C H A P T E R IV

METHODOLOGY, RESEARCH TOOLS AND DATA COLLECTION

The present chapter deals with the problem of research methodology, selection of sample, the preparation of research tools and the plan of data collection.

RESEARCH DESIGN

Research design of any study depends upon what the investigator aims at finding out from the study. The problem of design is thus linked with the purpose of the study, the variables being studied in the inquiry and the hypotheses formulated for being examined. All these aspects of the present inquiry have already been discussed earlier. Two major outcomes of the present inquiry which the investigator aims at are:

(i) whether any relationship exists between a number of attributes of the school principal and the innovativeness of a school and if so,

(ii) whether it is possible to identify some specific predictors of school adaptability and develop a prediction equation for the same.

The research design in an inquiry of this type will include different modes of analysis. In order to find out the factors associated with adaptability, one approach planned is to use 't' test or 'Chi-square' test, to test the significance of differences between measures of factors associated with schools with high adaptability and those with low adaptability. Again, the second mode of analysis will be based on finding out correlations between the predictor variables and the criterion variable. As there are as many as fortynine predictor variables, the statistical design will take the form of multivariate analysis. Multiple correlation and stepwise linear regression analysis will characterize the treatment of data in the present inquiry.

Most prediction analysis have employed multiple correlation as the statistical tool for the analysis of data. A number of diffusion studies in the field of rural sociology and education have attempted to predict either the adoption of a single innovation or the rate of adoption of a group of innovations, or the innovativeness of a school system with a battery of personal characteristics of the potential adopter. Gross and

Taves (1952), Marsh and Coleman (1955), Carlson (1965a), and Wallace (1970), have attempted to predict adoption of innovations with a battery of personal characteristics of the farmers or the school principals or the institutional characteristics like the organizational climates in the schools. The methods utilized in these past prediction studies would prove useful in attempting to predict school adaptability in the present inquiry.

Multiple correlation is a statistical method whereby a series of predictor variables are related to a criterion variable. The goal of multiple correlation approach to prediction is to explain a maximum of the variance in the criterion variable. It is also possible to determine the relative contribution of each predictor variable in explaining the criterion variable.

The multivariate design of the study will utilize stepwise linear regression analysis to determine the ability of a combination of predictor variables to account for variance in the criterion variable, viz.,the school adaptability. Regression analysis permits various factors to be evaluated from available data even when the variables cannot be controlled. Williams (1959) defines the technique of regression analysis as, "the estimation or prediction of the value of one variable from the value of other given variables". (Williams, 1959, p.2)

Veldman has characterized multiple regression analysis as follows:

> Multiple regression analysis may be considered a general model for testing any hypothesis cast in the form of predicting a criterion from particular sources of information. Especially important is the fact that the predictor information may be in the form of dichotomous scores reflecting group membership, or may consist of scores on continuously distributed variables. Both kinds of predictor variables may be included in the same equation. (Veldman, 1967, p. 294)

The stepwise linear regression technique selects variables at a time on the basis of their correlation with the dependent variable, from the total set of available predictor variables. In order to undertake such a sophisticated analysis, the investigator took the help of the Operation Research Group, Baroda, and got a computer programme for stepwise linear regression analysis prepared. The programme selects the most potent predictor variable for the first iteration. On the subsequent step the programme selects the variables which when added to the first produces the largest increase in the multiple correlation. The programme then continues in a similar fashion selecting additional variables, one by one, which when combined with the previously selected variables prove most effective in predicting the criterion variable. This iterative procedure is continued either until all the variables have been added or until the addition of the next most useful remaining

variable does not increase the multiple correlation significantly. The listing of this programme is given in Appendix A.

In short, the statistical analysis of data will have the following steps:

1. Computing the means and standard deviations of the scores on all variables;
2. Preparing a correlational matrix of fifty variables;
3. Performing stepwise regression analysis.

POPULATION AND THE SAMPLE

The aim of the present inquiry is to find out the factors related to adaptability in Indian schools. The problem thus is concerned with the process of change in schools which are typically Indian. This interpretation, therefore, raises the question of the population and the sample. There is nothing like a typical Indian school as education in India is a State subject and the schools in different States differ in structure as well as instructional programmes. However, there are certain common characteristics in the schools in different States. There are certain variations also. The variations are:

a. Structure of schools

In some States there are high schools upto class X and higher secondary schools upto class XI. There are other States where the high school stage prolongs upto class XI. In quite a number of States, high schools and higher secondary schools co-exist. In U.P. the high school is upto class X and then the intermediate stage upto class XII.

b. Management and the grant-in-aid system

In all the States there are three types of recognized schools - private unaided, private aided and government or local bodies managed. The private aided schools receive grants from the government according to the grant-in-aid codes in the States. Less than 20 per cent children in India are in government secondary schools. Even then the government managed schools are considerable in number and exert a strong influence on the other aided and unaided schools. Only in the States of Gujarat and Maharashtra, government schools do not have much influence on the change process in the private aided schools. The private aided schools receive different amounts of grants in different States. By and large, grant-in-aid codes of Gujarat, Maharashtra and Madhya Pradesh are considered satisfactory by the management of private schools. In all other States, the grant-in-aid

codes do not provide adequate grants, thereby discouraging schools to take up innovative programmes.

c. The courses of study

The courses of study differ from State to State. This is specially so when it comes to the question of the place of Hindi and English in the school curriculum. The variations are not merely in case of Hindi and English but one finds some variations in the case of science also.

Inspite of the variations mentioned above, there are quite a few aspects which are common in schools all over the country.

(i) In all the schools in India, the principal is the key figure taking most of the decisions by himself. The Indian schools are characterized by a somewhat controlled climate. Whatever the nature of the management, this is more or less the picture in all Indian schools. Only in few cases, innovations start from teachers. This is mainly because of a stereotype training programme, absence of professionalization amongst the teaching personnel, and lack of communication between different schools.

(ii) Whatever the instructional programme, there is little or practically no involvement of the teachers therein. The working conditions, the physical facilities

are also not stimulating enough to promote innovations by teachers. No doubt, attempts are being made to encourage experimentation by teachers but this programme has touched only a small section of teachers.

