Many teachers, however, indicated that the folders were not effective in communicating the needed information to them. One thing the teachers seemed to need was a way to quickly have needed information. Another thing the teachers wanted was more help in knowing how to interpret and understand the information in a meaningful way. It seemed from the comments by school faculty, that if an effective communication of the information were to take place, the form of presentation must somehow reflect these considerations.

The problem was not only one for the teachers but one also for the school psychologist, speech specialist, and other personnel directly associated with collecting and orgainizing information about the children for teachers' use. These people were also disturbed that the information was not being effectively communicated to the teachers. In addition, the school administrative staff felt that if much time and money were to be spent on collecting and organizing the information, the teachers should receive a much higher gain from the efforts than

had been the case. The present study then takes up the problem of effectively transmitting information about students to teachers.

THEORETICAL ISSUES

The present study is cognitively oriented, the focus being on bringing the available information on students to the awareness of the teachers. It must be pointed out that a distinction is made between the teachers' being aware of information and how the teachers use the information once they become aware of it. It is assumed that the teacher must become aware of the information before he can act upon it. Although the latter focus is an important problem, it is a separate issue which is not within the scope of this paper.

The variables involved in transmitting student information to teachers include: the information to be transmitted, the receptivity on the part of the teachers for the information, and the method or vehicle for communicating the information. The first variable, the nature of the information to be transmitted, needs to be considered in terms of the specific problem faced in this study. For purposes of this study it must be assumed that the exact content of the information presented to the teachers is not an issue. One might say that any information about the students potentially provides the teacher with more tools with which to deal with the problems facing students and should be communicated to the teachers. No attempt is made to evaluate the testing program in the school district or to attempt to influence the teachers toward any particular biases for or against any of the information collected by the school on students. For example, it is not meaningful here to argue the merit or lack of merit

of intelligence test results or achievement scores. This study accepts the data about students as it has been chosen by the teachers and school district, for whatever reasons they feel it to be useful, and attempts merely to aide in the transmission of the existing information to teachers.

The importance of the information then is bound up in the interest the teachers have in it, and the usefulness they attribute to it. Thus, the first variable discussed concerning the nature of the information to be transmitted is really a consideration of a second variable, receptivity on the part of the teachers for the information. Since the teachers did not previously seek out the information to any great extent, it might be assumed that they did not view it as particularly helpful to them. However, the teachers seemed to feel that it was important to have the information available. In fact, the teachers provided the impetus for this study by their concern. The reason that the information was not sought out by the teachers is not a reflection on the importance the teachers attribute to it or on their interest in it but rather in the way in which it is made available to them.

The third variable to be considered then is the method of communicating the information to teachers. As implied earlier, the problem for the teachers arose when, even though they were interested in the information and thought it to be potentially useful, they felt it was not presented to them in a form which they had time to acquire or sort out or interpret. For example, some teachers indicated that the folders were too thick and cluttered to read through to find what they were interested in. This is understandable given the fact that a teacher might have thirty-five students in his class and each student might have a folder two or more inches thick. The teacher would have more

information than he could make use of. Also, much irrelevant information somehow seemed to accumulate in the folders, making the desired information even more difficult to find. For example, this author found original spelling papers and other school related work included in some of the folders. Many teachers felt that they had the background to understand the information but could not afford the time it would take to filter through the thick folders. Other teachers, on the other hand, felt that they did not have the background to understand and interpret much of the information in a meaningful way; especially percentile ranks, intelligence scores and achievement scales.

The method of communication was selected as the variable to be studied. Several methods of presenting the information to the teachers are compared in an effort to find ways which prove to be effective in transmitting the information.

The previous school psychologist recognized the need for communicating the information to the teachers and made an attempt to meet it. His effort was not generally considered successful by the kindergarten teachers involved. The method he employed was to present a legal-sized sheet of paper which was subdivided into squares of one-fourth inch with the names of pupils listed along one axis, the types of information listed along the other axis, and the scores registered in the boxes. The failure of his presentation paralleled the failure of the folders. First of all, it might have been too cluttered and difficult to read while at the same time it might not have been explicit enough for rapid comprehension and clear understanding. Also, it may not have given the teachers suggestions on what use to make of the information and possible applications were not immediately evident. In addition, it was placed in the same folder which was the original source of the problem.

This study then is an attempt to deal with the problem of communicating information to teachers by comparing alternative methods of presentation. Any effective communication must somehow employ a clear, concise presentation which can easily be referred to. Also, some explanation must be employed which will provide the teachers with enough background to effectively understand how to employ the information to help the students.

CHAPTER TWO

THEORETICAL BACKGROUND

The question in this study became how to alter the methods of presentation to achieve the effective communication of student information to teachers. The work of Bruner (1957) on selective preception and the work of Haber (1966) on the effect of set on perception provide relevant theoretical sources for the hypotheses in this study.

Bruner concerns himself in part with a view of perception which deals with the construction of a set of organized categories through which stimulus inputs may be sorted, identified, and elaborated in their meaning. Essential to this concept of perception is the inference of an identity of categories from cues or signs. Bruner refers to identity as the "range of inferences about properties, uses, and consequences that can be predicted from the presence of certain cues."[1]

Looking at this notion in terms of the problem at hand, we must ask whether or not the cues provided by presentation of information through the folders permit acceptable organization of categories through which, as in Bruner's conception, the stimulus inputs can be sorted, identified, and elaborated in their connotative meaning. This is not a sensory problem of making the stimulus sufficiently above the threshold to activate some receptor. It is a matter of cognition. The material perceived must be compatible with the teachers' existing cognitive organization so that it can be processed in a meaningful way. It appears that the information presented to the teachers is at least somewhat compatible with the teachers'

existing cognitive categories in that the teachers see the value in the information. There is not adequate congruency, however, because many teachers need help in understanding the implications of the information.

Along this same line of thought, Bruner postulates that perceptual readiness refers to the relative accessibility of categories to incoming stimuli. Thus, with respect to presentation of student information, it is possible that the vast majority of elementary and secondary public school teachers have little if any knowledge about research, psychometrics, and interpretation of the information. And in turn, with respect to Bruner's conceptualization, the teachers' perceptual categories would not be ready. That is, the teachers' perceptual categories would not be accessible to such information and the teachers could not find meaning and relevance to such inputs if the information were presented without sufficient explanation, as is the case with the existing folders.

Furthermore, if a category becomes more accessible to a certain input it requires less of the stimuli in order to categorize the input appropriately. For a category to become more accessible it must become more likely that learned events will occur. In perceiving the environment, certain events will occur at a greater frequency than others. This is a form of probability learning which reduces the element of the organism becoming unduly surprised by events.

If a teacher feels that it is unlikely that he will be able to understand the information he receives, either because it is not clearly presented or because he has not been given enough background to interpret the information, then he will be less likely to put forth the kind of effort required to filter through the folders.

Other factors, which Bruner labels extro-stimulus factors determine how close a stimulus input and the perceptual categorization of it are to each other. In terms of antecedent and consequent conditions, the organism is stimulated with some appropriate input and responds by referring the input to some class of things or events. We can tell what category or classification to which he has referred the stimulus by his resultant behavior. In the case in point, our input to the teachers does not stimulate the teachers in a way in which they can refer it to a meaningful class of events. The stimulus in question may not have the same categorization in the mind of the school psychologist as it does in the mind of the teacher. In addition, one teacher may feel that looking through the folders is understandable and worth the effort while another teacher may find the folders incomprehensible and not worthwhile.

The sorting of sensory inputs to appropriate categories involves the utilization of cues from the environment. A notion critical to this concept is that the threshold of recognition for stimuli presented is not only a function of the time, intensity, or how the stimulus input corresponds to an appropriate existing category for the perceiver, but is also determined to a great extent by the number of alternatives for which the perciever is set. In other words, the size of the expected array increases the identification threshold for any item in the array.

