CHAPTER IV

METHODOLOGY

SELECTION OF THE TOOLS

The nature of the investigation was such that it required the measure of teacher behaviour, measure of personality traits, and measure of attitudes of the teachers. For the first requirement Flanders Interaction Category System (32) for observing and recording teacher's classroom verbal behaviour was selected. For the measurement of personality traits it was decided to use Thurstone Temperament Schedule (96). To measure teachers' attitudes toward various groups and issues under study decision was taken to adopt attitude scales developed by Wandt (99), Glassey (40), and Yashumati Patel (70).

In research it often happens that after selecting a problem the investigator is handicapped by the unavailability of research tools. Consequently he sets to prepare the necessary tools and before this process is over, to his surprise he finds

that time alloted to him has run short. Ultimately he has to wind up everything. Instead, the best thing for any research worker is not to rush for the development of new tools, but make use of available ones if necessary with certain modifications. This will save a lot of time and he will be in a position to devote his full time to his real work. With this idea the investigator decided to use the available research tools and selected the above mentioned instruments to fulfill the requirements of the present investigation. These tools are described below along with personal information proforma.

DESCRIPTION OF TOOLS

Personal Information Proforma

Results of any investigation will be of little use or will not be applied unless and until, the nature of the sample on which it is based is known. This is because research investigations are conducted with specific purposes, whose results are not applicable to each and every individual in each and every situation, but the population similar to its nature and kind. Therefore in research it is necessary to obtain the personal information or the bio-data of the individuals falling in the sample of the study. Accordingly with the needs and requirements of the research a proforma was prepared in order to collect the bio-data of the teachers, which was directly related to the present study. The information sought in the

proforma included teacher's name, age, sex, marital status, general and professional qualification, pre/post and total teaching experience, subjects offered in B.A. or B.Sc., B.Ed., or T.D. examinations etc. Other informations which were not related to the subjects but which were of concern to the investigator were the date, class, sequence of period, duration of period, subject of observation, and composition of the class. A specimen copy of the proforma is shown in appendix A.

Flanders Interaction Analysis Technique

As the name indicates, this technique was developed by Dr. Ned A. Flanders (33) at the University of Minnesota between 1955 and 1960. It is an observation technique which records classroom interaction in ten categories.

Interaction analysis is primarily concerned with analyzing the influence patterns of the teacher and distinguishes those acts of the teacher which increase the students' freedom of action from those acts which decrease it (32). The system of categories forms a screen in front of observer's eyes so that those acts which result in compliance are sharply separated from those that invite more creative and voluntary participation while certain aspects of subject matter are ignored.

Since observation categories involve concepts which are

in turn related to some theory, interaction analysis is a process of abstracting the intent of an act from the act itself. The observer must judge whether an act increases or decreases the students freedom of action; he is not necessarily concerned with the conscious intent of the teacher. In fact, what the teacher has in mind when the communicates with students may be inconsistent with the observer's judgement of intent that is made within the limited number of categories available.

Interaction analysis is concerned primarily with verbal behaviour, which can be observed with higher reliability than most non-verbal behaviour. The assumption is made that the verbal behaviour of an individual is an adequate sample of his total behaviour. In the classroom we must assume that the verbal statements of a teacher are consistent with his non-verbal gestures, in fact his total behaviour.

Structure of the Technique

As shown in table one, there are ten categories in the system. Seven are assigned to teacher talk and two to student talk. The tenth category covers pauses, short periods of silence and talk that is confusing or noisy.

The seven categories assigned to teacher talk are divided into indirect and direct influence. Categories one or four namely accepts feelings, praises or encourages, accepts or uses

Table 1

Categories for Interaction Analysis

TEACHER TALK	INDIRECT INFLUENCE	1. * ACCEPTS FEELING : accepts and clarifies the feeling tone of the students in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
		2. * PRAISES OR ENCOURAGES : praises or encourages student action or behaviour. Jokes that release tension, not at the expense of another individual, nodding head or saying "um hm ?" or "go on" are included.
		3. * ACCEPTS OR USES IDEAS OF STUDENT : clarifying, building, or developing ideas suggested by a student. As a teacher brings more of his own ideas into play, shift to category five.
		4. * ASKS QUESTIONS : asking a question about content or procedure with the intent that a student answer.
	DIRECT INFLUENCE	5. * LECTURING : giving facts or opinions about content or procedure; expressing his own ideas, asking rhetorical questions.
		6. * GIVING DIRECTIONS : directions, commands, or orders to which a student is expected to comply.
		7. * CRITICIZING OR JUSTIFYING AUTHORITY : statements intended to change student behaviour from non-acceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK		8. * STUDENT TALK -- RESPONSE : a student makes a predictable response to teacher. Teacher initiates the contact or solicits student statement and sets limits to what the student says.
		9. * STUDENT TALK -- INITIATION : talk by students which they initiate. Unpredictable statements in response to teacher. Shift from 8 to 9 as student introduces own ideas.
		10. * SILENCE OR CONFUSION : pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

* There is NO scale implied by these numbers. Each number is classificatory. It designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

ideas of student and asks questions represent indirect influence. Categories five to seven viz. lecturing, giving directions, and criticizing or justifying authority represent direct influence. The categories of student talk are divided into student response and student initiation. All these categories are mutually exclusive, yet together they are totally inclusive of all verbal interaction occuring in the classroom (1). A brief description of each category is provided in the following paragraphs.

1. Accepts Feeling: The teacher accepts feelings when he says he understands how children feel, that they have right to have feelings, and that he will not punish the children for their feelings. These kinds of statements often communicate to children both acceptance and clarification of their feeling.

Also included in this category are statements that recall past feelings, refer to enjoyable or uncomfortable feelings that are present, or predict happy or sad events that will occur in the future.

