C H A P T E R V

PLANNING THE EXPERIMENT

In the last chapter, a teaching strategy viz. PROGRAMMED TEACHING was developed and discussed. As the effectiveness of this strategy is not known, it was decided to evaluate the strategy empirically. The investigator selected the 'experimental approach' for evaluating the effectiveness of Programmed Teaching and for comparing it with conventional teaching.

Difficulties in conducting language experiments are obvious. The number and frequency of influences and variables affecting language learning are enormous. Some of them cannot even be identified. Others are difficult to be controlled. If one manipulates some variables the teaching situation becomes artificial and the generalisations become questionable.

There is another difficulty with regard to content to be taught and previous knowledge to be assessed. Language responses that one wants to test or build in the behaviour of students are so numerous that, at a given time,

one can handle only a few of them. As language is a 'system of systems (Mackey, 1969, p.77) an investigator can select only a small sample of linguistic skills for experimental purposes. The domain of generalisation, thus, remains limited.

Knowing well the limitations of a language experiment, the investigator adopted the experimental approach because it is the only approach with which one can compare two methods or teaching strategies and evaulate their respective effectiveness. It is an approach which gives more meaningful data in 'comparing two or more treatments' (Lehmann and Mehrens, 1971, p.333).

1. The Experimental Approach

An experimental approach is commonly used in pure science disciplines. In behavioural science and education, it came only in the beginning of this century.

Campbell and Stanley (1963) observe that a wave of enthusiasm about this approach dominated education in 1920s. It was then followed by a wave of apathy and indifference in 1930s. The main reason for apathy was that manipulation and control of variables in experiments

in education was haphazard, inadequate or difficult. For obvious reasons a researcher found it difficult to maintain and control experimental conditions and avoid contamination. Unless all precautions are taken to maintain the purity of an experiment, one cannot for certainty say that differences in dependent variables are precisely due to the independent variable. Since the control of the experiment was difficult, researcherx, not in frequently, tried to avoid the use of the experimental approach in education.

In spite of the obvious difficulties in adopting the experimental approach, potentialities of this approach cannot be undermined. It is through experimental approach that one gets a fairly dependable evidence for the functional validity of a plan or relationship. It gives us objective data for establishing or refuting a hypothesis. Difficulties inherent in this approach only caution us to be more vigilent, rigorous and careful in the design and control of the experiment.

An experimental research differs from other researches in terms of manipulations. In an experimental design, an independent variable is introduced. This condition imposed in an experiment is referred to as Treatment. The variable which is manipulated (i.e.

Treatment or independent variable) is an untried element and the researcher wants to evaluate the effect of this independent variable.

There is another variable, the dependent variable by which the independent variable is to be evaluated. In this study Programmed Teaching was the independent variable and students' achievement on the post-test was the dependent variable.

Apart from independent and dependent variables, there are other variables which may influence the closure and completeness of an experiment. They are termed as intervening variables (Fox 1969) or extraneous variables (Lehmann and Mehrens, 1971).

In this study sex, age, I.Q., Socio.Economic status, family environment, learning atmosphere, language atmosphere were the intervening variables. It is very difficult to control all the intervening variables and to equate groups, on all relevant variables. However there are ~~same~~ some procedures with which one can equate two groups and ~~partial~~ parcel out the influence of intervening variables. By holding the variable constant, by systematic variation, correlated variation, random distribution and by statistical procedures one can match the groups (Fox,1969)

In this study efforts were made to control most of the intervening variables identified by the investigator.

2. Selecting The Experimental Design

Campbell and Stanley (1963) give 16 experimental designs out of which three are pure experimental designs. The design adopted in this study is one of the three pure experimental designs.

The design followed was pre-test-post-test-control group design. It can be represented as follows:-

Group	Pretest phase	Treatment phase	Post test phase
Experiment group	Scores on the pre-test measure. T_1 E	Introducing the independent variable (introducing P.T. strategy)	Scores on the post-test measure. T_2 E
Control Group	T_1 C	Not introducing the independent variable teaching with conventional method.	T_2 C

Computing gain in the scores of the experimental group

$$T_2E - T_1E \ (= G_E)$$

Computing the gain in scores of the control group

$$T_2C - T_1C \ (= G_C)$$

Computing the gain in scores in the experimental group (GE) with gain in scores in the control group (GC)

Comparing G_E with G_C

3. Objectives of the Experiment

Objectives of the experiment were

(a) to evaluate the effectiveness of programmed teaching strategy on the basis of the achievement of the experimental group on the post test, and

(b) to compare the achievement of the experimental group with that of the control group.

4. Statement of Experimental Hypothesis

Students taught by Programmed Teaching do not perform significantly better on written criterion measures than students taught by the conventional method.

5. Delimitations of the Experiment

1. The teaching strategy employed in this study covers only one modality viz. some aspect s of written

expression. The results of this strategy should not be generalised for other modalities like oral fluency, or oral comprehension.

2. Since teachers of the control group are not M.A.'s in English and not trained in the methodology of teaching English, the results of this study can't be applied to performance of students taught by qualified and well trained teachers.

3. The study is limited to students who are

(a) studying in Government schools of Rajasthan,

(b) who learn English in schools as compulsory subject and not as an optional subject,

(c) who are taught English for 45 minutes six days a week,

(d) whose mother-tongue is not English, and

(e) who do not live in localities where English is spoken as a mother tongue by the peer group.

6. Description of Sample

One Hundred sixty students of class eighth of four different Government schools of Udaipur city formed the sample of the experiment.

(a) Selecting the Schools

Three Government Higher Primary Schools and one Government Secondary School were randomly selected out of the schools of Udaipur City. In all, four Government

schools were selected for conducting the experiment.