This would explain why the folders are not effective. As stimulus arrays, they are too large, in terms of too much information, so that the identification thresholds are increased for each person on the array. Perhaps we have the opposite of stimulus deprivation, a flooding of stimulus receptors or simply too much information to be remembered.

Cognitive, as well as perceptual, processes are also relevant to the problem in that the organism monitors the stimulus input. There is a screening effect at higher centers on sensory information. Here we have selective perception. Bruner describes the situation where the perceiver selects a set of categories which are inappropriate for adequate prediction of his environment.

Thus, a teacher having a particular attitude with respect to school psychologists, researchers in general, or even toward the type of information provided by these people will screen the information in terms of appropriate categories. In other words, inadequate perceptual readiness comes about through a failure to learn appropriate categories for sorting the environment and through interference of categories which are less accessible to the person by more accessible categories which are acceptable to the person.

According to Haber (1966), "when a perceiver is given instructions to attend to only one of several attributes of a stimulus he is able to report his perception of that attribute more accurately than he would be able to otherwise."[2] One probable cause of the communication problem is that the teachers are given no preparation for receiving the results. Even when they are only given one type of data, such as intelligence scores, they are not prepared for receiving or interpreting it.

Haber attempts to explain the effects of set on perception according to two hypotheses. Both of these hypotheses he contends are correct, or, at least, neither is able to be disproved. One covers enhancing the percept of the stimulus while the subject is viewing it, the other deals with enhancing the memory or facilitation of reporting the stimulus without affecting the percept. The important point for our purposes is that no matter which hypothesis you subscribe to, the result is the same

in that set increases perceptual clarity.

Research on perception therefore seems to be somewhat helpful in providing insights for dealing with the complex problem as stated earlier. One interpretation of the cited problem is possibly related to the organization of categories by the teachers whereby stimulus inputs are sorted, identified, and elaborated. Following this interpretation, the teachers would sort and identify the information of students but they might organize it in categories which would not permit its effective utilization.

A present factor in the teachers' not receiving the material is the overwhelming size of the folders. Bruner points out that it is more difficult to sort larger arrays than it is to sort small arrays. Bruner also discusses the screening effect whereby less accessible categories are interferred with by acceptable categories. It has been noted that it is usual for a person to make a judgement about another person based on a few cues while screening out other cues. In the same way, it may be usual for a teacher to judge information feedback on selective cues, retaining that which corresponds to the teacher's own experience and rejecting that which is contradictory.

And finally we looked at the notion of ability to receive feedback information as a function of a preparatory set to receive it. This might include giving the information some meaning for the teachers or focusing attention on certain aspects of the information as was shown by Haber to be effective in increasing performance.

The findings of Bruner and Haber roughly parallel comments made by teachers. Specifically, whether the information is said to need organization into perceptual categories which enable sorting, identifying and adding meaning to inputs as Bruner and Haber espouse or simply as the teachers suggested the information should be presented so that the

teachers can understand it, the concept is identical.

Similarly, the comments by teachers reflected Bruner's postulation about quantity of information and reception. The larger the quantity of information, the more difficult to sort out the important parts. Teachers expressed that the amount of material in the folders was too great to effectively sort out the appropriate information.

Finally, both theoretical discussion by Bruner and ideas expressed by teachers focus on the notion of preparatory set to receive information. This concept focuses on giving the teachers the kind of background which would prepare them for receiving the information.

The hypotheses in this study reflect these concepts. First of all, it is hypothesized that presenting the information in a manner which gives it increased meaning for the teachers will prove to be more effective than the means of communication now employed.

Furthermore, it is hypothesized that presenting the information in a manner which promotes simplicity and a clear, concise, overall view will be a more effective means of communication than the means for transmitting now employed.

Finally, it is hypothesized that preparing the teachers for understanding the information by personally explaining its content and possible uses will prove to be more effective in enhancing the communication of the information than any of the other methods which do not employ this approach.

In operational terms, the first hypothesis becomes: information on students which is presented to teachers on five inch by eight inch index cards with one card for each pupil, on which the information from each folder is written out and some explanation to aid the teacher's understanding of the information is included, will be recalled by the

teachers to a greater extent than information presented in the folders.

Operationally, the second hypothesis becomes: information on students which is presented to teachers on one large page eleven inches by seventeen inches, on which the information from all of the folders is classified into demarcated categories for each pupil, will be recalled by teachers to a greater extent than information presented in the folders.

The final hypothesis may be operationally stated as: teachers who are prepared to receive and understand the information on students by having its meaning and possible uses discussed with the experimenter will recall more of the information presented to them, regardless of the form of presentation of the information, than teachers who are not prepared to receive the information.

The measure for comparison between conditions will be scores received on a comprehensive examination of information about pupils possessed by the teachers covering and paralleling the information presented in the experimental conditions cited above.

CHAPTER THREE

EXPERIMENTAL METHOD

The experiment was designed and conducted to assess the retention by teachers of information dealing with their students. The independent variables in the study focus on the method of presenting the information to the teachers.

SUBJECTS

The subjects in this experiment consisted of forty-two teachers from a large school district near Detroit, Michigan. Fifteen of these subjects taught first grade, fourteen taught second grade, and thirteen taught third grade. The sample included all of the primary block (first, second and third grade) teachers in the six elementary schools in this particular school district. The information about the students of the teachers involved in this study had been collected to help the teachers to focus on the individual needs of their students. Information was available for the one thousand two hundred and sixteen primary block students, four hundred and six from primary one, four hundred and thirty-five from primary two, and three hundred and seventy-five from primary three.

MATERIALS

The information used was of a general nature. It had accumulated in each student's school record from his entry into school until the

present time. Some of the information had been collected by the students' previous teachers, some by the school psychologist, and some by various other school personnel, as for example the school speech consultant.

Information for the first grade students included: visual motor coordination scores showing eye to hand coordination or the ability to see a design or symbol and to duplicate it in a drawing; attendance records showing number of half-days absent; intelligence scores as measured by the Peabody Picture Vocabulary Test and described by the intelligence quotient; achievement readiness scores for reading, for spelling, and for arithmetic as measured by the Wide Range Achievement Test; who the child lives with; handedness; and the child's social development as indicated by the child's previous teachers in a behavior rating scale.

Information for the second and third grade students included: special health problems; who the child lives with; attendance information showing number of days absent; intelligence information including intelligence quotients, mental age, chronological age and national percentile rank for intelligence; scores on national reading tests indluding raw scores and national percentile rank for reading; and social development as indicated on a behavior rating scale by the child's previous teacher.

The material used in presenting the information to teachers consisted of five-inch by eight-inch index cards; matrix-like summary sheets; the students' cumulative record folder; and a verbal explanation of the information. These materials were divided into two main parts or independent variables: visual enrichment (which included the five-inch by eight-inch index cards, the matrix-like summary sheets and the

control condition or cumulative record folder); and verbal enrichment (which included the verbal explanation of the information and control condition which included presentation with no explanantion). See figure A for examples of each presentation (see next page).

The testing instrument consisted of a multiple choice questionnaire. The items on the questionnaire were taken directly from the information presented to the teachers. Also included in the questionnaire were items on level of confidence the teacher had in his answers, how well the teacher felt that he knew the child, and how helpful the teacher felt the information presented in the experiment was in helping him know about the students. See figure B for examples of the first, second, and third grade questionnaires.

Figure A

MATERIALS FOR PRESENTING INFORMATION TO TEACHERS

PART ONE: Visual Enrichment Presentations

An example of cards presented to first grade teachers with the appropriate information to be included in the blank spaces.

