CHAPTER-3

METHODOLOGY

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3.1 Introduction

The preceding chapter has given a broad overview of the researches investigatingvarious material developed and to test effectiveness of the remedial measures given on relations and functions . On the basis of these research findings , certain generalization can be made which provided a rationale of present study.

The purpose of the educational research can not be completed without detailed design of investigation. Research methodology involves a systematic procedure, which starts from identification of problems to analyzing the obtained data This chapter deals with...........

> ➤ Research design
> ➤ Variable
> ➤ Sample
> ➤ Tools
> ➤ Procedure of the study

3.2 Research Design

According to Brog and Gall(1983), "Reaearch design refers to procedure used by the researcher to explore relationship between variable to form subject into groups, administer the measures apply treatment conditions and analyze the data"

This study used experimental research design,the researches used single group pretest posttest design to study the learning difficulties . in relations and functions and remedial measures.

The **design of study is specified in the table below.**

CHARACTERISTICS EXPERIMENTAL GROUP

Entry Status	**Pre-test**
Treatment	**Remedial Teaching**
TerminalStatus	**Post-test**

3.3 Variables

The essential feature of experimental research is that the researcher deliberately manipulates controls or observes the conditionor characteristics which determine the events in which researcher is interested.These condition and characteristics are called "Variables". According to Brog and Gall(1983), "A variable can be through of as a qualitative expression of construct variable usually take the for of scores on a measuring instrument"

- Independent Variables

The independent variable are the conditions or characteristics that the researcher deliberately, manipulates and control to determine the events in which researcher is interested and its relationship to an observed phenomenon.

- Dependent Variables

The dependent variable is that factor which is observed and measured to determine the effect of independent variable i.e. the factor that appears, disappears or varies, as the experimenter introduces, removes or varies the idependent variable.

- Background Variables

The scores/results of the study analysed or interpreted through background variables. In this study

Independent Variables:- Remedial teaching

Dependent Variables:- Achivement in relations and functions

Background Variables:- Gender

3.4 Sample

Data collection is an important part of the research. Data is collected from a selected sample and the sample is the representative of population .

According to **Brog and Gall(1983),** "The larger group we wish to learn is called population, whereas the smaller group we actually study is called sample". Thus sample is a portion of the population which represents the population. A good sample must be as nearly the representative of the entire population as possible and ideally it must provide the whole of the information about the populaion as from which the sample has been drawn.

There is usually a trade-off between the desireability of a large sample and the feasibility of a small one. The ideal sample is large enough to serve as an adequate representation of the population about which the researcher wishes to genalize and small enough to be selected economically —in terms of subject availability and expence in both time and money . There is no fixed number or percentage of subjects that determines the size of an adequate sample. It may depend on the nature of the population of interest or the data to be gathered and analyzed.Investigator has selected two sample school in which both are

having two science stream sections of class XII and Investigator had choosen one section from each school by adopting purposive sampling technique. So the sample consisted of 54 students.

Classification of the sample

Thus the total sample of 54 students was classified into sub-sample on the basis of criterion variable such as gender. The resultant classification of the final sample is summarized in the table below.

TableNo.-3.4.1 Classification of the final sample into sub-sample (N=54)

Criterion variable	Sub-sample	No. of students	Total
Gender	Boys	27	54
	Girls	27	

3.5 Research tools

A researcher requires many data gathering tools or techniques. Each tool is suitable for the collection of certain type of information. One has to select from the available tools which will provide data she seeks for testing hypothesis.

For the study **"Learning difficulties"**in relations and functions of class XII of the selected school.

Pre-test: for finding learning difficulties committed by students in solving problems of relations and functions.

Post-test: for finding the achievement of students in solving problems of relations and functions.

The researcher has taken pre-test for finding the error on the basis of some criteria. Therefore, pre-test is a diagnostic test also and post-test was conducted for minimizing the difficulties on the basis of the given remedial teaching. Therefore post-test is an achievement test also.Both these test were based on parallel test.

Constructing Achievement Test

Achievement tests attempts to measure what an individual has learned-his or her present level of performance . Most tests used in schools are achievement tests. They are particularly helpful in determining individual or group status in academic learning. Achievement test scores are used in placing ,advancing or retaining students at particular grade levels. They are used in diagnosing strengths and weaknesses. Many of the achievement test in schools are non standardized,teacher-designed test. The purpose of achievement test is to evaluate and accumulate data regarding the finding of the root cause . In education,achievement testing is a multi-dimensional process that requires well-planned efforts on the part of the teacher.when conducted in a systematic manner, it could help to identify the root cause of the problem and sebsequently remove learning impediments. As a result the learning could turnout to be more meaningful to the learners and satisfying to the teacher. A variety of strategies could be used to diagnose the learning impediments.