In our society people often react to expressions of negative feelings by offering negative feelings in return. Acceptance of these emotions in the classroom is quite rare, probably because teachers find it difficult to accept negative emotional behaviour. However, it may be just as difficult for them to accept positive feelings. Feelings expressed by students

may also be ignored by the teacher if he considers the classroom to be a place where people are concerned primarily with ideas rather than feelings.

2. Praises or Encourages: Praise or encouragement are statements which carry value judgement of approval (33). To look directly at a boy or girl and nod the head while saying "Um hm" is to communicate the pupil, that he is on the right track and the teacher would like him to produce more of the same. Statements such as, "continue", "Go ahead with what you are saying", "Uh huh; go on; tell us more about your idea" are the indicators of encouraging behaviour. Often praise may consist of a single word like, "good", "fine" or "right" (1). Some times the teacher simply says, " I like what you are doing". Praise may also be given in the form of repetition of student's answer when this repetition communicates to the child that his answer is correct. Jokes by the teacher which release the tension of the class but not at the expense of some students are included in this category.

3. Accepts or Uses Ideas of Student: This category is similar to category one but instead of accepting feelings it accepts student's ideas. When a student makes a suggestion, the teacher may paraphrase the student's statement, restate the idea more simply or summarize what the student has said.

The teacher may also say, "well, that is an interesting point of view. I see what you mean". Statements belonging to category three are particularly difficult to recognize; often the teacher will shift from using the students idea to stating his own idea. When a teacher repeats students idea indicating that the student's idea is one that should be considered rather that it is the correct answer, record a 3.

Statements belonging to category three can be identified by asking question, "Is the idea that the teacher is now stating the student's or is it the teacher's?" If it is the student's idea, then this category is used; if it is the teacher's idea, another category must be used.

4. Asks Questions: This category includes only questions which the teacher expects an answer from the pupils. If a teacher asks a question and follows it immediately with a statement of opinion or if he begins lecturing obviously the question was not meant to be answered. A rhetorical question is not categorised as a question. An example of another kind of question that should not be classified in category 4 is the following: "What in the world do you think you are doing out of your seat, John?" With proper intonation the question is designed to get John back in his seat, if such is the case it must be categorized as criticism of the students' behaviour (category 7).

Questions that are meant to be answered are of several kinds. There are questions that are direct in the sense that there is a right or wrong answer. The question,"What are 2 and 2?" is one that limits the freedom of the student to some extent. Although he can refuse to answer, give the wrong answer, or make a statement of another kind, in general this kind of question focuses the student's answer more than does a question such as, "what do you think we ought to do now?" Questions then, can be either narrow and restrict the student in his answer, or they can be broad and give the student a great deal of freedom in answering. All questions however broad or narrow which require answers and are not commands or criticism fall into category four.

5. Lecturing: Lecture is the form of verbal behaviour used to give information, facts, opinions, ideas or orientation to children. The presentation of material may be used to introduce, review, or focus the attention of the class on an important topic. Usually information in the form of lecture is given in fairly extended time period but it may be interspersed with children's comments, questions, and encouraging praise.

Whenever the teacher is explaining, discussing, giving opinion, or giving facts or information, category five is used.

When the teacher is orienting the class to a topic or explaining the procedure that the class will follow, this is also classified in category five. These statements are often referred to as procedural 5's. Rhetorical questions are also included in this category. Category five is the one most frequently used in classroom observation.

6. Giving Directions: The decision about whether or not to classify the statement as a direction or command must be based on the degree of freedom that the student has in response to teacher direction when the teacher says, "Will all of you stand up and stretch?" he is obviously giving direction. If he says, "John go the board and write your name", he is giving a direction or command. When he says,"John I want you to tell me what you have done with your reader," he is till giving a direction. This category is used only when the student's compliance would take the form of an observable act.

7. Criticizing or Justifying Authority: A statement of criticism is one that is designed to change student behaviour from non-acceptable to acceptable. The teacher is saying, in effect, " I do not like what you are doing. Do something else". Another group of statements included in this category are those that might be called statements of defense or self-justification. These statements are particularly difficult to detect when a teacher appears to be explaining a lesson or

the reasons for doing a lesson to the class. If the teacher is explaining himself or his authority, defending himself against the student or justifying himself, the statement falls in this category. Other kinds of statements that fall in this category are those of extreme self-reference or those in which the teacher is constantly asking the children to do something as a special favour to the teacher.

So far we have discussed the indirect and direct categories of teacher talk. Whenever the teacher is talking the statements must be categorised in one of these seven categories. If the observer decides or feels that with a given statement the teacher is restricting the freedom of the students, the statement is tallied in categories 5,6, or 7. If on the other hand the observer decides that the teacher is expanding freedom of the students, the category used is either 1, 2, 3, or 4. Now we discuss student talk, which consists of categories 8 and 9 and the last category meant for silence and confusion.

8. Student Talk-Response: This category is used when the teacher has initiated the contact or has solicited student statements, and the student answers a narrow question asked by the teacher, or when he responds verbally to a direction the teacher has given. Anything that the student says that is clearly in response to initiation by the teacher belongs in category eight.

9. Student Talk-Initiation: This category is used to indicate the expression of the students own ideas in spontaneous interaction. If the student raises his hand to make a statement or to ask a question when he has not been prompted to do so by the teacher, the appropriate category is then 9.

Distinguishing between categories 8 and 9 is often difficult. Predicting the general kind of answer that the student will give in response to a question from the teacher is important in making this distinction. If the answer is one that is of a type predicted by the observer (as well as the teacher and class), then the statement comes under category 8. When in response to a teacher-question the student gives an answer different from that which is expected for that particular question, then the statement is categorized as a 9. Statements in response to broad teacher questions, which give the student an opportunity to express his own opinion or his own ideas on the topic are classified as 9's. In general a broad teacher question is a clue that the answer is a 9.