NAME OF SCHOOL_____ GRADE NUMBER 1 TEACHER NAME_____

_____ was absent ___ times in kindergarten last year. the child lives with _____, and ____ handedness is _____. When tested last year the results showed an I.Q. to be ____, indicating a _____ learner with a mental age of _____ _____ and a chronological age of _____. The child's Visual Motor Coordination is _____ for his chronological age. His achievement readiness level indicates _____ _____ in reading, _____ in spelling, and _____ in arithmetic. His social development is _____. Other information_____ _____

An example of cards presented to second and third grade teachers. The cards for third grade teachers are identical to the second grade cards except that the third grade cards contain an additional category for attendance.

NAME OF SCHOOL_____ GRADE NUMBER 2 TEACHER NAME_____

_____ was absent ___ times in kindergarten,

and ___ times in the first grade. The child lives with _____ _____ and his physical defects are _____. When tested last year the results showed an I.Q. of ___ indicating a _____ learner with a mental age of _____ and a chronological age of _____ which yields a national percentile rank of ___ indicating that he did as well or better than ___ per cent of all those who took the test in the U.S. His reading score is ___ yielding a percentile rank of ___ indicating he did as well or better than ___ per cent of the children of the same age in the U.S. who took the test. His social development is _____

Other information_____

_____

An example of the matrix type of summary sheets for presenting information to first grade teachers with the appropriate information to be included.

NAME OF SCHOOL GRADE LEVEL NAME OF TEACHER	Kindergarten Attendance	Who the Child Lives with	Handedness	Intelligence Quotient	Chronological Age	Mental Age	Visual-Motor Coordination	Achievement In Arithmetic	Achievement In Spelling	Achievement In Reading	Social Development	Other	
List of Students in the Class													

An example of the matrix type summary sheets presenting information to second and third grade teachers. The third grade sheets contain an additional column for attendance but are otherwise identical to the second grade sheets.

NAME OF SCHOOL LEVEL NUMBER NAME OF TEACHER	Kindertarten Attendance (#of Days Absent)	First Grade Attendance (#of Days Absent)	Who the Child Lives With	Health Problems	Intelligence Quotient	Mental Age	Chronological Age (At the Time of Testing)	Percentile Rank--I.Q.	Reading Score	Percentile Rank -Reading Score	Social Development	Other
List of Students in the Class												

PART TWO: Verbal Enrichment Presentations

An example of verbal enrichment presentations for first grade teachers.

VERBAL ENRICHMENT----LEVEL ONE

Mrs._____ I am _____.

I am working for the (name of school district) and the Primary Block Schools to try to find ways of helping teachers to know more about their children. The school district is interested in trying to communicate information to teachers which has been considered helpful for them in dealing with their children. For example, much time and money has been and is being spent on testing children because it is felt that the results can provide important help to teachers in dealing with the problems facing their children. But in the past, however, the results of this effort have not been presented in ways which would facilitate the teachers' using it.

One type of information to which I am referring is attendance data. This type of information may indicate many things besides illness. For instance: it may indicate family trouble, or mother not getting up in the morning to help get the child ready for school, it could indicate a child's negative attitude toward education and/or life in general, or it could indicate fear of peers, teachers or school in general. One result of poor attendance is being behind in work.

Who the child lives with can also be important information for the teacher. For instance, a fatherless male might rebel against a female teacher or identify with female characteristics. He may be socially behind the other children in social development and is certainly at a disadvantage by not having a father-son relationship.

Handedness is very important to a first grade teacher. A left handed child needs special treatment by his teacher to help him accept his difference from the other pupils. If a teacher is demonstrating letter printing or writing, the left handed child may try to duplicate the teacher's movements whereas it may take a different set of movements to write lefthanded, e.g., holding the pencil and paper. Thus, a teacher might assume that the child is not very alert or retarded when he is merely left handed. Studies have shown that a relationship exists between handedness and school achievement. Also, students who have established side dominance--left or right--tend to be better students than undecided ones. A child's learning patterns may be disrupted by trying to change or overlook his handedness.

I.Q. shows a child's capability to learn. It does not show how much he has achieved but his untapped capacity to achieve. It turns out that the average I.Q. is around 100 with 50% of the population falling between 90 and 110 points and 2/3 of the population falling

between 85 and 115 I.Q. points. Most children will be encompassed within these scores. I.Q. is an important index number because if a child has a high I.Q. but is not doing well in school, it could mean he is not challenged by the work or he is having emotional difficulties or problems at home or health or physical defects, e.g., visual deficiencies, etc.

The components of I.Q. are Mental Age and Chronological Age. These are important to know because even if a child has a low I.Q., he may have a low Chronological Age showing bad placement. Chronological Age may show why a very young or very old child for his grade is having difficulties. Any two children in a grade may not be on the same level --they may differ with respect to Mental Age or Chronological Age, e.g., a seven year old first grader is different from a five year old one.

Visual Motor Coordination like handedness is important for a teacher faced with a slow child. The problem may not be intelligence but the lack of ability to see a design or symbol or to be able to duplicate it in a drawing. Visual Motor Coordination is essentially a child's eye to hand coordination and is basic to all school related tasks.

Achievement Tests can be a useful tool of the teacher. Failure in school and in life adjustments may be caused by many other factors besides lack of intelligence. A child of average or even superior intelligence may have great difficulties in learning reading or figuring while on the other hand a child with low intelligence can do very well in these areas. Some children show uniform development in subject areas while others show wide discrepancies. Achievement test results provide answers to questions about a child's development. The Wide Range Achievement Test provides information on diagnosing reading, spelling, and arithmetic disabilities in persons of all ages. The reading section deals with recognizing and naming letters and pro-

nouncing words. The spelling section deals with copying marks resembling letters, writing the name, and writing single words to dictation. The arithmetic section focuses on counting, reading number symbols, solving oral problems, and performing written computations.

A seemingly non-academic function of the school is helping a child with his social development. But knowing how the child is developing socially is necessary for a teacher to know for academic reasons too. It is difficult to know the exact relationship between social development and academic achievement but the fact that there is a relationship is evident. For instance, a child's doing poorly academically could be a result of his spending all of his time and energy dealing with his insecurities in interpersonal relationships.

I am trying to find ways which might be helpful in communicating the information to teachers. Would you please look this over and perhaps I can discuss it with you later on to get your reaction to it------ ---what days might be good for you for this purpose?

Thanks for your help. We hope that this will prove useful in helping teachers with their children.

An example of verbal enrichment presentations for second and third grade teachers.

VERBAL ENRICHMENT CONDITION----LEVELS TWO AND THREE

Mrs._____ I am _____. I am working for the (name of school district) and the Primary Block Schools to try to find ways of helping teachers to know more about their children. The school district is interested in trying to communicate information to teachers which has been considered helpful for them in dealing with their children. For example, much time and money has

been and is being spent on testing children because it is felt that the results can provide important help to teachers in dealing with the problems facing their children. But in the past, however, thr results of this effort have not been presented in ways which would facilitate the teachers' using it.

One type of information to which I am referring is attendance data. This type of information may indicate many things besides illness. For instance: it may indicate family trouble, or mother not getting up in the morning to help get the child ready for school, it could indicate a child's negative attitude toware education and/or life in general, or it could indicate fear of peers, teachers or school in general. One result of poor attendance is being behind in work.

Who the child lives with can also be important information for the teacher. For instance, a fatherless male might rebel against a female teacher or identify with female characteristics. He may be socially behind the other children in social development and is certainly at a disadvantage by not having a father-son relationship.

Health information is closely related to school attendance. That is, if a child has severe physical defects he is likely to be sick more often or unable to attend school. Health is also related to the child's academic success. For example if a child has trouble seeing the blackboard or hearing the teacher or speaking, he will likely do poorly even though he has a high I.Q.

