CHAPTER - II

METHODOLOGY, EXPERIMENTAL DESIGN, SAMPLE, TOOLS EMPLOYED, DATA COLLECTION, STATISTICAL TECHNIQUES USED AND SUMMARY OF THE CHAPTER

CHAPTER II

Methodology, Research Tools and Data Collection

The present chapter deals with the research method, experimental design, selection of sample, preparation of research tools, plan of data collection and the statistical techniques used.

2.1.0.0. Research Method

Research studies are distinguished on the basis of their different purposes and approaches. There are various methods which can be utilised for these purposes and approaches for data collection. These are:

i) The historical or documentary method
ii) The normative survey or descriptive method
iii) Experimental method
iv) Complex casual -- comparative method
v) Correlational method
vi) Case study method
vii) The genetic method

Among these research methods, the descriptive survey method and correlational method are the most commonly used for the survey approach to educational problems. These methods generally help in ascertaining the prevailing conditions by collecting the real facts and in finding out the relationship between various variables. The requirement of the present

investigation being the same, the descriptive survey-cum-correlational method seemed to be the most suitable research method for collecting the data and finding out the relationships between the variables. The title of the investigation 'A study of the characteristics of the resource system and the process of developing and communicating innovation and their impact on the adoption process' itself justifies the method used.

2.1.1.0. Descriptive Survey method

The historical studies discover, describe and interpret what existed in the past. There are other kinds of investigations which study, describe and interpret what exists at present. These are concerned with conditions that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, effects that are being felt or trends that are developing. Such investigations include descriptive survey or normative survey methods. The term survey suggests the gathering of evidence and relating it to current conditions. The term descriptive survey is generally used for the type of research which proposes to ascertain what is the typical condition or practice at the present time.

2.1.2.0. The correlational method

The correlational method of research does not denote merely a statistical device of calculating coefficients of

correlation between certain data. On the other hand, it is a research approach, which analyses the relationship between data, between variables and some results in making the underlying pattern of relationships clear. This method utilises the correlation technique of analysis.

2.2.0.0. EXPERIMENTAL DESIGN OF THE STUDY

Research design of any investigation depends upon what the researcher aims at finding out from the investigation. The problem of experimental design is directly related to the purpose of the study and the variables being studied in the investigation. The present investigation is a descriptive-cum-correlational method. It involves adoption process as the criterion variable (dependent variable) and characteristics of educational resource system (CERS), the process of developing innovation (PDI) and the process of communicating innovation (PCI) as the variate (independent variables). These are represented in the table No. 2.1.0.0.

Table No. 2.1.0.0. Showing the criterion and Variate Variables of the present study

S.No.	Criterion Variable	Variate Variables
1	Adoption process	i) Characteristics of Educational Resource System (CERS) ii) The Process of Developing Innovation (PDI) iii) The Process of Communicating Innovation (PCI)

2.3.0.0. Sample

During recent years sampling has been increasingly used in education to ascertain information necessary in answering certain questions about a specific population.

The population of the present study consists of the educational resource systems in India which have developed and communicated at least a few educational innovations in the last five years. It was a difficult task to find out such educational resource systems as there is no particular directory available for this. The investigator was totally dependent upon the information received from the eminent educationists, NCERT Volumes (I, II and III) on innovated practices on teacher education in India at secondary level (Khosla, 1970, 71 and 73), and 'A survey of research in education (Buch, 1974). In the present study four types of educational resource systems have been drawn for the fulfilment of different objectives of the study. These are as follows:

(1) The first sample consists of all the educational resource systems at the national level in the country. In all, ten (10) educational resource systems at the national level were taken into considerations; viz., National Council for Educational Research and Training (NCERT) New Delhi, Centre of Advanced Study in Education (CASE) Baroda, National Staff College for Educational Planners and

Administration (NSCEPA) New Delhi, Central Institute of English and Foreign Languages (CIEL) Hyderabad, etc. The list of these national level educational resource system is presented in appendix 1.0.0.0.