Rationale

The investigator selected only the Government schools and not the private schools. The reason was that in Rajasthan more than 90 per cent of schools (and almost all schools in rural areas) are run by the Government. Findings of a study conducted on students of Government schools (which form the greater bulk of schools in Rajasthan) would have more applicability value.

(b) Another consideration for selecting three Higher Primary and one Secondary School was this. Higher Primary schools are far greater in number than secondary schools. To make the findings of the study more relevant for a greater population of schools, the investigator decided to select three Higher Primary schools and one Secondary school.

Besides the above considerations, there was another point at the back of the investigator's mind. It is a general comment from secondary and higher secondary schools that students coming from higher primary schools are poor in English. The reason pointed out is that teachers at the higher primary level are under qualified. Statistics as given in the Education Commission Report

(1964-66, p. 79) show that only 6 per cent of higher primary teachers are graduate and above. It is also pointed out (Pant, 1967) that teachers in higher primary schools use ineffective teaching techniques. By taking three upper primary schools, the investigator wanted to know how the programmed teaching strategy works in schools staffed with under-qualified and untrained teachers.

(b) Selecting the Class

The investigator selected Class VIII

Rationale

Consideration for selecting class VIII for the experiment was that class VIII is the terminal class of higher primary schools and the feeding class of the secondary and higher secondary schools. A study conducted on students of this class would be more useful for both levels of schools.

(c) Selecting the Students

No selection of students was done in school No. 1,2 and 4. There were only two sections of class VIII in these schools and the investigator selected all the students of both the sections of schools 1, 2 and 4. In school 3 there were six sections. The investigator randomly selected two sections out of them for the study.

(d) Selecting the Teachers

No selection was made in terms of teachers. It should be mentioned here that the Dy. Director of Education of Udaipur and the headmasters of schools explicitly and categorically told the investigator to conduct the study within the confines of school time table.

(e) Selecting the Content

The following content items were selected for the study.

i) Transformation of statements into question forms
   - sentences having helping verbs
   - sentences having verbs in simple present and simple past forms only,

ii) Change of narration
   - when the reporting verb is in simple present tense
   - when the reporting verb is in simple past tense,

iii) Use of apostrophe,

iv) Contractions.

Rationale

Language is a system of four sub-systems viz. phonology, morphology, syntax and semantics. Any comprehensive evaluation of language teaching should incorporate all these subsystems. But it is well nigh impossible to make a research study so broad-based as to encompass all

the different subsystems. A researcher cannot but be selective.

The following considerations prompted the investigator to select the content topics specified above.

(a) Direct and indirect narrations are included in the textbook of Class VIII.

(b) It is the personal experience of the investigator that most of the students commit mistakes in transforming sentences in simple past and simple present tense into questions.

(c) Students find it difficult to master the use of apostrophe mark (for showing contractions and possession) as this mark of punctuation doesn't exist in Hindi.

7.5. Designing the Groups

The investigator before starting the experiment, went to the Deputy Director of Education and sought his permission to conduct his experiment in four Government schools of Udaipur city. He also acquainted the Deputy Director with the nature of the experiment. Four schools were randomly selected with the help of the Deputy Director.

The Deputy Director sent an official letter to the headmasters of four schools and asked them to extend cooperation to the investigator.

The investigator, then, called on headmasters separately and requested them to spare two sections of Class

VIII for the experiment.

Eight sections of four different schools formed the sample of this study. Four constituted the experimental group (E) and remaining four constituted the control group (C). Sections were randomly distributed.

The distribution scheme adopted was as under

School	1		2		3		4	
Sections	A	B	A	B	A	C	A	B
Group	E	C	C	E	E	C	C	E

Sections A, B, A and B of schools 1,2,3 and 4 formed the experimental (E) group and sections B,A,C and A of schools 1,2,3 and 4 formed the control (C) group.

9. Equating the Groups

The headmasters, in the beginning asked the investigator not to disturb the placement of students in classes. As such the investigator decided to work with the existing sections and then statistically matched them on variables on which they significantly differed

The experimental and the control group didn't significantly differ on intelligence and socio-economic

status. The groups, however, differed significantly on initial abilities. The two groups were afterward matched by the following the statistical procedure of analysis of co-variance.

9.10. Identification of Intervening Variables

One of the difficulties in a behavioural science experiment is to identify and control intervening variables. There may be some intervening variables which may escape the notice of a researcher. Some may or may not be controllable.

In a language experiment the following intervening variables may be supposed to influence language learning (Gagne, 1966; Carroll, 1963a).

1. Students intelligence.
2. Students socio-economic status.
3. Learning opportunities in school.
4. Time devoted to learning.
5. Content to be learnt.
6. Language climate at home.
7. Initial abilities of students.
8. Student motivation, age and sex.

10. Controlling Intervening Variables

Two procedures were followed to control the

intervening variables.

(a) Keeping the intervening variable constant for both the groups, and

(b) allowing the intervening variable to operate in both the groups and then partiating out the effect of these variables by using analysis of co-variance.

Two variables viz. teaching items (content) and teaching time were kept constant for both the groups.

Variables like language climate at home, learning opportunities in schools, motivation, age and sex were taken care of by following random distribution of sections to the experimental and the control group.

It was decided to match the groups statistically on intelligence, socio economic status and initial abilities or achievement. It was found that the two groups do not significantly differ on intelligence and socio economic status. As such the analysis of co-variance was used to match two groups on initial abilities.

The research design of a study depends upon the nature of investigation undertaken. In this study as the investigator wanted to evaluate the effectiveness of programmed teaching, he had to select the experimental approach and the pre-test post-test control group design.

The investigator has discussed the objectives of the experiment, delimitations and the sample. He has

also spelled out the potential intervening variables and measures used for controlling them.

The next chapter outlines the details and the design of the treatment introduced in both the groups.