I.Q. shows a child's capability to learn. It does not show how much he has achieved but his untapped capacity to achieve. It turns out that the average I.Q. is around 100 with 50% of the population falling between 90 and 110 points and 2/3 of the population falling between 85 and 115 I.Q. points. Most children will be encompassed

within these scores. I.Q. is an important index number because if a child has a high I.Q. but is not doing well in school, it could mean he is not challenged by the work or he is having emotional difficulties or problems at home or health or physical defects, e.g., eyes.

The components of I.Q. are Mental Age and Chronological Age. These are important to know because even if a child has a low I.Q., he may have a low Chronological Age showing bad placement. Chronological Age may show why a very young or very old child for his grade is having difficulties. Any two children in a grade may not be on the same level--they may differ with respect to Mental Age or Chronological Age, e.g., a seven year old first grader is different from a five year old one.

Percentile Rank for I.Q. reveals much to a teacher about the children in his class as a whole as well as each individual child within the class. For instance, a teacher's classes change each year with respect to ability. One year the teacher may have a very bright class and the following year his class may be slow. One problem with this is that if a class is very slow a child with average ability may appear very bright when compared with the other students whereas the same child may appear very dull in a smart class. Percentile Rank tells where the child ranks nationally. This can give the teacher a proper perspective with which to outline a program to suit the child's individual needs. The teacher then knows where the child ranks nationally as well as how he compares with his own class.

Reading Score and Reading Percentile Rank tell the teacher the reading ability of a child in his class compared with all of the other children in the United States of the same age who took the test. These index numbers give the teacher more information about each child than he could otherwise get. As with I.Q., one year a teacher may have a

very bright class and the following year his class may be very slow with respect to reading. In the slow reading class, the average reading child will appear very bright and in the rapid reading class he will appear slow. The Reading Score and Reading Percentile Rank give the teacher a broader range of comparison than possible otherwise.

A seemingly non-academic function of the school is helping a child with his social development. But knowing how the child is developing socially is necessary for a teacher to know for academic reasons too. It is difficult to know the exact relationship between social development and academic achievement but the fact that there is a relationship is evident. For instance, a child's doing poorly academically could be a result of his spending all of his time and energy dealing with his insecurities in interpersonal relationships.

I am trying to find ways which might be helpful in communicating the information to teachers. Would you please look this over and perhaps I can discuss it with you later on to get your reaction to it----------what days might be good for you for this purpose?

Thanks for your help. We hope that this will prove useful in helping teachers with their children.

An example of the verbal presentation for the non enrichment condition in all grade levels.

NON ENRICHMENT CONDITION----ALL LEVELS

Mrs._____ I am _____. I am working for the (name of school district) and the Primary Block Schools to try to find ways of helping teachers to know more about their children. The school district is interested in trying to communicate information to teachers which has been considered helpful for them in

dealing with their children. For example, much time and money has been and is being spent on testing children because it is felt that the results can provide important help to teachers in dealing with the problems facing their children. But in the past, however, the results of this effort have not been presented in ways which would facilitate the teachers' using it. The types of information to which I am referring are for example: intelligence, social development, and attendance.

I am trying to find ways which might be helpful in communicating the information to teachers. Would you please look this over and perhaps I can discuss it with you later on to get your reaction to it----------what days might be good for you for this purpose?

Thanks for your help. We hope that this will prove useful in helping teachers with their children.

Figure B

Questionnaire to test the retention of information by teachers.

Example of instruction page.

QUESTIONNAIRE ON THE USEFULNESS OF INFORMATION PRESENTED TO TEACHERS

INSTRUCTIONS:

PLEASE CIRCLE THE RESPONSE WHICH IS MOST NEARLY ACCURATE

(ALL QUESTIONS DEAL WITH INFORMATION
AS IT HAS BEEN PRESENTED TO TEACHERS)

Example of questions for first level teachers.

NAME OF CHILD_____

1. The child's social development was: Good, Average, Poor. Don't know. No information available.

2. The child lives with: Both parents, Mother only, Father only, Other. Don't know. No available information.

3. The child's dominant hand in kindergarten was: Right, Left, Undecided. Don't know. No information available.

4. The child's intelligence quotient indicates that he is: A very slow learner (below 75 I.Q.), A slow learner (75-84 I.Q.), A low average learner (85-94 I.Q.), An average learner (95-104 I.Q.), A high average learner (105-114 I.Q.), A rapid learner (115-124 I.Q.), or A very rapid leaner (above 124). Don't know. No information available.

5. The child's visual motor coordination or eye to hand coordiantion was:
   A. Greater than expected for his chronological age.
   B. Average for his chronological age.
   C. Less than expected for his chronological age.
   D. Don't know.
   E. No available information.

6. The child's reading readiness achievement was:
   A. Ready for first grade work and can use enrichment supplement.
   B. Ready for first grade work.
   C. Ready for first grade work with minimal assistance.
   D. Needs assistance and more individualized help.
   E. Unable to do first grade work; needs readiness exercises and much individualized instruction.
   F. Don't know.
   G. No available information.

7. The child's spelling readiness achievement was:
   A. Ready for first grade work and can use enrichment supplement.
   B. Ready for first grade work.
   C. Ready for first grade work with minimal assistance.
   D. Needs assistance and more individualized help.
   E. Unable to do first grade work; needs readiness exercises and much individualized instruction.
   F. Don't know.
   G. No available information.

8. The child's arithmetic readiness achievement was:
   A. Ready for first grade work and can use enrichment supplement.
   B. Ready for first grade work.
   C. Ready for first grade work with minimal assistance.
   D. Needs assistance and more individualized help.
   E. Unable to do first grade work; needs readiness exercises and

much individualized instruction.
F. Don't know.
G. No available information.

9. The average attendance for Primary Block children in (_____) last year in terms of number of days absent was 15. Last year was this child's attendance above average or below average, i.e., above 15 days or below 15 days? Don't know. No information available.

10. Did the child have some special problem, e.g., a bully, shy, other? Don't know. No available information. No special problem.

11. How well do you feel that you know this child:
very well, pretty well, average, not too well, not at all.

12. How confident are you that your answers accurately reflect the information as presented to you:
very confident, pretty confident, average, not too confident, not at all confident.

13. How helpful was the information presented to you about the children: very helpful, pretty helpful, average, not too helpful, not helpful at all.

Example of questions for second and third level teachers.

NAME OF CHILD_____

1. The child's social development was: Good, Average, Poor. Don't know. No available information.

2. The child lives with: Both parents, Mother only, Father only. Other. Don't know. No available information.

3. The child's health problems are: None, Teeth, Eyes, Hearing, Speech, Other, Don't know. No available information. (Circle all appropriate responses).

4. The child's intelligence quotient indicates that he is: A very slow learner (below 75 I.Q.), A slow learner (75-84 I.Q.), A low average learner (85-94 I.Q.), An average learner (95-104 I.Q.), A high average learner (105-114 I.Q.), A rapid learner (115-124 I.Q.), or A very rapid learner (above 124). Don't know. No available information.

5. The child's National Percentile Rank on intelligence is: Very low (below 6%), Low (7-17%), Low average (18-37%), Average (38-60%), High average (61-83%), High (84-93%), Very high (above 93%). Don't know. No available information.

6. The child's reading score indicates that he is: A very slow reader (below 18 points), A slow reader (18-24 points), A low average reader (25-32 points), An average reader (33-40 points), A high average reader (41-46 points), A rapid reader (47-49

points), A very rapid reader (above 49 points). Don't know. No available information.