(2) The second type of resource systems are at the State Institutes of Education. An attempt was made to cover all the educational resource systems at the State level in India. In all, 12 educational resource systems at the State level were taken into consideration. The list of selected state level educational resource systems is given in appendix No. 1.0.0.0.

3. The third sample consists of the educational resource systems at regional level. For this, all the Regional Colleges of Education were considered. In all three Regional Colleges of Education were taken into consideration. The list of selected regional level educational resource systems is given in appendix No. 1.0.0.0.

4. The fourth sample consists of all the innovative teacher training colleges and university departments of education in the country. The selection of these institutions is based on the information obtained from: (i) Innovated practices in teacher education in India at secondary level (Volume I, II & III) by Khosla (1970, 71 and 73),

(ii) A Survey of Research in Education (Buch, 1974), and (iii) The information about the innovated practices in teacher education in the teacher training colleges and departments of education was also gathered from eminent educationists, principals of teacher training colleges and heads of the university departments of education.

Seventy teacher training colleges and university departments of education were taken into consideration for this purpose. The list of the above seventy teacher training colleges and university departments of education is given in Appendix No. 1.0.0.0.

Thus, in all, ninety five (95) educational resource systems of four types were taken into consideration for the present study. The classification of these ninety five educational resource systems on the basis of level is shown in the table No. 2.2.0.0.

Table No: 2.2.0.0.: Showing the distribution of ninty five educational resource systems on the basis of their level

No. of ERS / ERS at different level	ERS at national level	ERS at state level	ERS at regional level	ERS at local level	Total ERS
Number of ERS	10	12	3	70	95

where: ERS = Educational resource system

2.4.0.0. Tools Employed

Since there are no tools available at all which the investigator can use for the purpose of investigating, he had to prepare his own tools. The following tools were used for the data collection in the present study.

i) A questionnaire, and
ii) A rating scale

"In general the word questionnaire refers to a device for securing answer to questions by using a form which the respondent fills by himself" (Goode and Hatt, 1952). Questionnaire has been defined as a systematic compilation of questions that are submitted to a sampling of population from which information is desired.

A questionnaire is a form which is prepared and distributed for the purpose of securing responses to certain questions. Generally those questions are designed to secure information about conditiongor practices of which the recipient is presumed to have knowledge. The questionnaire may, however, ask for the opinions and it may be used to afford an insight into the attitudes of a group. The questionnaire thus is an important instrument in survey research, being used to gather information from widely scattered sources.

The questionnaire procedure normally comes to use where one cannot readily see personally all the people from whom he desires responses or where there is no particular reason to see them personally.

Rating scale is a term applied to the expression of opinions or judgment regarding some situation, object or character. Opinions are usually expressed on a scale of values. Rating techniques are devices by which such judgments may be quantified. The rating scale is a very useful device in assessing quality. Rating scales record judgments or opinions and indicate their degree. Descriptions of different degrees of quality are arranged along a line from high to low or otherwise, and this line is the scale. This is the most commonly used instrument for making appraisals having a large variety of forms and uses.

2.4.1.0. Questionnaire

The study aims at finding the relationship between three variate variables with one criterion variable, viz., the adoption process. The questions which the investigator faced at the time of instrumentation were: (i) What characteristics should be attributed to educational resource systems and on what criteria? (ii) What steps should be included in the process of developing innovation in the educational resource system and on what criteria? (iii) What ways of

communication should be selected and on what criteria? (iv) What sort of information is to be gathered for measuring different variables? (v) What should be the sensitivity of the tools in terms of realiability and validity. In all the investigator constructed three questionnaires, viz., (i) questionnaire on the characteristics of the educational resource system (CERS); (ii) questionnaire on the process of developing innovation in the resource system (PDI) and (iii) questionnaire on the process of communicating innovation from the educational resource systems (PCI).