10. Silence or Confusion: The purpose of this category is to record pauses, silence, and periods of confusion as they occur during classroom interaction. It is not intended to record longer periods of silence or confusion for example those that are more than two minutes. The continuous use of this category for long periods of silence does not serve any useful purpose.

This category system is designed for situations in which the teacher and the students are actively discussing school work. It is an inappropriate tool when the verbal communication is discontinuous, separated by fairly long periods of silence, when one person is engaged in prolonged lecturing, or is reading aloud to the class. In situations in which two-way communication does not exist the observer should stop, make a note of the exact time of which spontaneous interaction lapsed and the reasons for the interpretation. The observer must remain alert to the resumption of spontaneous interaction.

OBSERVATION PROCEDURE

The observer sits in the classroom in the best position to hear and see the participants. At the end of each three second interval he decides which category best represents the communication just completed. He writes down this category number while simultaneously assessing communication in the next period and continues at a rate of 20 to 25 observations per minute, keeping the tempo as steady as possible. His notes are merely a sequence of numbers written in a column, top to bottom, so that original sequence of events is preserved. Occasionally marginal notes are used to explain the class formation, or any unusual circumstances. When there is a major change in class formation, the communication pattern, or the subject under discussion, a double line is drawn and

the time indicated. As soon as the total observation is completed, he retires to a nearby room and completes a general description of each separate activity period indicated by the double lines, including the nature of activities, the class formation, and the position of the teacher. The observer also notes any additional facts that seem pertinent to an adequate interpretation and recall of total observation period.

TABULATING THE MATRIX

The mere sequence of numbers that the observer has with him does not give any information about the interaction pattern. Hence to obtain a generalized sequence of teacher pupil interaction the sequence of numbers is entered in a 10 x 10 matrix. While preparing the matrix two numbers are taken at a time. The first number stands for row and the second number for column. Thus each number in a sequence once becomes row and once column.

Interpretation of Matrix:

After the observer tabulates the matrix, he then has the job of developing a description of the classroom interaction. He has several ways of describing the interaction but begins by reporting the different kinds of statements in terms of percentages. The first step is computing the percentage of tallies in each of the columns. This is done by dividing each of the column totals, 1 to 10 by the total number of tallies

in the matrix. This computation gives the proportion of the total interaction in the observed classroom situation found in each category. A similar procedure is used to determine the percentage of total teacher talk that falls in each category. This is done by dividing the total of each category, 1 to 7, by the sum of these seven categories.

The total percentage of teacher talk that is of prime importance in interpreting the matrix is found by dividing the total number of tallies in column 1 to 7 by the total number of tallies in the matrix. To find the percentage of student talk the total number of tallies in column 8 and 9 is divided by the total number of tallies in the matrix. Similarly, the percentage of total time lost in silence or confusion is obtained by dividing the tallies in column 10 by grand total of the matrix and multiplying by 100.

Next the observer focuses on the relative number of indirect and direct teacher statements. The total number of tallies in columns 1, 2, 3, and 4 is divided by the total number of tallies in columns 5,6 and 7 to find the I/D ratio or the ratio of indirect to direct teacher statements. An I/D ratio of .5 means that for one indirect statement there are two direct teacher statements; and I/D ratio of 1.2 means that for every six direct statements there are five direct statements. The average indirect teacher has an I/D ratio of 0.7 and the average direct teacher has an I/D ratio below 0.4 (20).

An i/d ratio is calculated in order to find out the kind of emphasis given to motivation and control in a particular classroom. The number of tallies in columns 1,2, and 3 is divided by the total number of tallies in columns 6 and 7 to find this ratio. Categories 1,2,3,6 and 7 are more concerned with motivation and control in the classroom and less concerned with the actual presentation of subject matter. This ratio eliminates the effects of categories 4 and 5, lecture and asking questions, and gives information about whether the teacher is direct or indirect in his approach to motivation and control. An i/d ratio of .9 reveals that the teacher has used nine motivating statements to ten controlling statements. Campbell and Barnes (20) report that an average indirect teacher has an i/d ratio of 2.0 and the average direct teacher has an i/d ratio below 1.0.

An illustration of matrix depicting frequencies, percentage of frequencies, along with the calculation of I/D and i/d ratios is shown in appendices U and V.

The matrix is also interpreted in terms of its various special areas known as "Constructive Integration Cells", "Steady State Cells", "Vicious Circle", "Content Cross", "Short Answer Drill Situation" etc.

TRAINING PROCEDURE

After memorizing the categories, training begins with tape recordings of classroom interaction. It is desirable to have a variety of training tapes that provide unusual examples of indirect or direct influence patterns and to have an exact category distribution for each tape. Observer trainees seem to learn faster, working with tapes in teams of two or more. They can start and stop the play back to discuss each classification; an experienced observer on hand is helpful and frequent but short straight runs without interruption should be carried out to develop a consistent tempo.

During the preliminary training it becomes apparent that classroom observation involves judgements that are not as objective, automatic, and "black and white" as the trainees originally thought. They soon learn that reliable observation requires consideration of the total social situation being observed in order to understand the individual acts being classified. Trainees also discover the need for ground rules in order to be consistent when choices occur. They have been useful in working in classrooms at all grade levels and in all subject matter areas. These ground rules are given in appendix W.