(iii) Whatever the innovations there are in schools, they have mainly been sponsored by State Department of Education and Extension Services Departments and other external agencies.

With this picture in view, a study in school adaptability has to consider only the location of schools (urban or rural area) and the type of management. With these two dimensions kept in mind, the study can be made on a sample of schools in any State, except the schools of Delhi, which by no stretch of imagination can be said to represent a typical Indian school. In western countries, specially in U.S.A., the school systems differ very much, depending upon the capacity of the community to pay for the education of their children. No attempt, therefore, has been made to undertake studies on schools selected from all over U.S.A. Even Carlson's (1965a) study takes two school communities separately. As the purpose is to study factors promoting school adaptability, what is needed is a group of representative schools incorporating all structural and functional dimensions which influence adaptability.

In the present study, no attempt has been made to study per capita expenditure as a variable influencing school adaptability. It was, therefore decided to take schools belonging to different types of management and located in urban and rural areas in one State only. However, the tool to measure adaptability was constructed keeping the entire country in view. The population for the present study consists of 1700 schools sending students to the S.S.C. examination in the year 1969, in the State of Gujarat. Out of this, seventyfive schools were selected at random on the following stratifications:

1. Government schools and private aided schools,
2. Located in urban area and rural area.

The following table gives the distribution of the schools - managementwise and locationwise:

TABLE 4.1

Showing the Distribution of Schools Selected in the Sample

	Management		
	Private aided	Government	Total
Rural	45	-	45
Urban	21	9	30
Total	66	9	75

The proportion of schools in various categories has been fixed on the data available from the records of the S.S.C. Boards. No school which is government managed and also located in rural areas could be selected, as there are very few government schools in the State of Gujarat and the same are located in urban areas only. Again no public school has been selected in the sample as it would not be a typical average school in India.

PREPARATION OF TOOLS

In investigations in education and allied social sciences, preparing or selecting tools demands greatest care. In fact, many a study are not even attempted in absence of valid and reliable tools.

The present study aims at finding the relationships between a set of variables with one dependent variable viz. the adaptability of the school. The questions which an investigator faces at the time of instrumentation are: "In what way will he like the data to be quantified? Does his plan of analysis require data to be measured in ordinal scales or internal scales? Does he want to quantify his data at all? What should be the sensitivity of the tool in terms of reliability? Are there any tools available at all which the investigator can use?" These are some of the questions which the investigator has to keep in mind.

In the present investigation, three major tools have to be constructed. One is the scale to measure innovativeness, the second is a tool to measure a large number of independent variables and lastly the third is a tool to measure dimensions related to organizational climate of schools.

1. Measurement of adaptability

Before any attempt was made to develop a new tool, it was considered desirable to analyse some of the existing tools to measure different aspects of school adaptability. A brief description of the thirteen different tools which the investigator could procure is given here.

1. The Growing Edge:- This instrument was developed by Mort, Vincent and Newel (1945). It has provided the criterion scores for most of the later adaptability studies.

The process of measuring the adaptability of school systems by means of this instrument is based upon the observation of school practices which reflect the growing edge of American education.

The specific practices included in the instrument are organized around four major areas of educational purpose.

(i) The teaching of the basic skills:

a. Teaching of basic skills in life-like situation,

b. Variety of basic skills taught.

(ii) The teaching of the areas of knowledge:

a. Teaching facts in relation to their meaning and usefulness,

b. Breadth of knowledge area taught, including variety of resources for knowledge.

(iii) Discovery and development of special aptitudes of individuals through test and tryout.

(iv) Development of gross behaviour patterns like citizenship, character and thinking.

Each item of the instrument is a description of a specific school practice. The items are drawn from "What schools can do?", a publication bringing together the results of the work of more than two hundred and fifty school people who made an intensive study of the practices existing in their schools. The particular items included in this instrument were chosen by a panel of trained educators. The high school form consists of 85 items while the elementary form consists of 64 items.

In general, the technique of using the instrument consists in discovering in a given school system the presence or the absence of specific practices. This instrument may be applied as a self-evaluation guide or by outside observers. It is not necessary that the person using the instrument (a field worker) observes in actual operation every practice for every item. But he must satisfy himself by reliable evidence of some kind that a given practice described in the instrument (or its allowable substitute) has been an event in the life of the pupils within four month period previous to his visit to the school.

The scoring of the responses goes according to the tickmark made by the respondent. The direction for the respondent is simple. If the situational example quoted in the item or an equivalent of that is present, a single check (_/) is to be put. If there is a strong evidence that the example given in the booklet (or the alternative) is characteristic of the teaching with respect to the particular skill in question, two check marks are to be put. The score is added-up at last.

Test of reliability made by the split-half technique yielded a coefficient of reliability of .88 for the high school form and .89 for the elementary school forms.

While the two parts of the instrument were not designed to be comparable, one being for the elementary school and the other for the high school, they are both designed to measure the adaptability of schools. Some indication of the validity of the instrument is revealed by an inter-correlation of .68 between the two forms. The inter-correlation of the elementary school form with another measure of adaptability "The Time Scale" is .51 and the same for the high school measure is .58.

2. A Guide for Self-Appraisal of School Systems: This instrument is often referred to as "The Lag Book" or the "Mort-Cornell Guide". It was first published in 1937 and was extensively used in the Pennsylvania study. The logic behind this instrument is that as one studies the intelligence of persons not directly but by observing what they do under given circumstances, the same way one can begin to understand adaptability by observing adaptations which have taken place or which are in process.

The instrument consists of 183 practices, each of which can be seen in operation in good public schools. The main purpose of this instrument is that of self-appraisal. The ideal against which the average school executive, engaged upon the diagnosis of his school system would measure its adaptability would be within the reach of the ordinary everyday public school. A majority of the items refer to steps which school systems

have already taken to improve their educational programmes, yet some of the items definitely relate to activities carried on by schools in anticipation of future improvement. The practices included tend to reflect conditions of schools as they are today, both with respect to changes which have taken place in the future. They imply response to new demands and to change in demands to satisfy persistent needs.