Keeping the aims and objectives in mind, the investigator constructed items with the help of relevant literature, research studies, newspaper articles, research articles, research reports, criticism, etc. Besides, he contacted a large number of educationists, educational administrators, secretary of the State Board of Education, heads of the extension departments, directors of the state institutes of education; principals of secondary teacher training colleges, heads of the university departments of education and allied field, directors of the educational resource institutions of national level (Centre of Advanced Study in Education, Baroda (CASE) and National Council of Educational Research and Training (NCERT), New Delhi seeking their assistance in preparing the exhaustive list of items for the three questionnaires to study the characteristics of

the educational resource system, the process of developing innovation, and the process of communicating innovation. Thus, in all 152 items were constructed. These items were placed before two language experts for their suggestions and modification. The investigator on the basis of the suggestions, made a suitable modification in the structure of the items without disturbing its content. Items were distributed into their respective questionnaires. These are shown in table No. 2.3.0.0.

Table No - 2.3.0.0. showing the distribution of items questionnairewise

Questionnaire on C E R S	Questionnaire on P D I	Questionnaire on P C I	Total
54	60	38	152

CERS = Characteristics of the educational resource system

PDI = Process of developing innovation

PCI = Process of communicating innovation

The items were classified into divisions forming the major dimensions of each questionnaire. Dimensions of the items were identified on the basis of literature available on the subject and consultations with experts. Thus, the division

of items into various dimensions, supposed to be prevalent in Indian educational resource systems was done. Dimensions selected for three questionnaires are shown in Table 2.3.1.0.

Table No - 2.3.1.0 showing the distribution of items on various dimensions

Questionnaire on the characteristics of educational resource system			Questionnaire on the process of developing innovation in educational resource system			Questionnaire on the process of communicating innovation from the educational resource system		
S.No.	Dimensions	Items	S.No.	Dimensions	Items	S.No.	Dimensions	Item
1	Linkage	6	1	Awareness of innovations	10	1	One way cimmunication	13
2	Structure	9						
3	Openness	8	2	Sources of getting ideas about innovations	22	2	One way feedback Communication	12
4	Capacity	6						
5	Reward	6						
6	Proximity	10	3	Shaping of innovations	28	3	Two way Communication	13
7	Synergy	9						
	Total	54		Total	60		Total	38
							Total	152

2.4.2.0 DRAFT OF THE QUESTIONNAIRES

2.4.2.1. QUESTIONNAIRE ON CHARACTERISTICS OF EDUCATIONAL RESOURCE SYSTEM (CERS)

A. LINKAGE

To what extent:-

(i) - does your institution develop reciprocal relationship with its clients?

(ii) - does your institution develop collaborative relationship with its clients?

(iii) - does your institution develop successful internal linkage within itself?

(iv) - has your institution relevance to its clients?

(v) - has your institution primacy over its clients?

(vi) - does your institution adopt appropriate media for appropriate innovations?

B. STRUCTURE

To what extent:-

(i) - has your institution a degree of structure in terms of meaningful division of labour?

(ii) - has your institution a degree of structure in terms of coordination of efforts?

(iii) - is your institution organised into a system?

(iv) - does your institution function as a whole?

(v) - has your institution a coherent view of its clients?

(vi) - has your institution a structured view of its clients?

(vii) - is your institution able to understand inter-relationship of the various sub-system of the client system?

(viii) - is your institution able to plan innovations in a structured sequence?

(ix) - has your institution an approach for problem solving efforts?

C. OPENNESS

To what extent:-

(i) - has your institution willingness to help the other institutions in the development of innovations?

(ii) - has your institution readiness to be influenced by the clients' feedback?

(iii) - has your institution readiness to be influenced by the new scientific knowledge?

(iv)- has your institution possess flexibility towards innovations?

(v) - does your institution possess reality of new ideas?

(vi) - has your institution accessibility to new ideas?

(vii) - has your institution demonstrability of innovations?

(viii) - has your institution adaptability to innovations?

D. CAPACITY

To what extent:

(i) - does your institution possess a high degree of power?

(ii) - does your institution possess a high degree of finances and funds?

(iii) - does your institution possess a high degree of academic environment?

(iv) - does your institution possess a high degree of prestige?