ESTIMATING INTER-OBSERVER RELIABILITY

A method of estimating inter-observer reliability should be as simple and quick to calculate as possible. Bales (7)

proposes an adaptation of chi-square which was found to be less appropriate in the present context than was Scott's (81). Scott's method is unaffected by low frequencies, can be adapted to percent-figures, can be estimated more rapidly and is more sensitive at higher levels of reliability. Scoot calls his coefficient "pi" and it is determined by the two formulas given below:

$$\text{pi or } \pi = \frac{Po - Pe}{100 - Pe} \qquad (1)$$

Po is the percentage of agreement (obtained), and Pe is the percentage of agreement expected by chance which is found by squaring the proportion of tallies in each category, summing these overall categories, and multiplying by 100.

$$Pe = 100 \sum_{i=1}^{k} P_i^2 \qquad (2)$$

In formula two there are K categories and Pi is the proportion of tallies falling into each category. π in formula one can be expressed in words as the amount that two observers exceeded chance agreement divided by the amount that perfect agreement exceeds chance.

In estimating reliability during training, problems of tempo or the speed of talling are less important than the proportional distribution within the categories. Sooner or later

in the training cycle observers settle down to the required tempo of 20 to 25 tallies per minute.

In summary the following steps take place in calculation of inter observer reliability.

Step One: The original tallies are recorded as hash marks for quick summing on a sheet containing ten columns, one for each category.

Step Two: Add column totals, divide each by grand total and multiply by 100 to convert to percent.

Step Three: Find Pe. To calculate this the percentage of each category of both the observers is totalled and averaged. This average is squared and the resulting product is divided by 100. Lastly all the end products obtained for each category in this way are summated. This sum is Pe.

Step Four: Po is determined by subtracting the total percent disagreement from 100.

Step Five: π is found out by using the formula one and substituting the values of Po and Pe respectively.

An example illustrating the calculation of (coefficient of interobserver reliability) is given in appendix X. A Scott coefficient of .85 or higher is considered to be a reliable measure of the observer's categorization.

THURSTONE TEMPERAMENT SCHEDULE (96)

Purpose:

Most tests describe a person in terms of psychotic or neurotic tendencies. Since for practical pruposes most of us are reasonably well adjusted, these clinical streotypes do not seem to provide the best method for describing personality traits. We need a schedule that emphasizes important stable traits which describes how normal, well adjusted people differ from each other.

The Thurstone Temperament Schedule (Appendix-R) was devised for this purpose. It is limited to a practical description of important aspects of temperament and makes no attempt to appraise the degree of conflict, insecurity, or maladjustment. It is designed to assess those traits which are relatively permanent for each person, and excludes those which reflect recent social experience, social identifications, disturbing experiences, or exposure to propoganda. However because of this limitation in depth the schedule has unusually broad coverage. Seven areas of temperament are appraised in a relatively short questionnaire.

Description of the Areas Covered by the Schedule

The seven areas of temperament namely Active, Vigorous,

Impulsive, Dominant, Stable, Sociable and Reflective are described in chapter on "Problem" under the heading "Description of Independent Variables - Personality Traits".

FORMAT

The 140 items covering the seven areas are printed in a six-page step down booklet. This booklet can be used with either a self-scoring carbon answer pad or a machine-scored answer sheet. Both of these have adult and boy and girl profiles, printed on them. The self-scoring answer pad has the unique feature of only indicating the correct answers.

ADMINISTRATION

The Thurstone Temperament Schedule is self administering. It may be given with or without supervision, in a group or individually.

The directions for taking the test are printed on the first page of the schedule. Subjects are instructed to read them carefully. The administrator also can read the directions aloud if he wishes. This is sometimes helpful in group situations. No comments should be made about the items in the schedule before or after the test has started. There is no time limit. Sufficient time must be allowed for everyone to complete all items. Twenty minutes time is usually adequate. As each

individual finishes, his answerbook must be checked, if he has left any item he is asked to complete it.

RESPONSE MODE

Three alternate responses namely "yes" "?" and "No" are provided against each of the items of the schedule. The subject is asked to give his response by placing a tick mark against any of the three alternatives which reveals his answer best.

SCORING

Scoring of the items can be done manually as well as by machine. Only correct responses are scored. Every correct response is given a score of one. A total score for each subject on each trait is obtained.

NORMS

Norms of the schedule are based on four different groups.

The first group consists of 694 freshmen men and 161 freshmen women, attending the University of Illinois. The second group is made up of 419 boys and 504 girls drawn from five Chicago high schools. The third group comprises of 540 male and 496 female office workers, stenographers, typists receptionists, file clerks, book-keepers, machine operators, coordinators, etc. The age range of this group is from 20 to 55, but the majority is from 25 to 45. The fourth and last

group is composed of 1234 adult males and 657 adult females. Thus the schedule has four separate norms for male and female university students, high school boys and girls, male and female office workers, and male and female adults.

RELIABILITY

The reliability for the seven areas of the schedule have been computed by split-half method for the four groups viz. men, women, high school boys and high school girls. The odd-even correlations were computed and then reliabilities were estimated by the Spearman-Brown correction for double length. Reliabilities were also calculated for a fifth group consisting of men and women seeking counselling and employment through the University of Chicago. These reliability coefficients are shown in table 2.

TABLE -2

	Men	Women	Boys	Girls	Employment and Guidance Group
Active	.48	.46	.48	.50	.51
Vigorous	.61	.63	.59	.67	.68
Impulsive	.65	.65	.62	.70	.70
Dominant	.77	.77	.82	.83	.86
Stable	.63	.64	.59	.63	.55
Sociable	.68	.73	.69	.78	.76
Reflective	.73	.62	.60	.48	.45
N	200	157	236	277	106

The reliabilities for seven areas of the schedule are also computed by test-retest method for a sixth group which consisted of 81 male executives. The retests were all given within six months of the first administrations, but the time between administrations varied for different subjects. The reliability coefficients are higher in the test-retest group than in the split half group. The reliability coefficients of this group are presented in table 3.