There are four major divisions of the instrument - classroom instruction, special services for individual pupils, educational leadership and physical facilities and business management. These divisions are again subdivided into subsections giving 183 items referred to as adaptations to be scored.

The responses given to the questions put at the end of each of the items serve as indication for either the presence or the absence of the same practice. The total weightage of the evidence recorded determines the presence or the absence of the particular practice.

3. Mort-Pierce Time Scale:- The instrument aims at finding out the index of adaptability of a school system by finding out at what stage of the diffusion of a given innovation a school introduced it. By finding out the date of introduction of a given innovation, it was possible to find out the relative characteristic of the

school as pioneering, early adopter or late adopter and laggard.

In order to get a pretty good index of the school adaptability, twentytwo innovations widely known and within the reach of system have been supplied. Credit to a system on the introduction of an innovation was given in relation to the total diffusion of the same innovation among the other school systems. Addition of all the scores thus derived on the introduction of all the innovations indicates the relative position of the school system to be classified under the four adopter categories.

The reliability of the instrument obtained by the split-half technique is .84.

4. A.P.S.S. Time Scale:- The A.P.P.S.(Associated Public School System) Time Scale is a further refinement of Mort-Pierce instrument. Rather than taking merely the list of practices introduced in the school, this instrument takes into account the extent of use and date of introduction of the practice in the school. Thus the main feature of this tool is the weight being given to the degree of use. In this instrument there are thirty-three practices. Information is obtained for each practice in terms of percentage of pupils involved. Again the status of the practice in terms of its being

used on an experimental basis or being used occasionally or being used on a widespread basis is also studied. On the basis of this information, indices of adaptability are being developed.

5. Carlson's Measure of Rate of Adoption:- Carlson's (1965a) study of rate of adoption uses a simple measure of time of adoption of innovations by superintendents in their school district. His technique involves in finding out the time at which a particular innovation was adopted. In order to get a reliable measure, Carlson suggests that the tool to be used only for those superintendents who are in position at least one year prior to the adoption of innovations. He has used three innovations to measure the rate of adoption.

In order to combine the rates of adoption of each one of the three innovations, the separate rate of innovation of each individual innovation is converted into sten scale which are then added. This establishes a numerical value for the combined rates of adoption. The respondents are divided into different categories of adopters on the basis of the generally accepted percentages for these categories.

6. Marion's Scale of Innovativeness:- Marion (1966) in his scale of innovativeness has used two indices of innovativeness. The number of innovations

adopted by a school constitutes the first index of innovativeness (I_1). By adoption of an innovation was meant a practice used regularly in the school and not incidentally or occasionally. Extent of use,constitutes the second index (I_2).

The decision to produce two indices was based on the belief that the adoption of a number of innovations is a different type of behaviour than is the adoption in depth of the innovations.

Five innovations, (departmentalization in grade IV, V & VI, subject consultants, parent-teacher interview, French instruction, and television) were chosen out of the twenty supplied by the Central Office of the school district. All these innovations were still in process at the time of investigation.

The objective behind developing 'second index (I_2)' is in an endeavour to determine which variables are significantly related to the extent to which the innovations were adopted within the school and also to ascertain whether these variables are the same as those associated with adoption of the five educational innovations.

7. Rogers, et al. Tool:- Rogers et al. (1966) prepared a tool to measure the assimilation of an

innovation in three Michigan high schools.

The tool measuring the assimilation of the innovation includes four variables. They are: (i) Time of awareness, (ii) Time of adoption, (iii) Internalization, and (iv) Self-perceived change orientation.

The tool gives four separate measures of the adoption of innovation. No combined score has been attempted.

8. Miller's Inventory of Change-Proneness:- Miller's (1967) inventory to measure change-proneness functions as a self-appraisal device for the persons in the field of education.

The inventory can be used by classroom teachers, principals and superintendents also. Twelve common questions form the core of the inventory with a few more additions given particularly as and when it is used either by the superintendent or the principal or the teacher.

The rating is done on a simple seven point scale. The added score gives the estimate of a person's change-proneness.

9. Indices of Innovativeness by Seger and Holdaway: Three indices of innovativeness viz.(1) number

of innovations adopted, (2) extent of adoption, (3) relative earliness of adoption are calculated for each school using five innovations by Seger and Holdaway(1968).

Index I_1, measures the number of the new practices out of the selected five, present in the school. The score, therefore, ranges from zero to five.

Index I_2 is used to assess the extent of utilization of the five practices. This measure helps in discriminating a principal who has an overall limited adoption of the new practices from the other who has adopted the practices more completely. The score for I_2 is obtained by normalizing the sums of the percentages of adoptions of each of the new practices.

Index I_3 is developed to measure a tendency towards early adoption of new practices. It is assumed that the earlier-adopting principal does not necessarily adopt all available new practices nor does he adopt them to a greater extent than does a late adopter.

It can be argued that a relationship among the indices is inherent in the definition, and that a score on any one index of innovativeness indicates a score on the other two. However, in the present study (Seger and Holdaway) a score on any one index does not fix the score on either of the other two. It, therefore,

supports the contention that a positive and significant relationship would exist but that the ability to predict a score on one index from a score on the other would not be great. These expectations seem to be consistent when the three indices purport to evaluate differing elements of the common phenomena of innovativeness.

All the indices are related but not predictable one from the other. Seger and Holdaway observe that they tend to "factor out" as a legitimate statistical dimension. A combination of the tendencies to adopt new practices, to adopt these more extensively, and to adopt them earlier, can possibly be used as a gross innovativeness measure.

10. Roosa's Scale of Measuring Rate of Adoption: Roosa (1969) measured the rate of adoption by schools on twenty innovations which were in the process at the time of study. They were innovations well scrutinized by the persons in the field.

His technique of measuring the rate of innovation includes three things: (1) Time; (2) Usage; (3) Time + Usage.

Scoring on time is done by giving credit for the adoption of each of the innovations, according to the time interval by the investigator.