(v) - does your institution utilise its own internal resources?

(vi) - does your institution believe in sophistication?

D. REWARD

To what extent:-

(i) - does your institution perceive the relative advantage of its clients?

(ii) - is your institution aware of the past experiences of reward for utilisation of innovations?

(iii) - is your institution aware of the time saving potential?

(iv) - is your institution aware of the relative value of innovations?

(v) - is your institution frequent in rewarding its clients?

(vi) - has your institution sufficient grants and funds for reinforcement of clients?

E. PROXIMITY

To what extent:-

(i) - does your institution offer easy accessibility with other resource institutions?

(ii) - does your institution offer easy linkage with other resource institutions?

(iii) - is your institution cosmopolitan in nature?

(iv) - has your institution proximity to its clients geographically?

(v) - has your institution proximity to its clients psychologically?

(vi) - does your institution develop innovations which have some familiarity to its clients?

(vii) - does your institution develop innovations which have congruence with past innovations which the clients have adopted.

(viii) - does your institution develop innovations which have similaritywith past innovations which the clients have adopted.

(ix) - has your institution a high degree of proximity to its clients?

(x) - has your institution a high degree of familiarity to its clients?

6. SYNERGY

To what extent:-

(i) - has your institution a high degree of persistent leadership?

(ii) - does your institution spread over a variety of messages in combination to the clients?

(iii) - does your institution focus on the variety of messages in sequence upon the clients?

(iv) - does your institution focus on the variety of messages in repetition upon the clients?

(v) - does your institution depend upon the number of resourceful persons who gain access to their clients?

(vi) - does your institution depend upon the diversity of resourceful persons who gain access to their clients?

(vii) - does your institution depend upon the number of change agents who gain access to their clients?

(viii) - does your institution depend upon the diversity of change agents who gain access to their clients?

(ix) - does your institution repeat the message over and over before it gets attended to and absorbed?

2.4.2.2. QUESTIONNAIRE ON THE PROCESS OF DEVELOPING INNOVATION (PDI)

A. AWARENESS OF INNOVATIONS

How often -

i) - does your institution feel that the function of an innovation is to 'trigger off' far wider changes in education?

ii) - does your institution feel that the educators must introduce the kinds of innovations that will transform educational institutions into dynamic organisations?

iii) - does your institution feel that innovations are required to meet the need of present educational system?

iv) - does your institution develop innovations based on the need of present educational system?

v) - is your institution aware of the current educational problems?

vi) - is the top management of your institution aware of the burning problems of education?

vii) - are innovations developed in your institution represented a change from what was available earlier?

viii) - does it happen in your institution that the procedure of developing innovations are based on compatibility of innovations?

ix) - does it happen in your institution that the procedure of developing innovations is based on personal policies?

x) - is your institution aware of the future educational problems arising from socio-economic change?

B. SOURCES OF GETTING IDEAS ABOUT INNOVATIONS:

How often -

i) - does your institution send experts to study the innovations of education in advanced countries?

ii) - does your institution transplant innovations from advanced countries?

iii) - does your institution select innovations because financial assistance is provided from various agencies?

iv) - does your institution initiate innovations because other institutions also have initiated?

v) - does your institution develop innovations because it gives prestige to your institution?

vi) - does your institution take the help of survey in locating the needs of innovations?

vii) - does your institution take the help of previous researches for developing innovations?

viii) - does your institution take the help of research reports for developing innovations?

ix) - does yourinstitution consider research journals for developing innovations?

x) - does your institution take the help of newspapers for developing innovations?

xi) - do your ideas receive support in your institution for changing the way things are done in client system.

xii) - does your institution receive adequate information about the innovations?

xiii) - are discussions very free in the meetings of your institution?

xiv) - are discussions open in the meetings of your institution?

xv) - does your institution take into cognizance the suggestions made by students for the development of innovations?

xvi) - does your institution take into cognizance the suggestions made by University for the development of innovations?

xvii) - does your institution take into cognizance the suggestions made by Secondary Board of Education?

xviii)- does your institution take into cognizance the suggestion made by State Education Department for the development of innovations?

xix)- does your institution take into cognizance the suggestions made by Union Ministry of Education?

xx)- does your institution take into cognizance the suggestions made by UNESCO for the development of innovations?

xxi)- does your institution take into cognizance the suggestions made by job providing organizations?

xxii)- does your institution take into cognizance the suggestions made by Bureau of Guidance and Counselling?