TABLE -3

	Retest Reliability Coefficient	Means from first administration	Standard deviation, first administration	Means from second administration	Standard deviation second administration
	r_{12}	M_1	SD_1	M_2	SD_2
Active	.78	11.73	3.41	12.17	3.36
Vigorous	.78	11.91	3.70	11.85	3.62
Impulsive	.79	12.17	3.39	12.52	3.43
Dominant	.82	13.59	4.64	13.48	4.89
Stable	.61	14.95	2.97	15.69	2.81
Sociable	.73	13.37	3.10	12.64	3.40
Reflective	.75	5.64	2.74	5.30	2.94
N		81		81	

VALIDITY

To determine the validity a study was conducted with ten groups of sales employees of a national retail company. The supervisor of each group completed a forced choice rating scale for each of his employees. The scales included pairs of items describing the seven traits measured by the schedule. In each pair one item described behaviour typical of the high scoring individual and the other typical of the low scoring individual. Supervisors selected the item of each pair that best described the employee.

Ratings were compared with the employees' actual test performance. Biserial coefficients of correlation between the ratings and actual test performance were found to be very high. These coefficients, shown in table 4 indicate that behaviour can be described accurately by the Temperament Schedule.

TABLE -4

	Active	Vigo-rous	Impul-sive	Domi-nant	Stable	Socia-ble	Ref-lec-tive
r_{bis}	.95	.93	1.00	.92	.90	.98	.81

The validity of the Thurstone Temperament Schedule has also been studied by using effectiveness of job performance as a criterion. The subjects in various studies were teachers, office workers, retail store sales employees, sales supervisors, and managers of retail stores. The procedure in general was to compare schedule scores of groups of employees rated "high" or "good" in performance with scores of employees rated "low"or "poor" and to determine the significance of the difference of the two groups.

Two validity studies, one involving teachers and another involving sales supervisors are reported here. Ryans studied Thurstone Temperament Schedule scores in relation to teacher performance. The subjects were 275 third and fourth grade teachers. Three or four trained observers rated teachers independently on the following six criteria:

(1) Pupil participation; originality, adaptability and tolerance of the teacher.

(2) Teacher's "business like" attitude; controlled pupil activity.

(3) Teacher's qualities of human understanding, impartiality, calmness and consistency.

(4) Teacher's sociability with reference to eight to ten year old children.

(5) Total score obtained by summing the teachers criterion scores on 1,2,3, and 4.

(6) An additional criterion score obtained from judgements made on a six item observation blank relating to pupil behaviour.

On each, criterion, a high group and a low group of teachers were selected for comparison on the Thurstone Temperament Schedule. Active, Stable and Reflective scales failed to discriminate high and low groups on all the five criteria. Vigorous trait discriminated high and low groups significantly on first criterion. Dominant trait discriminated on first, fourth, fifth, and six criteria. Sociable trait discriminated on first fourth, and sixth criteria.

To determine the validity of the Temperament Schedule in predicting success of sales supervisors, 282 supervisors were rated by their superiors. The overall rating of general job effectiveness included a consideration of the supervisor's ability as merchant, his ability in performing the technical aspects of his job, and his capacity for dealing effectively with his subordinates, peers and superiors. Forty-five of the supervisors were rated "good" and forty-one were rated "poor". Good and poor groups significantly differed from each other on Active, Vigorous, Impulsive. Dominant, and Sociable traits.

ATTITUDE SCALES

In the present investigation totally eight attitude scales were used. These scales were meant to measure attitude toward (1) Management,(2) Parents,(3) Teachers, (4) Democratic Classroom Procedures, (5) Pupils, (6) Democratic Administrative Procedures, (7) Education and (8) Teaching Profession.

SCALES ONE TO SIX

The first six scales (Appendices L to Q) were originally developed by Dr. Edvin Wandt on Likert model (79, 99). Two versions of scales were constructed in each area, one composed of statements, agreement with which indicated a favourable attitude (positive statements) the other composed of statements, agreement with which indicated an unfavourable attitude (negative statements). Each version consisted of twelve statements. Thus each of the six scales was made up of 24 statements, half of which positively and half of which negatively framed.

One statement from each version is given below to illustrate the content of the scales.

Scale measuring attitude toward Management

(Positive) Administrators are usually courteous to their teachers.

(Negative) Most administrators play favourites.

Scale measuring attitude towards Parents

(Positive) Parents usually cooperate with the teacher.

(Negative) Parents only come to school when they have a complaint to make.

Scale measuring attitude toward Teachers

(Positive) I consider it a previlege to associate with my fellow teachers.

(Negative) Many teachers do not take their share of responsibilities.

Scale measuring attitude toward Democratic Classroom Procedures

(Positive) Democracy can be successfully practiced in the average classroom.

(Negative) Pupils should be seen and not heard.

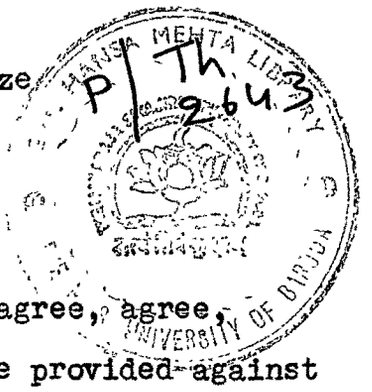
Scale measuring attitude toward pupils

(Positive) Most pupils take their responsibilities seriously.

(Negative) Pupils naturally "have it in" for their teachers.

Scale measuring attitudes toward Democratic Administrative Procedures

(Positive) Teachers are entitled to have some voice in any decision which affects them.



(Negative) Teachers have no right to criticize administrative decisions.