7. The child's National Percentile Rank on reading is: Very low (below 6%), Low (7-17%), Low average (18-37%), Average (38-60%), High average (61-83%), High (84-93%), Very high (above 93%). Don't know. No available information.

8. The average attendance for Primary Block children in (_____) last year in terms of number of days absent was 15. Last year was this child's attendance above average or below averabe, i.e., above 15 days or below 15 days? Don't know. No available information.

9. Did the child have some special problem, e.g., a bully, shy, other? Don't know. No available information. No special problem.

10. How well do you feel that you know this child?
very well, pretty well, average, not too well, not at all.

11. How confident are you that your answers accurately reflect the information as presented to you:
very confident, pretty confident, average, not too confident, not at all confident.

12. How helpful was the information presented to you about the children:
very helpful, pretty helpful, average, not too hlepful, not helpful at all.

EXPERIMENTAL DESIGN

A factorial design was used in this experiment to test each independent variable separately and also the interaction of the independent variables. See Figure C.

FACTORIAL DESIGN

VISUAL ENRICHMENT

	GROUP I FOLDER	GROUP II CARDS	GROUP III MATRIX	TOTAL
GROUP A VERBAL ENRICHMENT	N= 6	N= 6	N= 6	N= 18
GROUP B NON-ENRICHMENT	N= 6	N= 6	N= 6	N= 18
TOTAL	N= 12	N= 12	N= 12	N=36 / N=36

Figure C

Factorial design to test both verbal and visual enrichment separately plus the interaction of these two independent variables.

The experiment consisted of seven unique conditions. See Figure D. Five conditions were enrichment conditions containing two conditions were control groups. The independent variables were: type of visual enrichment (index cards, matrix summary sheets, or cumulative folders) and type of verbal explanation (enrichment or non-enrichment) of the information. The dependent variable was the number of correct responses on the questionnaire, or in other words, the amount of re-

tention by the teachers of the information presented to them on their students.

FACTORIAL DESIGN

VISUAL ENRICHMENT

VERBAL ENRICHMENT	B_1	B_2	B_3
A_1	$A_1 B_1$	$A_1 B_2$	$A_1 B_3$
A_2	$A_2 B_1$	$A_2 B_2$	$A_2 B_3$

A_1 = verbal enrichment

A_2 = no enrichment

B_1 = folder delivered

B_2 = cards

B_3 = matrix

C = folder unchanged

Figure D

The interaction of verbal and visual presentations.

A separate control group (C) was included. This group was exactly the same condition as is normally found in the school district. All data available on each student is normally collected and placed in a folder which is kept in the school office in a filing cabinet. These folders are available to each teacher at all times but it is usually left to the teacher to obtain and utilize the folders.

A second condition (A_2B_1) consisted of the experimenter delivering the appropriate student folders to each of the teachers in this condi-

tion. This condition was the second control group. It differed from (C) only in that the folders were delivered to the teachers in (A_2B_1) while in (C) the folders were left in their usual place in the office. A third condition (A_1B_1) was identical to condition (A_2B_1) except that the experimenter personally presented the student information to each teacher on an individual basis. During this presentation, any questions by the teacher regarding the information were dealt with and the experimenter attempted to point out possible ways in which the information could be helpful. The type and content of each presentation has already been described in the Materials section.

In a fourth condition (A_2B_2) the data were presented on one five-inch by eight-inch index card for each child. This condition contained the same type of information as all of the other conditions. It differed from the other conditions only with respect to form of presentation. In this condition, the information was written out and some explanation was included regarding what meaning could be made from the information. This type of presentation has already been described in the Materials section. The fifth condition (A_1B_2) was identical to condition (A_2B_2) except that the experimenter personally presented the student information to each teacher on an individual basis. In addition, any questions by the teacher regarding the information were dealt with and the experimenter attempted to point out possible ways in which the information could be helpful.

A sixth condition (A_2B_3) consisted of a matrix which summarized all of the data available on the children in each class. It differed from the other conditions only with respect to form of presentation. In this condition, the information was tabulated so that comparisons could be made between classifications and between students. Another

feature of this presentation is that all of the information can be seen together at one time. A further description of this type of presentation may be found in the Materials section. The seventh condition (A_1B_3) was identical to condition (A_2B_3) except that the experimenter personally discussed the student information with each teacher on an individual basis. In addition, any questions by the teacher regarding the information were dealt with and the experimenter attempted to point out possible ways in which the information could be helpful.

Thus, the factorial design permitted assessment of the effect of verbal enrichment, for each type of presentation (folders, matrix, and cards), by comparison with the same type of presentation without a verbal explanation.

PROCEDURE

Entry by the experimenter into the school system came when the experimenter was asked by the school psychologist to aid the school system in analyzing some of the information which had been previously collected on the kindergarten students. Shortly after entry had taken place, the individual kindergarten teachers on various occasions informally expressed concern to the experimenter about the problem central to this study. The school psychologist indicated that the teachers should be able to interpret and understand the student related information. He seemed to feel that the problem was in the teachers' attitudes toward understanding the information and not so much one of communication. In other words, the information was available if the teachers took the time to find it and to learn how to interpret it.

When the teachers discovered that the experimenter had an interest in democratic decision making where the teachers who were involved in the problem were also involved in the solution of the problem, information was forth coming from the teachers regarding how the student information could be more effectively communicated to them. This interest on the part of the experimenter for the teachers as people who have important contributions to make in terms of the solution of problems facing them, increased the teachers' hopes that something could be done to help them. It also increased the teachers' verbalization of this problem and prompted

discussion of other problems they were facing.

Many of the teachers were glad to have an interest taken in them as individuals with important points of view. The usual course of events in the school was that the teachers were given a solution which had already been made and were only expected to carry it out. The same type of reception for the experimenter came from the superintendent and school principal and representative from the federal title project funding. The administrators were interested in the kind of philosophical orientation described above and also in the immediate problem which is central to this study. The school psychologist was leaving the school system at the end of the year and the job was offered to the experimenter. The experimenter agreed to undertake the project for a dissertation instead.

The problem of ineffective communication of the student-related information was discussed separately with each member of the kindergarten school faculty. The focus of each interview was to determine which type of presentation each teacher felt would be the most beneficial. The teachers' comments were grouped together with respect to their similarity. The groups were put into two categories. One category of comments centered around verbal enrichment while a second category focused on visual enrichment. The variables or conditions used with the first, second, and third grade teachers in this study came from the specific comments by the kindergarten teachers taken from within the two broad categories (visual and verbal enrichment).

The first, second, and third grade teachers were assigned to each condition randomly, except that the conditions were stratified with respect to grade. This procedure insured that each condition would be equally represented in every grade level. It also opened up the possibility for grade level to become a third independent variable in the analysis. Thus,

the factorial design became a three way classification (A, B, C) instead of the two way design (A, B) described earlier. See figure E.

TWO WAY DESIGN (A, B)

VISUAL ENRICHMENT

VERBAL ENRICHMENT	B_1	B_2	B_3
A_1	$A_1 B_1$	$A_1 B_2$	$A_1 B_3$
A_2	$A_2 B_1$	$A_2 B_2$	$A_2 B_3$

THREE WAY DESIGN (A, B, C)

GRADE LEVEL

VERBAL ENRICHMENT	B_1			B_2			B_3		
	VISUAL ENRICHMENT								
	C_1	C_2	C_3	C_1	C_2	C_3	C_1	C_2	C_3
A_1	$A_1B_1C_1$	$A_1B_1C_2$	$A_1B_1C_3$	$A_1B_2C_1$	$A_1B_2C_2$	$A_1B_2C_3$	$A_1B_3C_1$	$A_1B_3C_2$	$A_1B_3C_3$
A_2	$A_2B_1C_1$	$A_2B_1C_2$	$A_2B_1C_3$	$A_2B_2C_1$	$A_2B_2C_2$	$A_2B_2C_3$	$A_2B_3C_1$	$A_2B_3C_2$	$A_2B_3C_3$

A_1 = verbal enrichment

A_2 = no enrichment

B_1 = folder delivered

B_2 = cards

B_3 = matrix

C_1 = first grade

C_2 = second grade

C_3 = third grade

Figure E
Difference between a two way factorial design and a three way design.