C. SHAPING OF INNOVATIONS:

How often -

i)- does it happen in your institution that innovations tend to flow from the central administration to subordinates?

ii)- does it happen in your institution that head supports most of the innovations?

iii)- does it happen in your institution that your ideas for initiating innovations are given a good hearing?

iv)– does it happen in your institution that the staff members get an opportunity to be involved in the development of innovations?

v)– does it happen in your institution that the higher authorities ask their subordinates for developing innovations?

vi)– does it happen in your institution that subordinates do not get fair hearing while developing innovations?

vii)– is it emphasised in your institution that work should be accomplished by individuals and not by teams.

viii)– are in your institution opportunities provided to the staff members to work in a group for developing innovations?

ix)– does your institution consider everyone's views before a decision regarding the development of an innovation is taken?

x)– is the information passed from one person to another who are associated in the development of innovations?

xi)– does it happen in your institution that the innovations developed are tried on a small sample?

xii) - does your institution have provisions for the modification of the innovations according to the needs of the clients?

xiii) - does your institution provide financial assistance to the clients for adopting innovations?

xiv) - does your institution take into consideration the favourable reactions of the clients in shaping of the innovations?

xv) - does your institution take into consideration the unfavourable reactions of the clients in reshaping the innovations?

xvi) - does your institution guarantee psychological safety to the subordinates in shaping institutional innovations?

xvii) - does your institution guarantee psychological freedom to the subordinates in shaping institutional innovations?

xviii) - does your institution consider the adaptability of innovations by the clients in the existing situations?

xix) - does your institution consider the associability of innovations existing in the present education structure?

xx) - does your institution consider the complexity of innovations?

xxi)- does your institution consider the divisibility of innovations?

xxii)- does your institution consider the effectiveness of innovations?

xxiii)- does your institution consider the flexibility of innovations?

xxiv)- does your institution consider the structuralization of innovations?

xxv)- does your institution consider academic effectiveness of innovations?

xxvi)- does your institution consider the burdensomeness of innovations?

xxvii)- does your institution consider the cost economy of innovations?

xxviii)- does your institution consider the time economy factor while developing innovations?

2.4.2.3 QUESTIONNAIRE ON THE PROCESS OF COMMUNICATION OF INNOVATION

A. ONE WAY TRANSMISSION PROCESS:

How often -

i) - does your institution disseminate innovations to its clients through journals?

ii) - does your institution disseminate innovations to its clients through newspapers?

iii) - does your institution disseminate innovations to its clients through research reports?

iv) - does your institution disseminate innovations to its clients through lectures?

v) - does your institution disseminate innovations to its clients through books?

vi) - does your institution communicate innovations to its clients through speeches?

vii) - does your institution communicate innovations to its clients through symposia?

viii) - does your institution communicate innovations to its clients through television?

ix) - does your institution communicate innovations to its clients through radio?

x) - does your institution disseminate innovations to its clients through taperecords?

xi)- does your institution communicate innovations to its clients through mailing.

xii)- does your institution communicate innovations to its clients through demonstration?

xiii)- does your institution disseminate innovations to its clients through oral presentation?

B. ONE WAY FEEDBACK TRANSMISSION PROCESS:

How often -

i)- does your institution elicit feedback through survey method?

ii)- does your institution elicit feedback through evaluation method?

iii)- does your institution adopt the direct method of feedback for communicating innovations?

iv)- does your institution use public archieves for knowing about the behaviour and attitude of the clients?

v)- does your institution adopt the indirect method of feedback for communicating innovations?

vi)- does your institution use private records to have statistical knowledge about the clients' behaviour and attitude?

vii)- does your institution collect opinions to determine reactions of the clients about innovations?

viii)- does your institution collect opinions to determine preferences of the clients about innovations?

ix)- does your institution take the help of observation technique to determine reactions of the clients about innovations?

x)- does your institution exercise observation technique to determine preferences of the clients about innovations?

xi)- does your institution consider the reviews of innovations communicated by other institutions?

xii)- does your institution consider the protest by the clients about the innovations?