Usage is found by comparing the amount of usage of twenty innovation in each of the sample school. It is scored on a five point scale 'not used', 'experimental use', 'occasional use', 'used in almost all possibilities' and 'used in all possibilities'.

The total score of points assigned for time and usage of twenty innovations finally gives rank to the schools in the sample on the rate of adoption of educational innovations.

11. Rao's Instrument to Measure Innovations in Secondary Schools:- Rao's (1967) instrument to measure innovativeness is an adaptation of the 'Growing Edge' of Mort. He has selected typical innovations in seven different areas. The respondent is expected to indicate whether he has got the mentioned practice or a similar one in his school. He has to mention any variation that he might have made in the practice. The instrument also collects the data about the year of adoption. The instrument was developed by Rao for his Doctoral Research.

12. Bhogle's Instrument to Measure Acceptance of Innovations:- Bhogle (1969) has prepared two scales to measure innovation acceptance. One scale is a simple instrument inquiring from the headmaster the

number of innovations adopted, out of the five selected by her. Depending upon this data the headmasters are classified into adopter categories.

The second instrument is a questionnaire measuring innovation-proneness of teachers.

13. Larry's Instrument:- Larry (1965), categorised his school districts as innovative or non-innovative by developing an instrument measuring the adoption of innovation in seven areas, viz., business, finance, administrative organization, staff personnel, instruction, pupil personality and school community - relations. The total score derived on the adoption of the innovation finally judged the innovativeness or the non-innovativeness of the school system. He used primarily the number of innovations adopted as an index of innovativeness.

The above study of various tools clearly establishes that they are mostly based on two considerations viz. (i) credit is given on the number of innovations or their equivalents adopted by a school from an extensive list of new practices supplied to them, (ii) credit is given on the manner of adoption of an innovation from the given list of concrete and relatively mature innovations - adoption time,extent etc.

Thus the measurement of adaptability requires an understanding of the process of adoption of innovations. It may include, in addition to the number of innovations adopted, information about the extent of adoption, the time of adoption and also continuation or discontinuation of innovations. These aspects of the adoption process are important.

The thirteen tools reviewed above incorporate one or more of these four aspects as can be seen in Table 4.2.

TABLE 4.2

Analysis of Various Tools to Measure Adaptability

Sr. No.	Name of the tool	No. of innova-tion adoption	Extent	Time	Continues or not
1	Growing edge	✓			
2	A guide for self-appraisal of school system	✓			
3	Mort-Pierce time scale	✓		✓	
4	A.P.S.S.time scale	✓	✓	✓	✓
5	Carlson's measure of rate of adoption	✓		✓	
6	Marion's scale of innovativeness	✓	✓		
7	Rogers et al.tool		✓	✓	✓

Sr. No.	Name of the tool	No. of innova-tion adoption	Extent	Time	Continues or not
8	Miller's inventory of change-proneness	✓			
9	Indices of innovativeness by Seger and Holdaway	✓	✓	✓	
10	Roosa's scale of measuring rate of adoption	✓	✓	✓	
11	Rao's instrument to measure innovations in secondary schools	✓			
12	Bhogle's instrument to measure acceptance of innovations	✓			
13	Larry's instrument	✓			

The investigator selected two criteria for the preparation of the tool to measure school adaptability, viz.

(i) How many innovations from the given list have been introduced?

(ii) Whether these innovations have been introduced fully or partially?

The investigator did not consider the year in which a particular innovation was introduced as this might give a wrong picture of the degree of adaptability

of a school, specially in the rural areas where the new innovations might not have reached in absence of any dissiminating agency. However, though not included in the scoring system, this item was introduced in the scale as it is likely to give rich information for those who might be interested in studying the dissimination process of new ideas and practices. These data might also be useful for future research.

The next question was the consideration of the continuation or the discontinuation of an innovation in the school. A.P.S.S. time scale has included the year of introduction as well as the year of discontinuation of an innovative practice. However, Adler (1955) is of the opinion that the scores based on the extent of adoption of an innovation provided more reliable data than those derived from introduction or discontinuation dates. In the present scale it was, therefore, decided not to give any score to the time of introduction and discontinuation. But again it was felt that wherever this information is available, it might provide the data for future studies. Again, if the school principals were asked to provide these data, they might be stimulated to think about a new practice more seriously, thereby possibly adding to the reliability of the data. The scale, therefore, took the following form:

Innovation (Name)	Whether introduced Yes/No	Partially or fully	Year of intro-duction	Continues or not
1				
2				
3				
4				
5				

Since 1952, when the report of the Secondary Education Commission was published, a number of new ideas began to be discussed by educational administrators, headmasters and teachers. This was followed by the establishment of All India Council for Secondary Education and subsequently the NCERT. As a result of the activities of these national bodies, a number of innovative programmes and practices appeared on the educational scene in India. Again the Extension Services Departments, State Boards of Education, State Evaluation Units, State Institutes of Education, further sponsored new programmes and new practices. To prepare a list of innovations, the investigator herself prepared a tentative list of innovative programmes and practices and contacted a large number of educationists, educational administrators, and teacher educators seeking their assistance in preparing an exhaustive list of new

practices and programmes. One hundred experts were contacted through correspondence. Seventytwo experts responded. In all thirtyeight innovative practices supposed to be prevalent in Indian schools were suggested.

Table 4.3 gives the list of these practices along with the frequency of number of experts suggesting the same.