The experimenter examined each of the one thousand two hundred and sixteen folders (1216). The information which was to be presented to the teachers was selected from the folders on the basis of the consistency of its availability and also with respect to its meaningfulness for the teachers. For example, information on handedness was selected because right or left handedness is important for a first-grade teacher to know when teaching beginning printing to students and this information was available in each folder.

The method of recording the information was to list the names of each student in the class along one side of the page. The categories of information that had been selected from the folders were listed along the top of the page. The appropriate scores for each student on each category were enclosed in the matrix. This recorded information was used for later transformation into the form of presentation appropriate to each experimental condition and as a later check against the teachers' recall of the information.

The information was then taken from the matrix discussed above and transformed on to the appropriate experimental condition format. The material was then presented to each first, second, and third-grade teacher in accordance with the condition randomly assigned to him. That is, the experimenter made each presentation to each teacher on an individual basis by appointments which had been previously made. At the time the appointments were made, the experimenter explained the study to each teacher and answered any questions he might have. A month after the presentation of the student related information, the teachers were tested on their recall of that information. It was felt that the amount of time between presentation of information and testing on it should be the same for each teacher. One month would increase the likelihood

that the results of the test would not reflect the teachers' memorization of the information. Also, since the teachers were very busy with the Christmas activities, one month would allow enough time to not exert any unnecessary pressure on the teachers. The time interval of one month was arbitrarily chosen but seemed an optimal period of time.

A questionnaire was used to test the teachers' recall of the information presented to them. The teachers were given the questionnaires individually. Some teachers completed the questionnaire in the presence of the experimenter while other teachers completed it during a free period while others completed it at home that night. The teachers were asked not to use the materials presented to them in completing the questionnaire. If the materials were immediately available, they were collected by the experimenter. All teachers seemed to comply with this request. A random sample of the information on ten students from each class was selected for each questionnaire. The questionnaires were scored and the results tabulated. See the materials section for a description of the questionnaire and the appendix for an example of the questionnaire. The method of scoring was one point per question. The first-grade classes had ten points per student and the second and third-grade classes had nine points per student. The reason for this difference was that the information presented to the first grade teachers varied somewhat in content from the second and third-grade information. The second and third-grade scores, however, were normalized to ten by multiplying the raw total score by 10/9. Therefore, the total possible score for each teacher was one hundred, that is, ten students with ten questions per student.

A safeguard to minimize bias was employed. When each teacher returned his questionnaire, the experimenter recorded an identifying code

number on it. When all of the questionnaires were collected they were scored in a random order. When all of the scoring was completed, each condition was tabulated and an analysis of variance and t-test were used to analyze the results.

STATISTICAL HYPOTHESES AND STATISTICAL TESTS EMPLOYED

The Null Hypothesis for the first experimental hypothesis is: there is no difference in performance between groups of teachers who were presented information by means of folders and groups of teachers who were visually enriched by presenting information to them on five-inch by eight-inch index cards.

The Null Hypothesis for the second experimental hypothesis is: there is no difference in performance between groups of teachers who were presented information by means of folders and groups of teachers who were visually enriched by presenting information to them on one large matrix type summary sheet eleven-inches by seventeen-inches.

The Null Hypothesis for the third experimental hypothesis is: there is no difference in performance between groups of teachers who were verbally enriched and groups of teachers who were given no verbal enrichment.

A fixed-effects analysis of variance was one of the statistical tests employed. In the analysis of variance, the Null Hypothesis for visual presentation became $B_1 = B_2 = B_3$, i.e., that there are no differences among the performances of the two visually enriched groups of teachers and the group who received no such enrichment. For verbal presentations, the Null Hypothesis in the analysis of variance was $A_1 = A_2$ or verbally enriched groups were the same as non-enriched groups.

A t-test following the F-test was employed to test each individual

comparison between groups. The computational formulas for these statistical tests are standard and can be found in a statistics book such as Winer (1962) page 228 through page 258.[3]

CHAPTER FOUR

RESULTS

The questionnaire administered to teachers to determine the effectiveness of the various means of communicating pupil information revealed the raw score data shown below in Table A.

NORMALIZED RAW SCORES

	B_1			B_2			B_3		
	C_1	C_2	C_3	C_1	C_2	C_3	C_1	C_2	C_3
A_1	64	61.1	50	98	83.3	83.3	95	95.5	86.6
	50	52.2	47.7	94	94.4	96.6	97	68.8	91.1
A_2	32	41.1	24.4	66	52.2	55.5	54	45.5	65.5
	35	30	35.5	54	30	42.2	64	65.5	52.2

MEANS

	B_1			B_2			B_3		
	C_1	C_2	C_3	C_1	C_2	C_3	C_1	C_2	C_3
A_1	57	56.65	48.85	96	88.85	89.95	96	82.15	88.85
A_2	33.5	35.55	29.95	62.5	60.5	48.85	59	55.5	58.85

A_1 = verbal enrichment
A_2 = no enrichment

B_1 = folder delivered
B_2 = card
B_3 = matrix

C_1 = first grade
C_2 = second grade
C_3 = third grade

Table A

Results obtained using a three way Factorial Design.

The results of a fixed-effects three way analysis of variance, with independent replications were obtained. See Table B.

SUMMARY TABLE FOR ANALYSIS OF VARIANCE

Source of Variation	Sum of Squares	DF*	Mean Square	F-Ratio	Level of Sig.	Level Needed For .01
A(Verbal Enrichment)	7516.891	1	7516.891	97.76	.01	8.29
B(Visual Enrichment)	7367.5049	2	3683.752	47.908	.01	6.01
C(Grade Level)	256.2166	2	128.1083	1.6661	not sig.	6.01
AB Interaction	283.2441	2	141.622	1.8418	not sig.	6.01
AC Interaction	58.8457	2	29.4228	.3826	not sig.	6.01
BC Interaction	196.3735	4	49.0933	.6384	not sig.	4.58
ABC Interaction	89.8042	4	22.451	.2919	not sig.	4.58
Within Group Experimental Error	1384.04	18	76.891			
Total	17,152.92	35				

Table B

A THREE WAY FACTORIAL DESIGN

* = Degrees of Freedom

The mean for variable A_1 was 78.25 while the mean for variable A_2 was 51.02. An F-ratio of 97.76 was obtained for the difference in mean scores for variable A or verbal enrichment. Since an F-ratio of 8.29 was needed for significance at the .01 level, the obtained F of 97.76 exceeded the .01 level of significance by a wide margin and the null hypothesis $A_1=A_2$ was rejected with considerable confidence. In other words, there was a statistically significant difference between the performance of groups of teachers who were prepared to receive and understand the information on students by discussing the meaning and possible uses of the information with the experimenter and the per-

formance of those teachers who were given no such verbal enrichment.

Furthermore, the mean for variable B_1 was 46.08, the mean for variable B_2 was 74.44, while the mean for variable B_3 was 73.39. An F-ratio of 47.908 was obtained for the difference in mean scores for variable B or visual enrichment presentation. An F-ratio of 6.01 was needed for significance at the .01 level. Therefore, the obtained F of 47.908 also exceeded the .01 level of significance by a large amount and the null hypothesis $B_1=B_2=B_3$ could be rejected with considerable confidence; neither $B_1=B_2$ nor $B_1=B_3$. In other words, there was a statistically significant difference between the performance of groups of teachers who were presented information through folders, from the performance of groups of teachers who were presented information on five-inch by eight-inch cards with one card per pupil, and from the performance of groups who were presented information on a one page matrix.