C. TWO-WAY TRANSMISSION PROCESS:

How often -

i)- does your institution disseminate innovations to its clients through dyadic exchange?

ii)- does your institution communicate innovations to its clients in small groups?

iii)- does your institution communicate innovations to its clients in large groups?

iv) - does your institution disseminate innovations in a setting where free feedback is received and responded to?

v) - does your institution communicate innovations in a setting where immediate feedback is received and responded to?

vi) - has your institution a consultant relationship with its clients of different status?

vii) - does it happen in your institution that each person accurately restates the ideas and feelings of the previous speaker before he presents his views in the communication of innovations?

viii) - does your institution exercise T-Group technique for communicating innovations?

ix) - does your institution exercise role playing technique for communicating innovations?

x) - does your institution exercise action research technique for communicating innovations?

xi) - does your institution take the help of inquiry team for communicating innovations?

xii) - does your institution exercise 'grid plan' for communicating innovations?

xiii) - does your institution arrange 'derivation conferences' to communicate innovations?

The first draft of the questionnaires was tried out on five experts for their judgement about the inclusion of the items in the particular dimensions. Closed type of responses were to be recorded against each statement in the space provided for the purpose. A persuasive forwarding note and instructions to complete the questionnaire were given on the first leaf of the questionnaire. Various terms which were interpreted differently by the respondents were explained by defining the terms below the items. The first draft of the questionnaires was ready with 152 items in thirteen dimensions (Questionnaire on CERS = 7 dimensions; questionnaire on PDI = 3 dimensions; and questionnaire on PCI = 3 dimensions).

2.4.3.0 Try-out of the Questionnaires

When the first draft of the questionnaire was ready it was given to 15 teacher educators available at the Centre of Advanced Study in Education, Baroda, Department of Educational Administration, M.S. University, Baroda, and Secondary Board of Education, Gujarat. This included teacher fellows and research fellows, heads and the staff of the above departments. They were requested to fill up the questionnaires and suggest improvement to enhance clarity. As a result of their suggestions, the following changes were made in the questionnaires:

1. In all 18 items were deleted from the questionnaires. These items were either redundant or the same data could be had from other items.
2. Double barred questions were divided into two.

The final draft of the questionnaires consisted of 134 statements (questionnaire on CERS = 45; questionnaire on PDI = 53; and on PCI = 36). The distribution of the statements is shown in the table 2.3.2.0.

Table No. 2.3.2.0 showing the distribution of the statements for the three questionnaires

Statements / Questionnaires	Questionnaire on CERS	Questionnaire on PDI	Questionnaire on PCI	Total statements of 3 questionnaires
Total Statements	45	53	36	134

Where CERS = Characteristics of educational resource system

PDI = Process of developing innovation

PCI = Process of communicating, innovation

The distribution of items in each dimension of the three questionnaires is shown in table 2.3.3.0.

Table No. 2.3.3.0. Dimension-wise break-up of items in the questionnaires of first and final draft.

Dimensions	First Draft	Final Draft
A. Questionnaire on the characteristics of the educational resource system:		
1. Linkage	6	6
2. Structure	9	6

3.	Openness	8	7
4.	Capacity	6	5
5.	Reward	6	5
6.	Proximity	10	8
7.	Synergy	9(54)	8(45)
B.	Questionnaire on the process of developing innovations in educational resource system:		
1.	Awareness of innovations	10	8
2.	Sources of getting ideas about innovations	22	20
3.	Shaping of innovations	28(60)	25(53)
C.	Questionnaire on the process of communicating innovations from the educational resource system:		
1.	One way communication	13	12
2.	One way feedback communication	12	12
3.	Two way communication	13(38)	12(36)
	Total	152	134