TABLE 4.3

List of Innovations Along with Frequency of Suggestions

Sr. No.	Innovations	Frequency
1	Objective centred evaluation of pupil's achievement	65
2	Internal assessment	63
3	Pupil's motivation	25
4	Work experience	18
5	School complex	6
6	Maintaining a cumulative record card	69
7	Instructional material	15
8	Unit tests	62
9	Objective type tests	70
10	Annual seminar of teachers	61
11	Self-evaluation of schools	8
12	Units plans	26
13	Weightage to different examinations held in the course of an year to decide promotion	69

Sr. No.	Innovations	Frequency
14	Programmed learning	8
15	Open shelf library	59
16	Library centred teaching	61
17	Integrated social studies programme	6
18	Class management for absent teachers	26
19	Experimental and developmental projects	66
20	Student's work book	61
21	Home projects	18
22	Tutorial systems	28
23	Team teaching	30
24	Subject departments of teachers	65
25	Educational and vocational guidance	62
26	Supervised study	15
27	Teacher exchange	23
28	Developing reading habits among pupils	65
29	Better utilization of school library	38
30	Remedial programme for backward children	61
31	Programme for the gifted children	67
32	Planned programme for professional development	20
33	Cooperative projects by teachersof the same school or of different schools	62
34	Stimulating creativity amongst pupils	63
35	Subjectwise promotion	13
36	Open book examination	8
37	Parent-teachers' associations	70
38	Examination without a supervisor	8

Once the initial list of innovative practices was compiled, the next question was to decide the innovations to be included in the tool. A straight answer to such a problem is to include all innovations. This would, however, raise certain problems. One problem is the danger of including such innovations which a teacher may not have even heard about. Some of these innovations are locally sponsored and except the schools in that zone no other schools might be aware of such problems. Again there may be some innovations which may have been sponsored by State authorities with financial support. Such innovations may not be possible in other schools howsoever ready they may be for change, e.g. UNESCO Science programme. It is an innovative programme sponsored by the NCERT, and the Ministry of Education, Government of India. Some schools are under an experimental project for trying out this programme. The students are given free text-books, the schools are given special laboratory kits and the teachers have a planned programme of inservice education. Such a programme could be implemented by an adaptable school only when it receives the administrative sanction and financial grant. Problems like these have to be considered while including any innovation in the instrument to measure adaptability. It was, therefore, decided to approach principals of schools to seek their opinion on the selection of innovations to be included in the instrument. Eighty

headmasters/principals from different States were approached seeking their opinion about the feasibility of an innovation being adopted by a school without special financial and administrative issues. These headmasters were requested to indicate such innovations from amongst the list of 38 which are normally well known to schools and which could be tried out without administrative and financial difficulties. With the ultimate purpose of developing a tool that can be used on a nationwide scale it was decided to include only those innovations which are commonly known in all the States.

An analysis of responses received from sixty principals indicated the following nineteen innovations where at least 80 per cent of the respondents agreed.The following innovations were selected for being incorporated in the tool to measure adaptability:

1. Objective centred evaluation of pupil's achievement.
2. Internal assessment (other than 20 per cent marks prescribed by the department).
3. Maintaining a cumulative record card (only if the C.R.C. is maintained systematically and scientifically).
4. Objective type tests.
5. Unit tests.
6. Weightage to different examinations held in the course of an year to decide promotions.
7. Annual seminar of teachers.

8. Library centred teaching.
9. Open shelf library.
10. Experimental and developmental projects.
11. Cooperative projects by teachers of the same school or of the different schools.
12. Stimulating creativity amongst pupils.
13. Remedial programme for the backward children.
14. Programme for the gifted children.
15. Developing reading habits among pupils.
16. Parent-teachers' association (if it is functioning systematically).
17. Subject departments of teachers.
18. Educational and vocational guidance.
19. Student's workbook.

Description of innovations :

X Objective Centred Evaluation of Pupils'

Achievement:- Objective centred evaluation received focus when a series of workshops were organized under the guidance of Dr. Benjamin Bloom of the University of Chicago and the establishment of the Evaluation Unit by the All India Council for Secondary Education. This concept of evaluation visualizes evaluation tools constructed on the basis of clearly defined instructional objectives. The formulation of instructional objectives was facilitated with the publication of the epoch making book, "the Texonomy of Instructional Objectives -

Cognitive Domain", by Bloom and others (1956). This innovation has been disseminated all over the country through the programmes and activities of the agencies like NCERT, State Institute of Education, Extension Services Departments, State Evaluation Units, etc.

Internal Assessment:- This innovation was started on the basis of the recommendation of a national seminar on examination reform. It includes the assessment of not merely academic achievement but also the non-scholastic traits of the pupils by teachers.

Maintaining a Cumulative Record Card:- The cumulative record is a continuous record of pupils' achievement and growth maintained systematically over a period of years.

Objective Type Tests:- In order to improve the objectivity and reliability of examinations, objective type of test items are being included in examinations. Many times these items test only memory or information.

Unit Tests:- When a meaningful teaching unit has been taught, tests based on this unit are framed and administered. The tests are based on a table of specifications incorporating the content, objectives and even test forms.

Weightage to Different Examinations Held in the Course of the Year to Decide Promotions:- In this innovation, the final results of pupils are decided not on the basis of annual examinations only. Weightage is given to different periodical examinations held in the course of the year.

Annual Seminars of Teachers:- A seminar of teachers of a school is organized once in a year — either towards the end of the year or in the beginning of the year. In the seminar, instructional programmes and other aspects of the school are reviewed and the plans for the next year are prepared.

Library Centred Teaching:- The school library is seen not merely as a place where books are kept but the same is seen as an instructional material centre. A regular period is given when the library work is linked up with the curricular programmes. The students use the library under the guidance of teachers.

Open Shelf Library:- Some of the schools have introduced the system of open shelf library. A free approach to the library shelves is permitted to the students. The students select the books of their own choice and interest.

Experimental and Developmental Projects:-Teachers

are encouraged to take up projects and experiments to improve classroom practices. This programme was sponsored by the All India Council of Secondary Education and subsequently supported by NCERT. A few projects receive a small financial support also.

Cooperative Projects by Teachers of the Same School or of the Different Schools:- Groups of teachers of the same school or different schools join together to take up cooperative projects in a specific subject or in an area of instruction.

Stimulating Creativity Amongst Pupils:- A teacher plans instructional programmes where pupils are stimulated to undertake activities on their own. Such programmes promote creativity amongst pupils.

Remedial Programmes for the Backward Children:- Special programmes are worked out to help the children who are lagging behind in their study. Such programmes take the form of a special instructional period for remedial work or special assignments to be worked out by students in the school or at home.