The mean for variable C_1 was 67.3, the mean for variable C_2 was 63.2, and the mean for variable C_3 was 60.9. An F-ratio of 1.666 was obtained for variable C or grade level taught. An F-ratio of 6.01 was needed for significance at the .01 level. The obtained F of 1.666 did not reach the .01 level of significance. Therefore, it would appear that the grade level taught was not an important variable affecting recall of student information.

The interaction of variables A and B or verbal enrichment and visual enrichment resulted in an F-ratio of 1.8418. Since an F of 6.01 was needed for significance at the .01 level, the obtained F did not reach the .01 level of significance. Therefore, the results indicated that an interaction between visual enrichment and verbal enrichment should be considered as negligible. In other words, the effect of visual presentation on performance does not necessarily

depend on the presence of a verbal presentation. Also, stating it the other way, the effect of verbal presentation on performance does not necessarily depend on the presence of a visual presentation.

The interaction of variables A and C or verbal enrichment and grade level taught resulted in an F-ratio of .3826. Since an F of 6.01 was needed for significance at the .01 level, the obtained F did not reach the .01 level of significance. As in the other interactions, the results indicated that an interaction between these variables should be considered negligible. Thus, the effect of verbal enrichment on teacher performance does not necessarily depend upon the particular grade level taught.

The interaction of variables B and C or visual enrichment and grade level taught resulted in an F-ratio of .6384. An F of 4.58 was needed for significance at the .01 level. The obtained F did not reach the .01 level of significance. Any interaction between these variables should be considered as negligible, that is, the effect of visual enrichment on teacher performance does not necessarily depend upon the particular grade level taught.

The interaction of variables A and B and C or verbal enrichment and visual enrichment and grade level taught resulted in an F-ratio of .2919. An F of 4.58 was needed for significance at the .01 level. The obtained F did not reach the .01 level of significance. It is not likely that any interaction exists between these variables.

None of the above interactions was significant at the .05 level in addition to not reaching significance at the .01 level.

An analysis of variance was also computed using a factorial design with two independent variables: verbal enrichment of information (A), and visual enrichment of information (B). The results were identical

to the three way analysis of variance previously computed. See the appendix for a summary table of this analysis. Also, see the appendix for a summary of the obtained raw scores, means, and standard deviations.

The significant overall F on the scores reflecting main effects A and B indicated that individual comparisons should be made between these conditions. These comparisons were made by means of a series of t-tests. The results of a t-test for each individual comparison are summarized in Table C. A t-test was computed for a difference between the means of the two control groups in the study. The control group which was essentially identical to what is normally found in the school district had a mean of 31.9. The control group in which the folders were delivered to the teacher had a mean of 33.0. The results indicated no significant difference between these scores. In addition, the results of individual comparisons by means of t-tests, supported the experimental hypotheses in the study.

SUMMARY TABLE FOR RESULTS OF t-TESTS

First Group Mean X_1	Second Group Mean X_2	t-Value	t Needed For Sig.: .01 Level	Significance Level
C	A_2 B_1	.2917	2.90	Not significant
A_1 B_1	A_2 B_1	5.9086	2.76	Greater than .01
A_1 B_2	A_2 B_2	7.1793	2.76	Greater than .01
A_1 B_3	A_2 B_3	5.6537	2.76	Greater than .01
A_1 B_1	A_1 B_2	9.7466	2.76	Greater than .01
A_1 B_1	A_1 B_3	6.8066	2.76	Greater than .01
A_2 B_1	A_2 B_2	5.3078	2.76	Greater than .01
A_2 B_1	A_2 B_3	5.9878	2.76	Greater than .01
A_1 B_1	A_2 B_2	.6483	2.76	Not significant
A_1 B_1	A_2 B_3	.2601	2.76	Not significant
A_1 B_2	A_1 B_3	.1577	2.76	Not significant
A_2 B_2	A_2 B_3	.0953	2.76	Not significant
A_1 B_2	A_2 B_1	16.527	2.76	Greater than .01
A_1 B_3	A_2 B_1	11.4287	2.76	Greater than .01
A_1 B_2	A_2 B_3	7.7482	2.76	Greater than .01
A_1 B_3	A_2 B_2	5.4194	2.76	Greater than .01

Table C

ALL POSSIBLE COMPARISONS BETWEEN GROUPS

CHAPTER FIVE

DISCUSSION OF RESULTS

Before discussing the main results in the experiment, special mention must be made of the final sample and of some additional information collected regarding the teachers' answers to the questionnaire. The final sample contained forty teachers. The study began with a sample of forty-two. The loss of one of the two teachers arose because one of the cells in the factorial design contained an extra teacher. Each of the cells had six subjects except for one which had seven. In order for the cells to be equal in number, the name of one of the teachers was removed. The other loss came from the separate control group. In this case, the teacher involved had too much accumulated work to devote any additional time to the questionnaire. It was also possible that the experimental condition involved had some bearing on this decision by the teacher. The condition was not enriched in any way. The folders were left in the office. So by presenting the teacher with a questionnaire without any noticeable enrichment, it might have been difficult for him to see past the work involved to some possible future benefit.

In addition to this experiment's focus on questions which concern teacher recall of student information, three additional questions of a different nature were used. One of these questions was: How well do you feel that you know this child: very well, pretty well, average, not too well, not at all? A second question was: How confident are you that your answers accurately reflect the information as presented to you: very confident, pretty confident, average, not too confident, not at all confident? The third question was: How helpful was the information presented to you about the children: very helpful, pretty

helpful, average, not too helpful, not helpful at all?

The results from these three questions were quantified so that comparisons could be made between experimental groups on the basis of their answers to these questions. The response, not at all, was scored as one point, not too helpful was scored two points, average was scored three points, pretty helpful was scored four points, and very helpful was scored five points. Taken as a whole, however, the results to these questions were inconclusive. This was due to the fact that many of the teachers left these questions unanswered while many other teachers interpreted the questions in different ways. The questions were then not directly useful in terms of adding any statistical information with which to discriminate between the experimental conditions. Their value, however, came in the responses they evoked from the various teachers.

For instance, many teachers who were in enrichment conditions gave low responses in answering the questions about how helpful the information was for the teachers. But when the experimenter questioned the teachers who gave the low responses to these questions, they told the experimenter that the information presented was very helpful and the method of presentation was useful and that their responses should not be taken as negative but only that the information could be made even more helpful if the presentation had been made to them in late summer or early fall. Therefore, another important variable was introduced. It was time of presentation of the information. If the information was presented in the first few days of the new semester it would seem to be very useful to the teachers when they set up individual programs for the students.

The main results of this study lead to three basic conclusions. One conclusion was that discussing the student information with each teacher

on an individual basis resulted in the teacher becoming more familiar with the information about his students than a teacher who did not discuss the information with the experimenter. The second and third conclusions were that either presenting the information about students to a teacher on an individual index card for each student or presenting the information about students to a teacher on a matrix type sheet which summarized all of the data available on the students in each class resulted in the teacher becoming more familiar with the information about his students than a teacher who was presented the information by means of a folder.

In addition to the results of this study being very significant in their support of the stated hypotheses, some other considerations made these results even more interesting. A further analysis revealed that an optimal combination of conditions could be found to exist for the variables considered in this design. The least effective ways of communicating information were the two control groups. The first control group which was separate from the factorial design, was the condition normally found in the school district. It included placing all available information on a student in a folder which was then kept in the school office. These folders were available to each teacher at all times but it was usually up to each teacher if and when he utilized the information available in the folders.