Response Mode:

Five alternate responses viz., strongly agree, agree, undecided, disagree, and strongly disagree are provided against each of the statements in the scales. The subject indicates his response by the placing a "tick" (✓) mark in any of the five choices which describes his attitude best.

Scoring:

In the case of positive statements of the scales strongly agree response is given a score of five, agree response a score of four, undecided response a score of three, disagree response a score of two and strongly disagree response a score of one. While in the case of unfavourable statements the scoring is done in reversed order i.e. strongly disagree response is given a score of five, disagree response a score of four, undecided response a score of three, agree response a score of two, and strongly agree response a score of one.

Reliability:

Reliabilities of the scales were determined by the split half method. Spearman-Brown formula was used for this purpose. The reliabilities of the scales range from .58 to .96 with a median reliability of .81.

Validity:

Validity of the scales were calculated by the standard method used and suggested by Likert, which involves a sort of item analysis (27). Total scores for each subject on all the scales were obtained and they were arranged in terms of their magnitude i.e. from high to low. Two contrasting groups or criterion groups were formed by taking 27 percent of the subjects obtaining high scores and 27 per cent of the subjects obtaining low scores. Responses of these two groups on each statement of the scales were compared. More specifically by applying t-test, critical ratio was found to examine the discriminative power of the statements. If the "t" is found to be significant it indicates that the statement is effective in discriminating people having favourable and unfavourable attitude. If the "t" is not significant the statement does not have the power of discrimination and it is rejected. However, in the present situation the t-values for all the statements were found to be significant and therefore all the statements were retained in the scales.

EDUCATION SCALE

This scale (Appendix-T) was constructed by W. Glassey (40) to measure attitude toward education. The scale is constructed according to Thurstone procedure and contains 34 items or statements.

Three statements are given below to illustrate the content of the scale.

(Favourable) Education is of first-rate importance in the life of man.

(Neutral) It is enough that we should be taught to read, write and do sums.

(Unfavourable) Education does more harm than good.

Response Mode:

The subject checks (ticks) those statements with which he fully agrees and places a cross in front of the statements with which he does not fully agree.

Scoring:

The subject's score is the average of the scale values of statements endorsed as "fully agree". High score indicates negative attitude toward education and low score positive attitude. But in the present investigation these values were converted on a continuum on which low values indicated negative attitude and high values indicated positive attitude. This was done to maintain the consistency of these scores with the scores of other tests in which a high score represented positive side and low score negative side.

The author has not reported reliability coefficient for the scale and with regard to validity relied upon content validity.

TEACHING PROFESSION SCALE

This scale (Appendix-5) was developed by Yashumati F. Patel (70) to measure teachers' attitude toward teaching profession. The scale is constructed on Thurstone principle. It contains 22 statements.

Following items illustrate the content of the scale.

(Favourable) Every sane individual should select this profession.

(Neutral) This is a tolerable profession.

(Unfavourable) I hate this profession.

Response Mode:

The subject is instructed to indicate those statements with which he agrees or willing to accept and those with which he disagrees and rejects. The statements which he accepts or agrees with are indicated by a "tick" mark and a "cross" is used to indicate disagreement or rejection of the statement.

Scoring:

The scale values of only those statements with which the

subject agrees are totalled and averaged. This average is the attitude score of the subject.

Reliability:

The reliability of the scale is determined by test-retest method, which is reported to be .86.

Validity:

The validity of the scale is determined by correlating teachers' attitude scores with the ratings of their principals. This correlation coefficient was found to be .56.

Though the personality schedule and attitude scales were perfectly reliable and valid instruments the investigator thought it worthwhile to study their reliability based on a sample of Indian teachers. In order to do this a sample of 40 teachers of Secondary Schools in the age range of 25 to 47 years was selected. The average age of these teachers was 31.90 years, with an average total teaching experience of 7.85 years. The average pre and post-training experiences were 2.25 and 3.70 years respectively. Of the forty teachers twenty were B.A., six were M.A., and ten were B.Sc., With regard to their professional qualification, thirty teachers had obtained B.Ed. degree and ten had passed S.T.C. (Secondary Teachers Certificate) examination. These teachers were administered the tests twice with an interval of fortnight and correlation between the scores

of first and second administration was calculated to obtain a measure of test-retest reliability. The reliability coefficients are presented in table 5.

TABLE 5

Tests	First Administration Mean	Second Administration Mean	r	
Active	6.650	7.100	.69064	*
Vigorous	11.800	11.950	.90872	*
Impulsive	8.950	9.675	.62706	*
Dominant	11.550	10.725	.75119	*
Stable	10.225	10.900	.66822	*
Sociable	12.950	13.250	.69163	*
Reflective	11.300	12.075	.49413	*
Management	69.675	70.125	.74690	*
Parents	69.125	67.650	.63428	*
Teachers	80.725	80.700	.80483	*
DAP	92.400	90.000	.62707	*
Pupils	87.100	87.475	.73051	*
DCP	74.000	71.625	.39750	@
T.P.	7.881	7.972	.36158	@
Education	7.982	7.970	.63145	*

* Significant at .01 level ; @ Significant at .05 level

It will be seen that thirteen correlation coefficients were significant at .01 level of confidence and two were at

.05 level. This ensures the reliability of the instruments.

OBSERVATION TRAINING

Systematic, unbiased, and complete observation of teacher's verbal behaviour cannot be achieved unless a person is appropriately trained in observation procedure. Thus next to the selection of the observation technique came the problem of training. In all five observers took part in training who later on collected the data. Of the five observers four had minimum of two years teaching experience at school and one had one year's teaching experience in college. Two of the observers had bachelor's degree and two had master's degree in Education. The fifth observer had master's degree in Psychology. Three members were on the permanent staff of the Centre of Advanced Study in Education, while two were employed for few months.