Programme for the Gifted Children:- Special programmes are organized for talented children. These programmes take the form of enriched curriculum, special guidance or challenging assignments for the gifted.

Developing Reading Habits Among Pupils:- A planned programme of studying the reading habits of pupils is undertaken. Based on the study, programmes are worked out for different pupils to develop their reading habits, at times in the form of selected reading materials for different children.

Parent-Teachers' Association:- Parent-teachers' associations are established in the schools. Meetings of these associations are organized for individual classes or for the school as a whole.

Subject Departments of Teachers:- A series of programmes are organized with a view to promoting the professional growth of teachers. This may include subject-wise study circles of teachers, discussion of articles from educational journals, teacher groups developing instructional materials, etc.

Educational and Vocational Guidance:- Teachers or career masters provide services to help the students select the subjects, provide information about the various courses in the school and in the university and also organize career conferences, occupational information courses, etc.

Student's Workbook:- To stimulate self-study, workbooks are provided to students. Such workbooks are

normally based on the textbooks being used by the pupils. At times the workbooks are based on the content included in the syllabus, specially in those regions where different textbooks are used by different schools.

Final form of the tool

With the innovations selected and decision taken to base the measure of adaptability on (i) the number of innovations adopted and (ii) the extent of their adoption, the scale got the final form. The final scale is reproduced below:

TABLE 4.4

The Final Scale

Sr. No.	Innovations	Whether introduced? Yes/No	Partially or fully	Year of introduction	Continuous or not
1	Objective centred evaluation of pupil's achievement.				
2	Internal assessment. (other than 20 per cent marks prescribed by the department).				
3	Maintaining a cumulative record card (only if the C.R.C. is maintained systematically and scientifically).				
4	Objective type tests				

Sr. No.	Innovations	Whether introduced? Yes/No	Partially or fully	Year of introduction	Continuous or not
5	Unit tests.				
6	Weightage to different examinations held in the course of an year to decide promotions.				
7	Annual seminar of teachers.				
8	Library centred teaching.				
9	Open shelf library.				
10	Experimental and developmental projects.				
11	Cooperative projects by teachers of the same school or of the different schools.				
12	Stimulating creativity amongst pupils.				
13	Remedial programmes for the backward children.				
14	Programmes for the gifted children.				
15	Developing reading habits among pupils.				
16	Parent-teachers association (if it is functioning systematically)				
17	Subject departments of teachers.				
18	Educational and vocational guidance.				
19	Student's workbook				

There are nineteen innovations. If an innovation is introduced fully, two credit is given. If it is introduced partly, one credit is given. The scale will therefore have a score range of 0 to 38.

Validity of the scale

It has been assumed that a measure of school adaptability can be developed in terms of the number of innovative practices introduced in a school and the extent of its introduction. With this concept of adaptability the present scale has a face validity. However, it was decided to determine the validity of the present scale in terms of some external criterion. That a school is adaptable or non-adaptable can be judged only by persons who are in continuous contact with the school. Usually the district education officer or the inspector of schools is supposed to be one who could rate the school on an adaptability scale but the present day inspection and supervision of schools has not attained a level of academic competence to find out whether the school is adaptable or not. One of the reasons for this is that adaptability by itself is a new concept with which the inspectors are not familiar. Again the supervision by district education officers in India is more of the administrative type rather than academic in nature. Even the proforma used for inspection does not include an account of new practices introduced in

the schools. Under these circumstances any opinion given by the district education officer may not provide a valid criterion measure against which the present scale could be validated. There is, however, another agency whose main function is to undertake academic work with the schools. This is the net work of Extension Services Departments attached to colleges of education in the country. The coordinators of Extension Services Departments work with a group of schools. Their work is purely of an academic nature. In fact, the Extension Centre is supposed to be the repository of all new ideas and practices in the area of school education. The investigator, therefore, decided to use this agency to get a list of schools which according to the officers of the Extension Centres are adaptable or non-adaptable. The coordinators of selected Extension Services Departments were requested to send a list of ten schools, five of which had shown a higher degree of adaptability and the remaining five a lower degree of adaptability. For the guidance of the coordinators the concept of adaptability was explained in the letter sent to them. A list of 75 adaptable and an equal number of non-adaptable schools was obtained. Again with the help of extension workers the present scale was administered to these schools. The results were analysed and t-test was used to find out whether the scale differentiated between adaptable and

non-adaptable schools.

TABLE 4.5

t-test Data for Validation of the Scale

Criterion groups	N	Mean		Diff. between means	S.E. of Diff.	C.R.	Remarks
Adaptable schools	75	24.3	4.94	9.5	.669	14.2	Highly significant
Non-adaptable schools	75	14.8	3.00				

It is thus seen that the present scale does distinguish between adaptable and non-adaptable schools.

Reliability of the scale

To find out the reliability of the present scale the test re-test method was used. The investigator herself contacted 40 schools and administered the scale during July, 1969. Again, during the month of September the same schools were readministered the scale. Pearson 'r' was calculated using the two sets of the scores. The two sets of scores are given in Appendix B. The high value of 'r' (.86) indicates a fairly good reliability of the present scale.

2. Tools to measure independent variables

The independent variables to be studied in this investigation have been broadly classified under seven categories as already mentioned in Chapter III. At the risk of repetition, to facilitate discussion, these categories are: (i) Demographic, (ii) Institutional, (iii) Communication behaviour, (iv) Psychological, (v) Community, (vi) Organizational climate and (vii) Miscellaneous.