The second control group was incorporated into the factorial design. It was the same as the other control group except that in this group, the folders were delivered to each teacher. The t-test employed to test the Null Hypothesis of no difference between the means of the two groups revealed no significant difference to exist between the means of the two groups. In fact, a t-value of .2917 was obtained while 2.90 was needed

for rejection at the .01 level. It seemed from examination of the raw scores in the two groups that there was little difference between presenting and not presenting the folders to teachers in terms of increasing the teacher's familiarity with the information. Neither case appeared to be very helpful in communicating the information to the teachers.

The most useful way of presenting the information to teachers was a combination of the experimenter discussing the student information with each teacher on an individual basis and presenting the information on individual index cards. It must be pointed out that the t-test of the Null Hypothesis of no difference between this group and the control group mean resulted in a t-value of 16.527 when 2.76 was needed for rejecting the Null Hypothesis at the .01 level. It appears that the more help a teacher had in interpreting, understanding, and simplifying the information, the easier it was for the teacher to familiarize himself with it.

The combination of the experimenter discussing the information with each teacher and presenting the information to the teacher by means of a matrix type summary sheet was also a very effective means of communication. A t-test of the Null Hypothesis of no difference between this group mean and the control group mean resulted in a value of 11.4287 as compared with the 2.76 needed for rejecting the Null Hypothesis at the .01 level.

The value of 11.4287 is somewhat less than the value of 16.527 obtained above for the combination of verbal enrichment and cards. However, when the group who was presented the cards was compared with the group who was presented the matrix, the resulting t-value of .1946 was not significant when 2.51 was needed for significance at the .01 level.

It appears that neither of these methods of presentation is more or less effective than the other in communicating the information. The difference seemed to be that the matrix was more effective for teachers who have had some experience in statistics and research while the cards were more effective for teachers who have had no such experience and consequently needed more explanation of the information. The value of the matrix was that groups could be easily compared on a wide variety of variables while the value of the cards was that it offered individual explanation for the information on each student. The verbal enrichment variable had no seeming effect upon the relationship between card presentation and matrix presentation. A t-value of .1577 was obtained for the difference between verbally enriched cards and matrix while a t-value of .0953 was obtained for the difference between cards and matrix groups with no verbal enrichment. In the first instance a t of 2.76 was needed for significance at the .01 level and in the second case a t of 2.90 was needed for significance at the .01 level.

The discussion thus far would seem to indicate that each additional bit of help was important for the teacher with respect to facilitating the communication of information to him. Supporting this notion are the findings that both the card presentation and matrix presentation without verbal enrichment were significantly more effective than the folder condition without verbal enrichment. Also, the matrix and card conditions with verbal enrichment were significantly more effective than the folder conditions with verbal enrichment. In addition, the folder condition with verbal enrichment was significantly more effective than the folder condition without verbal enrichment. Similarly, the card condition with verbal enrichment was significantly more effective than the matrix condition without verbal enrichment. Finally, the matrix

condition with verbal enrichment was more effective than the card condition without verbal enrichment.

A hierarchy of least effective to most effective in terms of means of communicating information to the teachers can be established. First of all, both the folder condition delivered to the teachers and the folder condition left in the office were the least effective means of communication. The next most effective method was either enriching the folder condition by adding a verbal explanation or presenting the information by means of cards or matrices. The most effective means of communicating the information was to combine the enrichment variables. That is, to present the information by means of a card or by means of a matrix while adding a verbal explanation of the information.

One of the most interesting results in the study was the apparent additivity of the two kinds of enrichment. Note that the two kinds of enrichment were about equally effective: verbal enrichment increased the mean score from 33.0 (control group A_2B_1) to 54.2 (A_1B_1), while card or matrix enrichment increased the control scores to 57.5 (A_2B_2, A_2B_3). When the two kinds of enrichment were combined, the mean score rose to 90.3. Despite the presence of a ceiling (scores cannot exceed 100), either kind of enrichment was just as effective (or more so) in the presence of the other as by itself. The interaction AxB was not significant. This kind of additivity suggests that the two kinds of enrichment achieve their effects by quite independent routes: the matrix and folder affect the total exposure of the teacher to information, while the verbal enrichment affects the way information is perceived, coded, and remembered.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

Several major experimental findings were obtained in this study. The three experimental hypotheses were supported by the results. One such finding was that teachers who received verbal enrichment through having the information discussed with them in terms of its meaning and possible interpretations, recalled significantly more of the information than did teachers who received no such verbal enrichment.

A second finding was that teachers who received the information about their students on five inch by eight inch index cards with one card for each pupil recalled significantly more of the information than did teachers who received the information by means of the traditional folders. A third finding was that teachers who received the information on students in their class on a matrix type summary sheet which summarized all of the data available on the pupils in the class, recalled significantly more of the information than did teachers who received the information by means of the folders.

In addition, it was also observed from the results of this study that there appeared to be no difference between particular types of enrichment only that there was an additive effect and that each bit of enrichment increased the teachers' familiarity with the information. The least effective means of communicating the information was the folder presentation. The card presentation, the matrix presentation, or enriching the folder condition by adding a verbal explanation each proved to be an effective means of communication. The most effective presentation was a combination of either the card or matrix along with a verbal explanation of the information.

Without wanting to over state the importance of the results of this study, it is concluded that such enrichments as described above are necessary for teachers in order that the information collected on their students can be made more meaningful for them. The various types of enrichments which might be helpful to a teacher in knowing more about his students might vary from school district to school district and from time to time within a particular school district. In fact, the results of this study showed, among other things, that no single method of enrichment was more effective than any other method in this study in facilitating the communication of the information. The important consideration seemed to be the concept of enrichment itself. In other words, some type of enrichment was necessary and various types were acceptable.

It is hoped that if the schools continue collecting information on students for use by teachers that enrichment programs will be established to help the teachers to more effectively sort out, understand and interpret the information.

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APPENDIX

Results for the Two Way Factorial Design

SUMMARY TABLE FOR ANALYSIS OF VARIANCE

Source of Variation	Sum of Squares	Degrees of Freedom	F	Sig. Level	needed for sig. at the .01 level
A (verbal enrichment)	7516.891	1	113.589	.01	7.56
B (visual enrichment)	7367.5049	2	55.666	.01	5.39
AB (interaction	283.2441	2	2.14	not sig.	5.39
within group variation (error)	1985.29	30			
TOTAL	17,152.92	35			

RAW SCORES

	B_1 Folder		B_2 Card		B_3 Matrix	
Verbal Enrichment A_1	64	50	98	94	95	97
	61.6	52.2	83.3	94.4	95.5	68.8
	50	47.7	83.3	96.6	86.6	91.1
No Enrichment A_2	32	35	66	59	54	64
	41.1	30	52.2	68.8	45.5	65.5
	24.4	35.5	55.5	42.2	65.5	52.2

MEANS

	B_1	B_2	B_3
A_1	54.16	91.6	89
A_2	38	57.28	57.78

STANDARD DEVIATION

	B_1	B_2	B_3
A_1	6.7107	6.59	10.5873
A_2	5.6536	9.6756	8.4155

TABLE D

TABLE OF MEAN SCORES
FOR THE THREE QUESTIONS
REGARDING TEACHERS' ATTITUDES

Condition:	Question Number One	Two	Three
A	34	35.5	33
B	39	40.8	34.5
C	34.8	36	34.5
D	37	36.2	39
E	37.8	37	28.3
F	38	39	31.5
G	42.8	47	34.6

A = folder in office
B = folder delivered with verbal enrichment
C = card with verbal enrichment
D = matrix with verbal enrichment
E = folder delivered
F = card
G = matrix

TABLE E

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