In this study, the researcher prepared a achievement test for identifying difficulties for constructing it , the items were framed on the basis of selected content of unit "relations and functions"of mathematics of class XII.Before constructing the test , the teachers of mathematics were consulted regarding the types of difficulties that student make under this topic.

The sub topics included in the test are given below

- Set theory
- Relation and its type
- Function and its type

The test consisted in 3 types of questions like experiential knowledge, Abstract or conceptual knowledge , high order thinking / Action knowledge base .These test iteams covered the above contents of the units . The number, type and marks of the items are shown in the following table.

Table No.-3.5.1 Showing the detailed distribution of various types of questions

Types of Questions	V.Short answer type	Short Answer Type	Long Answer type
Experiential Knowledge	3(1)	2(2)	1(4)
Abstract Knowledge	3(1)	3(2)	2(4)
Action Knowledge	4(1)	5(2)	2(4)

Total items = 25

Total marks = 50

Administration of tool

After developing the tool, to analyze the items in terms of their clarity, time, duration and appropriateness, to find out the discriminating power of the items and difficulty index, the **pilot study** was under taken; pilot study

was conducted in order to establish the reliability, validity and usability of the test items. The achievement test consisting of 35 items was administered to students of class XII of private schools. This school was different from school selected for the main study. The test scores were analyzed to find out questions which could not be adopted by the students. the test was modified as per the analysis with respect to the language and number of items. The test paper was also discussed with the teachers teaching the students of class XII and the subject expert and according to their suggestions; the necessary changes were made in the questions and now the achievement test is consisting of 25 items only.

Then researcher personally met the principal of the schools and get acquainted with the teachers concerned and established rapport with the student Prior to the administration, the students were supposed to attempt.The significance of the test and necessary instructions were given to item. The students were made clear that this test is designed to help them and is not for grade and the whole process had nothing to with there school achievement. After this, researcher administered the test on the students. The study was conducted on both male and female students . They were given question paper and asked to answer the questions which they thought correct . Adequate time was given to the students were observed during the test.

The atmosphere created at the beginning and during the test situation and the rapport achieved between taster and taste throughout the examination are of importance in respect to both the quantitative and qualitative results obtained, After completion of the test , the test papers were collected.

Now the experimental group was given treatment of remedial teaching. After treatment, the experimental group was given post test (the same

test administered as a pre test). The same test was used as pre test as well as post test.

TableNo.3.5.2- Showing the detailed distribution of various forms of questions.

Type	Formof Questions	No.of Questions	Total marks
A	Veryshort answer type questions	10	10 marks
B	Shortanswer type questions	10	20 marks
C	Long answer type questions	5	20 marks

3.6 Treatment

After identification of the students and their weak spots in the given topic , the proper remedial teaching learning were arranged.

The remedial teaching learning situations was given to students of class XII by the investigator herself. In this programme, proper teaching learning situations are used. The researches herself taught them through these situations for a short duration of 12 days.

3.7 Data Collection

After treating with remedial teaching again the achievement test was administered on sample for finding the achievement of class XII student in relations and functions. The same achievement test was administered as

given in pre-test and same instructions were given. The details of the both test are given in the table below

TableNo.3.7.1-: Showing the details of pre-test and post-test treatment.

S.No.	School	Pre-test	Treatment	Post-test
1	Peoples Puplic School	7/3/2011	11/3/2011 to 23/3/2011	25/3/2011
2	Sager Public School	7/3/2011	11/3/2011 to 23/3/2011	25/3/2011

The researcher expressed gratitude to the teacher and students for their cooperation.

Statistics Used

The data so collected was subjected to analysis by using 't-test'. The analysis was done with a view to study influence of remedial teaching on student's achievement for the analysis and interpretations of the data raw scores were classified and tabulated into different categories

In this study , the researches tried to study the achievement in mathematics of the students by using remedial teaching learning situation so descriptive statistics like mean , standard deviationand some quantitative analysis like 't' test were used. The significance of difference among the categories were determined by calculating 't' value.