Under each category, a number of variables have been included. When a large number of variables have to be studied simultaneously, the question of instrumentation presents a number of difficulties. If altogether new instruments have to be prepared, the very task of preparing a large number of instruments will be stupendous. Even if independent and sophisticated tools to measure the various variables are available, collection of data through the use of these instruments will present organizational and human problems. There are as many as 49 variables included in the present study. Apart from a few variables where only informative details are needed, a large number of other variables present the possibility of independent scales. A single principal would be at his wits end if he has to respond to a large number of separate tools. The second alternative is to have a short questionnaire. But a short

questionnaire may not give well refined data. It was, therefore, decided to construct a questionnaire which would include a series of items of Likert type which would indicate varying degrees of the existence of a particular variable. Again because of this structured nature of most of the items the respondents would not find difficult and boring even though the instrument may be an elaborate one. This would further add objectivity to the scoring scheme, thereby contributing to the reliability of the tool. After reviewing relevant literature and a large number of tools used in previous studies, it was felt that the tool used in the diffusion of educational innovations in the Government Secondary Schools of Thailand could form the base for preparing the present instrument. Considering the prestige value of this instrument also, it appeared to be a better choice as its authors included an eminent researcher, Prof.Everett M. Rogers. A large number of other questionnaires and scales were also studied and several items were adopted from them. Additional items were constructed by the investigator.

Under the first category, viz. Demographic,seven items were constructed. All the items were structured. Each of these items were in the form of a quasi scale. The scale values were mostly from one to five (1 - 5) e.g. in an item inquiring about the extension/inservice programmes attended by a principal during the last three years, a

score of <u>one</u> was given if the principal had attended one or two programmes, a score of <u>two</u> for attending three or four programmes, a score of <u>three</u> for attending four or six programmes, a score of <u>four</u> for attending seven or eight programmes, and a score of <u>five</u> for attending nine or more programmes.

The following two specimen items in this category are:

1. Extension/Inservice programmes attended during the last three years.
   (Please mention programmes held on district, State or national level only).

1	1 - 2	1
2	3 - 4	2
3	5 - 6	3
4	7 - 8	4
5	9 and more	5

2. Based on your reply to question No.9, please mention the number of days spent in attending extension/inservice programmes during the last three years.

1	1 - 5	1
2	6 - 10	2
3	11 - 15	3
4	16 - 20	4
5	21 and more	5

The category 'Institutional' is subdivided into two sub-categories viz. 'role perceptions' and 'the perception of superiors and superior relations'. Twentysix items were constructed to measure seven variables included in the sub-category 'role expectations'. All the items are structured on the Likert type of items. The following

are the specimen items in this category.

1. Generally speaking, I don't like being a principal, except that I get a better grade.

   1. agree on the whole----------1 ----------
   2. agree somewhat--------------2 ----------
   3. don't know------------------3 ----------
   4. disagree somewhat-----------4 ----------
   5. disagree on the whole-------5 ----------

2. I feel at home in this school as nothing makes me nervous or uneasy.

   1. agree on the whole----------1 ----------
   2. agree somewhat--------------2 ----------
   3. don't know------------------3 ----------
   4. disagree somewhat-----------4 ----------
   5. disagree on the whole-------5 ----------

3. How would you rate your administrative ability compared with other principals in general?

   1. good------------------------1 ----------
   2. above average---------------2 ----------
   3. average---------------------3 ----------
   4. below average---------------4 ----------
   5. poor------------------------5 ----------

4. How would other principals rate your administrative ability compared with other principals in general?

   1. good------------------------1 ----------
   2. above average---------------2 ----------
   3. average---------------------3 ----------
   4. below average---------------4 ----------
   5. poor------------------------5 ----------

Under the second sub-category, there are ten variables being measured by twentysix items. Some of the specimen items are given below:

1. How well do you think the training college personnel would agree with the following statement made by you?
"Personally I feel I can adjust to change easily".

   1. he would agree very much--------1 -------
   2. he would agree a little---------2 -------
   3. he would not be sure------------3 -------
   4. he would disagree a little------4 -------
   5. he would disagree very much-----5 -------

2. As compared with other principals whom you know, to what extent does the district inspector of schools take interest in the programmes of your school?

   1. much more frequently------------1 -------
   2. more frequently-----------------2 -------
   3. just about the same as he takes in other schools----------------3 -------
   4. less frequently-----------------4 -------
   5. much less frequently------------5 -------

3. What do you feel about the encouragement given by the training college personnel (extension coordinator) in implementing new programmes in your school?

   1. much more frequently------------1 -------
   2. more frequently-----------------2 -------
   3. just about the same as he takes in other schools----------------3 -------
   4. less frequently-----------------4 -------
   5. much less frequently------------5 -------

The third category - 'the Communication Behaviour' includes six variables and nine items. The following are the specimen items:

1. I read educational journals regularly. (Tickmark the number of journals)

   1. One----------1 ----------
   2. Two----------2 ----------
   3. Three----------3 ----------
   4. Four----------4 ----------
   5. Five----------5 ----------

2. Compared with an average principal of my district, I have attended professional/ educational conferences/meetings which involve educators from more than one district.

   1. very frequently----------1 ----------
   2. quite frequently----------2 ----------
   3. about the same----------3 ----------
   4. seldom----------4 ----------
   5. rarely----------5 ----------

The category 'Psychological' includes two variables and seven items. The following are the specimen items:

1. I make my own decisions and judgments.

   1. agree on the whole----------1 ----------
   2. agree somewhat----------2 ----------
   3. don't know----------3 ----------
   4. disagree somewhat----------4 ----------
   5. disagree on the whole----------5 ----------

2. Are you in contact through correspondence with educational personnel in foreign countries?

   1. none----------1 ----------
   2. one----------2 ----------
   3. two----------3 ----------
   4. three----------4 ----------
   5. four and more----------5 ----------

The category 'Community' includes information about the community where the school is located, involvement of parents of the children studying in the school and the

interest of the management. Eleven items have been found to measure these variables. Some of the sample items are:

1. As compared with an average school in the district, to what extent you receive help from the community in development and improvement of the school?

   1. to a great extent----------1----------
   2. somewhat----------2----------
   3. average----------3----------
   4. very little----------4----------
   5. not at all----------5----------

2. How often does your management encourage you in taking up a new programme in your school?

   1. always----------1----------
   2. many times----------2----------
   3. at times----------3----------
   4. hardly----------4----------
   5. never----------5----------

After all these variables, five more variables were grouped together under the category miscellaneous. They pertain to teachers, the vicinity of the training college and the size of the school. There are five items under this category. These items are purely informative in nature.