The final complete questionnaires include two parts. Part I consisted of the introduction, purpose and the instructions to the respondents. Part II of the questionnaire called for information on dependent variables, i.e. characteristics of educational resource system, process of developing innovations and process of communicating innovations. An identifying data sheet was devised to seek the information about educational

resource system with regard to the name of the resource system, place, state, year of establishment, type of resource system, nature of ownership of the resource system. In this identifying data sheet the respondents were also asked to mention the major innovations developed at their resource systems during 1965-1975. The identifying data sheet provided the background information of the educational resource system. It was sent along with the questionnaires to the respondents. The identifying data sheet along with the final complete questionnaires is given in Appendix 9.0.0.0. The dependent variable, viz. level of adoption of innovation has been measured by a rating scale.

2.4.4.0 Rating Scale

A rating scale was constructed to record the judgement of the heads of the educational resource systems about the level of the adoption of innovations which were developed in their institutions and communicated from them. The following points were kept in mind while constructing the rating scales.

i) The subject or phenomena to be rated.
ii) The continuum along which they will be rated.
iii) The respondents who will do the rating.

A seven point rating scale was constructed ranging from 1 to 7. The rating scale is arranged on a straight line, e.g.:

1 2 3 4 5 6 7

The respondent records his opinion along the top of the line by making a circle (O) at the appropriate place.

The degree of extent in the rating scale represents likewise.

1 = Adopted completely
2 = Adopted to a very great extent
3 = Adopted to a great extent
4 = Adopted to a considerable extent
5 = Adopted to some extent
6 = Adopted to a little extent
7 = Not at all adopted

Thus a resource system A could be on the 2nd point regarding the level of adoption of innovations which are developed and communicated from its resource system to adopters and resource system B could be on the 7th point regarding adoption of innovations which are developed and communicated to adopters.

The continuum hypothetically is thought to be of 7 categories and each of the seven categories of the level of adoption is described in the rating scale.

Each resource system was sent the rating scale along with the questionnaires for filling in the data.

The rating scale helped the investigator to study the level of adoption of innovations developed and communicated by the educational resource system.

2.4.4.1 VALIDITY AND RELIABILITY OF THE RATING SCALE

The draft of the rating scale was discussed with five experts for their judgement about the seven categories to determine the face validity of rating scale. A rating

scale is said to have face validity when it appears to measure whatever the investigator had in mind, namely, what he thought he was to measure. The judgements of the experts about the seven categories of the rating scale gave the face validity of the scale.

Reliability of the rating scale was found out by test-retest method. The rating scale was administered on a sample of 20 teachers' training colleges. The responses of each category were tabulated. After a period of one month the rating scale was readministered to the same 20 teachers' training colleges. The responses on each category were tabulated. Product moment correlation was calculated for these two scores. The product moment coefficient of correlation between the two scores was found to be 0.78. The high coefficient of correlation shows the stability of the scores of the rating scale.

2.5.0.0. DATA COLLECTION

The nature of the present study made it necessary to obtain the information on every item included in the questionnaire. Mailed questionnaire technique provides a comparatively

more convenient method to collect the data. The questionnaires, rating scale and identifying data sheet were mailed to the principals of the secondary teachers training colleges, heads of the university departments of education, Directors of the state institutes of education and the educational resource systems at national level and to the principals of the regional level educational resource system with a covering letter explaining the importance of the study, the need for their cooperation and an introductory note about the questionnaires. All precautions for early responses were taken. Two reminders and second time follow-up questionnaires were mailed to the non-respondents. Some institutions were personally visited. For studying the level of adoption of innovations the data were collected through rating scale. After all the questionnaires were collected, these were closely screened. As a result of the efforts ninety five (95) questionnaires were returned duly completed. The investigator could get complete data from nintyfive educational resource systems. Distribution of the various institutions which responded is given in Table No. 2.4.0.0.