The first phase of the training began with the three permanent staff members. An English medium school was selected for observation purpose. The ten categories were memorized by all of them. It was decided that observation period should be increased gradually. Hence in the beginning the observers made simultaneous observations of one teacher for 5 minutes and came out with their observations encoded in the form of numbers. The observers sat in lonely place and discussed their difficulties in identifying the particular categories. They expressed

their doubts and sought clarifications from ground rules and deliberations, and compared their observations. Second observation too was for a spell of 5 minutes. Third and fourth observations were of 10 and 15 minutes respectively. After each observation the observers discussed the problems arising in identifying the behaviour categories. Next day the duration was increased to 20 to 30 minutes and from third day complete periods of 35 to 40 minutes were observed. Once the observers set the rythm of coding the teacher behaviour or in Flanders' terminology interaction, at every three seconds, consistency was found in all the three simultaneous observations. Following sustained training throughout a week, inter-observer reliability using Scott's coefficient of correlation (as suggested by Flanders) was found to be consistently above .85 among all the three observers.

The services of three observers were limited for data collection, therefore, it was decided to hire two more observers for the purpose of data collection. For this, second round of training began. One of the senior observers (the present investigator) took charge of training these naive personnels (their personal qualification is described above). The senior observer gave them lecture about the Flanders Category System, which was followed by simultaneous observations. Briefly the training procedure consisted of the

following phases: (1) The observer trainees met with the senior observer for briefing, reviewing of the Category System and discussion of the problems involved in the direct observation and categorization, (2) The observer trainees studied at length the ground rules for observations, (3) The observer trainees and senior observer simultaneously conducted observations of a teacher and made independent observations, (4) The observer trainees met with the senior observer to discuss the observation just completed, the compare observations, and to clarify the basis of categorization of behaviours, (5) Additional simultaneous observations and assessments were conducted by the observer trainees and senior observer followed by further consultation, (6) In the final phase of training, the observer trainees and the senior observer made observations of the same teacher, but at different times and subsequently conferred to compare and discuss the assessment made.

During the process of training, correlation of coefficients by Scott's formula were computed between the assessments of the observers as a check upon the training. After the completion of training interobserver reliability was found to be above .85.

Following training, observers were given regular assignments for teacher observations.

The discussion and deliberations during the first training period resulted in the following ground rules (these ground rules were already framed before receiving Flanders' exhaustive list of 15 ground rules published in the booklet entitled "The Role of the Teacher in the Classroom (1)" for consistency in observations.

(1) Teacher reading from the book is put in category 5.

(2) Pupil reading from the book is put in category 8.

(3) Teacher or student writing on the black-board is to be treated as "no verbal interaction period" and hence, was ignored. A marginal note instead of clumsy and useless series of 10's was made.

(4) Likewise, also were ignored, after making necessary marginal notes, the occasions when a visitor came to the class, a circular was brought, the teacher excused himself for a while away from the class, pupils write either from the book or the black-board. These are all beyond any shadow of dount "no verbal interaction" periods.

(5) Other "ignored" types of events included "students' silent reading" and teacher dictating and the students taking down, and students suddenly plunging into a quarrel.

SAMPLE

The sample of the present research inquiry composed of two hundred teachers, drawn from 21 secondary schools. Eighteen schools were of Baroda city proper, two were of Ahmedabad, and one was of Nadiad. Of the twenty-one schools four were boys schools, six were girls schools, and eleven were mixed schools. There were one hundred and twenty male teachers and eighty female teachers. The types of schools and the numner of male and female teachers is presented in table six.

TABLE -6

Types of Schools	N	Male Teachers	Female Teachers
Boys schools	4	32	4
Girls schools	6	27	52
Mixed schools	11	61	24
Total	21	120	80

The break-up of the sample according to subjects shows that 58 teachers observed were of English, 53 of Social Studies, 33 of Science, 20 of Gujarati, 15 of Hindi, 15 of Mathematics and 6 of Sanskrit. Thus seventy two percent of the sample comprised of English, Social Studies, and Science teachers. The remaining twenty-eight per cent was comprised of Hindi,

Gujarati, Mathematics and Sanskrit. Table number seven shows the number and percentage of teachers belonging to various subjects.

TABLE -7

Subjects	Number of Teachers	Percentage
English	58	29.0
Social-Studies	53	26.5
Science	33	16.5
Gujarati	20	10.0
Hindi	15	7.5
Mathematics	15	7.5
Sanskrit	6	3.0

Examining the bio-data which was collected for each and every teacher before he was observed it was found that the age of the teachers comprising the sample ranged from 22 to 62 years, with a mean of 38.78, median of 38.60 and S.D. of 8.35. Their total experience ranged from 0 to 40 years with a mean of 14.14, median of 13.44 and S.D. of 8.23. The pre-training experience of the teacher ranged from 0 to 21 years with a mean of 3.75, and a median of 2.65. The S.D. being 3.75.

Whereas post-training experience had a range of 0 to 35 years having mean, median and S.D. of 10.31, 9.34, and 7.08. These details are shown in table number eight.

TABLE -8

	Range	Mean	Median	S.D.
Age	22-62	38.78	38.60	8.35
Total experience	0-40	14.14	13.44	8.23
Pre-training experience	0-21	3.75	2.65	3.75
Post-training experience	0-35	10.31	9.34	7.08

With respect to academic qualifications it was found that a majority of teachers with a percentage of 40.5 possessed the degree of Bachelor of Arts. Twenty-one point fifty percent of the teachers had the degree of Master of Arts and the same percentage of teachers had the degree of Bachelor of Science. Only 0.50 per cent teachers had M.Sc. degree, while 9.00 per cent of the teachers under study had matriculation certificate as their academic qualification. Regarding professional qualification the bio-data revealed that the majority of the teachers with a percentage of 64 had Bachelors degree in Education as their professional qualification. About 6.50 per cent had M.Ed.

while 8.50 per cent had diploma in Education. Fifteen per cent of the teachers possessed Secondary Teachers Certificate and Hindi Shikshak Sanad as their professional qualification. These details are furnished in tables 9 and 10.