An annexture to the main questionnaire is an additional questionnaire in the area of organizational climate. There are at least two scales available to measure the organizational climate of schools. These tools are:

(i) Organizational Climate Descriptive Questionnaire (O.C.D.Q.) by Halpin and Croft (1963),

(ii) Organizational Climate Index by Stern(1970).

The O.C.D.Q. by Halpin and Croft measures the organizational climate by actually measuring eight different variables viz: Disengagement, Hindrance, Espirit, Intimacy, Aloofness, Production emphasis, Thrust, Consideration. There are sixtyfour statements in the tool. The tool is to be administered to the teachers and through the application of the elaborate scoring and analysis system developed by the authors, the measures of the eight different traits are obtained. The reliability of the tool as reported by Halpin (1963) is .87.

The second tool viz. Organizational Climate Index developed by Stern has 300 items. A factorial study of the tool (Stern, 1970) has yielded the following factors:

The first order factors:

1. Intellectual climate,
2. Achievement standards,
3. Practicalness,
4. Supportiveness,
5. Orderliness,
6. Impulse control.

The second order factors:

1. Developmental press,
2. Control press.

The first tool, viz. O.C.D.Q. has been used by researchers in NCERT and also by research workers in the Centre of Advanced Study in Education, M.S.University of Baroda, Baroda. Considering the factors measured by O.C.D.Q., the investigator adapted the tool to Indian conditions by replacing a few statements. This tool has been used to measure eight variables, viz., Disengagement, Hindrance, Espirit, Intimacy, Aloofness, Production emphasis, Thrust, Consideration.

These combined list of items became the first draft of the instrument. This draft was placed before a group of five experienced principals who critically examined these items. This step was primarily intended to remove any ambiguity and to adjust the clarity of items. The items in the tool underwent some reorganization at the hands of the principals. After the principals had screened and reorganized the items, the tool was examined by four experienced researchers in the area of innovation and change. The result of this scrutinization was the present questionnaire.

3. Tryout of the questionnaire and its reliability

The investigator tried out this questionnaire by administering it to ten schools in the city of Baroda. The ten respondents filled in the questionnaire in the presence of the investigator individually. This was a

very fruitful exercise as it was found that inspite of two scrutinies, there were a few ambiguities still left in some of the items. The format of the questionnaire also required some change. The necessary changes were made in the items as well as the format and the questionnaire was finalized.

Reliability of the instrument:- The complete instrument now consists of three parts. One part consists of the questionnaire measuring all independent variables, except the eight variables connected with the organizational climate. Part two consists of the O.C.D.Q.. Part three consists of the scale to measure the criterion variable viz. the adaptability of the school. The reliability of the scale to measure adaptability has already been discussed earlier. The O.C.D.Q. is an adapted instrument and its reliability is also reported earlier in this chapter. The reliability of the questionnaire was found out by test-retest method. The questionnaire was administered to a group of forty schools in September 1969 and the same was readministered again in October 1969. The two sets of scores are given in Appendix C.

The value of Pearson 'r' (.81) shows that the instrument is fairly reliable. Table 4.6 shows the reliability of all the three parts of the instrument.

TABLE 4.6

Reliability of the Three Tools

Sr. No.	Tool	Test-retest reliability
1	Adaptability scale	.86
2	Tool to measure independent variables	.81
3	O.C.D. Q.	.83

This is how the tools for the present study were constructed. These tools are given in Appendix D.

DATA COLLECTION

The present study is not of the descriptive survey type, still it does assume the form of a correlational survey. Again the research design incorporates multiple regression analysis. Therefore it is necessary that information is obtained on every item included in the tool. Because of the size of the sample, going personally to every school to collect the data would present many difficulties. Mailed questionnaire technique provides a comparatively more convenient method to collect the data. But the danger in such a procedure is the possibility of a number of items left out by the respondents. This would also result in the non-return of the filled in questionnaire by a few respondents. Again data have to be

collected in the present study from two different sources in the same school viz. the school principal for the main questionnaire and a group of teachers from the same school for the questionnaire on the organizational climate. This situation necessitated a flexible approach for data collection. If the researcher decides to go personally to every school, the principal would be indirectly pressured to complete the questionnaire rather hurriedly. The thinking required to give the responses might not be there if the researcher's presence compells him to complete the questionnaire hurriedly. On the contrary, the presence of the researcher might help the principal to seek clarification and guidance for those items which he finds difficult to respond. It was therefore decided to collect the data in two stages. In the first stage, the questionnaire for the principal was mailed to each school with a covering letter explaining the importance of the study, the need for principal's co-operation and the introductory note about the questionnaire. It was suggested to the principal that the investigator would personally meet the principal to collect the questionnaire when clarifications for those items about which the principal had some doubts would be made. It was also felt that inspite of screening the responses given by the principal during the visit of the investigator, there might be some clarifications which might have to be sought later on. To meet such a situation, each principal was sent

two copies of the questionnaire; one of which would be retained by him. With this plan the questionnaires were mailed to the principals of the schools selected in the sample, in five different instalments at the end of every fortnight. After a week or so, the investigator and two of her research colleagues started visiting the schools to collect the questionnaire. During the visit the questionnaire was collected and screened. Whatever irrelevancy that was seen in the first screening was got rectified there and then. During this visit all available staff members who had put in at least two years of service in the school were administered the Organizational Climate Descriptive Questionnaire. In this way data from most of the schools was obtained. There were, however, eleven schools where the investigator nor her colleagues could make it possible to go. In such cases the principal was requested to administer the O.C.D.Q. instrument to the teachers and return the questionnaire filled in by him as well as those filled in by the teachers. After all the questionnaires were collected they were closely screened. Inspite of all the precautions taken, it was found that at least twenty per cent of the questionnaires had some discrepancies in the responses. These were rectified through correspondence. The investigator could get complete data from seventy schools. After the collection of the data, the questionnaires were scored, data tabulated and analysis of data undertaken. The next chapter deals with the statistical analysis of the data and discussion of the findings.