Table 2.4.0.0. shows the distribution of the various levels of educational resource systems which responded to questionnaires

	ERS at national level	ERS at state level	ERS at regional level	ERS at local level	Total ERS responded
ERS	10	12	3	70	95

Where ERS = Educational resource system.

After the collection of data, the questionnaires were scored, data were tabulated and the analysis of the data was undertaken.

2.5.0.0. USE OF STATISTICAL TECHNIQUES TO ANALYSIS THE DATA

The statistical techniques to be employed in a study depend upon the objectives of the study and the nature of the hypotheses to be examined. The main objective of the present study is to study the characteristics of educational resource system, the process of developing and communicating innovation and their impact on adoption process.

As far as the first three objectives are concerned the technique of analysis will involve the representation of scores in the form of mean and percentage for characteristics of ERS, process of developing and process of communicating innovation. As regards the IV, V and VI objectives, the three independent variables could be correlated with the score of the dependent variable (level of adoption). In order to find out the relationship between the characteristics of the educational resource system and level of adoption process, between the process of developing innovation and level

of adoption process; and between the process of communicating innovation and level of adoption process, the rank order correlation technique was used to test the null hypothesis of no significant relationship between the independent variables and the dependent variable.

(i) MEAN: Garrett and Woodworth (1967) defined mean as the sum of the separate scores of measures divided by their number. The formula for the mean (M) of a series of ungrouped measures is:

$$M = \frac{\Sigma X}{N}$$

in which N is the number of measures in the series, X stands, for a score or other measure, and the symbol Σ means 'sum of', here sum of separate measures. Mean is used: (i) when the scores are distributed symmetrically around a central point, i.e., when the distribution is not badly skewed. (ii) when the measure of central tendency having the greatest stability is wanted, (iii) when other statistics are to be computed later. Many statistics are based upon the mean.

(ii) PERCENTAGE: The mean scores of the variables were converted into percentage. Simple arithematic was employed

to calculate the percentage of the mean. It can be represented as follows:

$$\text{Percentage} = \frac{fi}{\sum fi} \times 100$$

where

fi = is the frequency for the fi th value of value x

$\sum fi$ = is the sum of all the frequencies of the value fi th.

(iii) RANK ORDER CORRELATION: Coefficient of correlation is defined as the relationship (positive or negative) between two variables. The spearman's rs seems to yield a closer approximation to product moment correlation coefficients when the data is more or less continuous (i.e., not characterised by a large number of ties at each rank). The coefficient value of Spearman rank order vary from + 1.0 to - 1.0. Spearman's rank order correlation is defined as the sum of the square differences in the paired ranks for two variables over all cases, divided by a quantity which can perhaps best be described as the sum of the squared differences in ranks. This quotient is then substracted from 1 to produce the standardised coefficient. Spearman rank order correlation is formally represented as:

$$rs = 1 - \frac{6 \sum_{i=1}^{N} d_1^2}{N^3 - N}$$

For computational purposes and particularly to correct for the occurence of tied ranks, spearman's rank order can be redefined as

$$rs = \frac{T_x + T_y - \sum_{i=1}^{N} di^2}{2 (T_x T_y)^{\frac{1}{2}}}$$

Where di^2 is the difference between the ranks of the two variables for each case, and where Tx or Ty is to be defined by the quantity.

SUMMARY OF THE CHAPTER

It is designed to study the characteristics of the resource system and the process of developing and communicating innovation and their impact on adoption process. It is a descriptive cum correlational study which involves adoption process as criterion variable while characteristics of the educational resource system, process of developing and communicating innovation as variates. The population sample in the present study includes all the educational resource systems at the national, state, regional and local levels throughout the country. The heads of the institutions are the respondents of the present study. Questionnaire, rating scale and identifying data sheet were employed to collect the data. Analysis

of the collected data were done in accordance with the objectives of the study. The details of the research method, experimental design, selection of sample, tools employed, data collection and the statistical techniques employed to analyse the data are discussed in this chapter. The next chapter deals with the statistical analysis of the data and discussion of the findings.