TABLE -9

Academic Qualifications

S.S.C.	B.A.	M.A.	B.Sc.	M.Sc.
9.0 %	40.50 %	21.50 %	21.50 %	0.50 %

TABLE -10

Professional Qualification

B.Ed.	M.Ed.	T.D.	S.T.C.,H.S.S.
64.0 %	6.50 %	8.50 %	15.00 %

With respect to the bio-data of the teachers information about the methods of teaching offered by them during their professional training was also gathered. It was found that 23.50 per cent had offered Gujarati-Social Studies as their special methods of teaching, while 21.50 per cent had offered Mathematics-Science. About 8.50 per cent of the teachers had offered English-Gujarati and 8.00 per cent English-Social Studies as their special methods of teaching. The subjects of

English-Gujarati were offefed by 4.50 per cent while the same percentage of teachers had offered History-Geography. Two percent of teachers had offered Gujarati-Sanskrit, English-Mathematics, and Hindi-Geography as their special methods of teaching, while only one per cent of them had offered Science-Social Studies, Mathematics-Social Studies, Hindi-Sanskrit, Gujarati-Mathematics and English-Hindi. The percentage of teachers who had offered English-Sanskrit as special methods of teaching was 1.5. Table number eleven below gives an analytical picture of the various special methods offered by the teachers.

TABLE -11

Subject	N	% age
History-Geography	9	4.50
Gujarati-Social Studies	47	23.50
Gujarati-Sanskrit	4	2.00
Mathematics-Science	43	21.50
English-Sanskrit	3	1.50
English-Gujarati	17	8.50
English-Social Studies	16	8.00
Hindi-Gujarati	9	4.50
English-Mathematics	4	2.00
Science-Social Studies	2	1.00
Social Studies-Mathematics	2	1.00
Hindi-Geography	4	2.00
Hindi-Sanskrit	2	1.00
Gujarati-Mathematics	2	1.00
English-Hindi	2	1.00

DATA COLLECTION

All the 200 teachers under study were observed in the classroom while teaching and their behaviour (interaction) was recorded with the help of Flanders Ten Category System. Each teacher was observed twice in the same class teaching the same subject, for a complete period of 35 to 40 minutes but not less than 20 minutes. The two separate observations of the single teacher were combined into one. Frequency tables were prepared and I/D ratio, i/d ratio, and T/S ratio were calculated. Frequencies of category 3 and category 9 were converted into percentages.

Personality tests and attitude scales in Gujarati versons were administered individually to all the teachers. The completion time of teachers varied from one hour to three months, however most of the teachers took about a week to complete the tests.

Scoring:

On return of the tests scoring was done according to the standardized procedure for each separate test. In the case of personality inventory every correct response was given a score of one. Incorrect and undecided responses were ignored. At the end a total score for each individual (teacher) on each

trait was obtained. Out of the eight attitude scales six scales were scored according to Likert procedure. The strongly agree response on positive statements was given a score of 5, agree response a score of 4, uncertain response a score of 3, disagree response a score of 2, and strongly disagree response of 1. While scoring the negative statements the procedure was reversed that is the strongly agree response was given a score of 1 and strongly disagree response a score of 5. Here also a total attitude score for each teacher on each of the 6 scales was obtained.

The scoring of Educational Scale and Teaching Profession Scale was done according to Thurstone procedure. The scale values of the statements with which the teachers fully agreed were totalled and averaged. This average score was considered the attitude score of that particular teacher. In Education Scale low scale values indicated favourable attitude while in Teaching Profession Scale high values indicated favourable attitude. To avoid this discrepency the attitude scores of Education scale were converted on a higher continuum.

ANALYSIS OF THE DATA

For the analysis of the data and statistical computation help of the computer was sought. Two reasons accounted for this (1) inability to compute the data manually and (2) complicated and higher order statistical procedures involved in the

computation. The investigator prepared a proforma in which the total values of the 5 criterion variables and 15 predictor variables were entered horizontally, for each of the 200 teachers. These statistical values were punched on the IBM cards and were fed in the computer for further calculations. About half of the analysis was done in the computer Centre of Sarabhai Operation Research Group, Baroda, and half of the work was done at Bombay in the Computer Section of the Tata Institute of Fundamental Research.

Statistical Methods:

Keeping in view of the objectives of the research namely determining relationship between - dependent and independent variables and making predictions appropriate statistical methods were selected. For the first purpose Pearson's Product-Moment correletation technique was adopted and for the second purpose step-wise regression equation method was used. For the third purpose namely to study the difference in the means of direct and indirect teachers on seven personality traits t-test was used. A brief description of step-wise regression equation is given below.

Step-wise Regression:

This technique selects variables for a regression equation at a time (24). Selecting first the most valid predictor variable, it then selects that variable which when combined with

thefirst is the most useful - that is the one which adds the most to the multiple correlation and which thus yields the best two predictor equation among those equations which contain the first variable selected. The extent to which the multiple correlation would be increased by a variable is determined by computing the validity of the orthogonal component, or some mathematically equivalent statistic for the predictor variable being considered. The technique then selects by the same criterion the variable which combines with the first two variables to produce the best three predictor equation. Subsequent variables are selected in a similar manner. Variables can also be removed if they are found to be no longer useful.

The process could be stopped when the initial sample validity of the equation approaches that computed using all available variables, or when adding the most useful remaining variable produces no satistically significant increase in the multiple correlation by the significance test.

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