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CHAPTER III

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CHAPTER III

TRY OUT STUDY

3.1 Introduction

This chapter deals with the try out study of different programme forms used in this investigation. As mentioned in Chapter I this study involves the use of four forms of programme, viz., linear overt, branching, skip and response prompt. The topic selected for this study was that on 'thermometers' coming under physics. Krishnamurthy (1972) developed different programme forms for this topic along with the pretest and posttest. When these programme forms were developed this topic was included in the syllabus prescribed for ninth standard. But at the time of the present investigation it was included in the syllabus for eighth standard. It was therefore considered appropriate to conduct try out study for these forms on a fresh sample drawn from the population under investigation in order to test the suitability of these programme forms.

3.2 Objectives

The objectives of the try out study were as follows :

(1) To study the suitability of the programme forms in terms of

40 (a) Performance of the students on the posttest; and

(b) Error rate on the programme forms.

(2) To estimate the time required to learn through each form.

3.3 Sample

The population under study consisted of eighth standard students of English medium schools of Baroda because the subject area was included in the eighth standard syllabus and was in English language. From amongst the English medium schools of Baroda, the Rosary High School was selected for the try out study. All the fifty four students of the eighth standard from this school were included in the sample for the study. These students were randomly divided into four groups by using the table of random numbers. Of these, forty eight students completed pretest, programme and posttest. Six students dropped out in between.

3.4 Entering behaviours and pretest

Instructions should always be based upon what the pupils already possess. DeCecco (1970) says, "Learning builds on learning as success builds on success". He elaborates his point by saying that 'when the foundation blocks are missing, future construction, if possible at all, is a very precarious affair'. To make the teaching less precarious, it is important to think of and formulate the entering behaviour which would help in turn to make the

41 terminal behaviour more feasible and accurate. If teaching can be described as getting the student from where he is to where would like him to be, it can be said that in programmed learning, teaching means moving the student from entering behaviour to terminal behaviour. DeCecco (1970) describes the entering behaviour as "the present status of the student's knowledge and skill in reference to a future status the teacher wants him to attain". The statements of entering behaviour should be written in behavioural terms so that it is easy to measure the pre-requisites behaviour through the pretest. The performance of the learners on this test would decide whether they are eligible to take that programme. The present programme which is on 'thermometers' need to have some knowledge of physics and mathematics. So, the entering behaviours for the present programme were stated as follows.

(1) The students can identify solids, liquids and gases.

(2) The students can distinguish between heating and cooling.

(3) The students can write down the symbolic form of positive and negative.

(4) The students can know what a transparent material is.

(5) The students can write down the unit of measuring length.

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(6) The students can distinguish between expansion and contraction.

(7) The students can write down the name of the instrument for measuring body temperature.

(8) The students can write down what thermometers are made of ordinarily.

(9) The students can know what a division on a scale is.

(10) The students can write down which is at a higher temperature - ice, water or boiling water.

(11) The students can write down the minimum number and maximum number from the given numbers.

Based on the above entering behaviours a pretest was prepared in order to determine the extent to which the students possessed the entering behaviours. The pretest consisted of two types of objective type items. In one type two alternatives were given and the students had to select one out of them. In the other, the students had to complete the items of their own. The pretest is given in Appendix 'A'.

3.5 Programme forms

As stated earlier there are four different types of programme forms used. In all these forms the content covered was same. These programme forms are given in Appendix 'B'. A brief discussion of the programme forms

43 used for the present investigation is given here.

(a) Linear overt form

It is the Skinnerian form with small steps. It requires either construct responses or selection of one of the two or more alternatives. In this, every student pursues a straight course through the programmes, responding to every frame with no deviations or reversals. If the student does error in this form, he is merely exposed to the desired answer. Because the steps are small a linear programme typically appears to move slowly in an inevitable progress towards its goal of instruction. Since it is an overt form the student is expected to write down the answer.

(b) Branching form

It is the Crowderian form with remedial materials. Each concept is elaborated in a paragraph or two, and is followed by a terminal question of multiple choice. Each alternative is provided with instructions which should be followed by the student according to his choice. If his choice is not right he is led to remedial information and then asked to re-read the original page. In this form also, the student has to write down the response.

(c) Skip programme form

This form contains small steps. The sub-concept starts with a terminal frame. The student who makes a

44 correct response here would skip certain frames dealing with further elaboration of that point through the regular frames and then goes to the next concept. In this form, the student has to write down the response. The skip programme form directs the pupil to branch off according to his response.

(d) Response prompt form

It is same as linear programme with answers given in the blanks so that the pupil is prompted with the answers rather than required to construct the answers. The pupil is expected to copy down the response word.

3.6 Terminal behaviours and posttest

Mager (1962) defines the terminal behaviours as, "……that which refers to the behaviour you would like your learner to be able to demonstrate at the time of your influence over him (the learner) ends". To make sure that the terminal behaviours are attained by the students, it is essential to evaluate them at the end of instructional work. This can be done by administering a test of terminal behaviours also known as criterion test or posttest. A posttest is one that determines the extent to which the terminal behaviours are attained. Unlike an achievement test its objective is not to discriminate between high and low achievers but to detect steps arrived by each student, where he has failed, whether he has arrived at the criterion

45 behaviour or not. An additional advantage of a criterion test is that it allows a reappraisal of the sequence in a given programmed learning material. Hence, it provides feedback to the programmer which helps him to modify the programme.

The terminal behaviours for the present programme were stated as follows.

The students would be able to :

(1) define thermometer and temperature;

(2) write down the symbolic representation of temperature;

(3) understand the shape and structure of thermometer in general;

(4) understand the working of thermometer in general;

(5) state the reasons for using mercury in thermometer;

(6) understand how the lower fixed point and upper fixed point are marked on the thermometer;

(7) understand the shape and structure of maximum thermometer and minimum thermometer;

(8) name the special parts of maximum thermometer and minimum thermometer;

(9) understand the liquids used in the maximum thermometer and minimum thermometer;

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(10) understand the working of maximum thermometer and minimum thermometer;

(11) write about the recording of temperature;

(12) describe the Six's thermometer;

(13) understand the shape and structure of clinical thermometer;

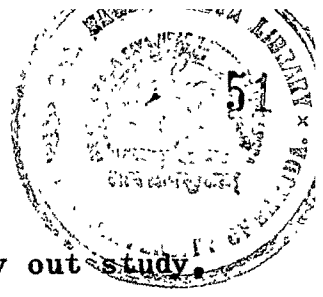
(14) write down the use of clinical thermometer; and

(15) write down the parts and functions of clinical thermometer.

In order to test the achievement of the students on the above terminal behaviours the posttest was prepared. The posttest consisted of items of completion type and also multiple choice. There were two types of items of completion. In one two alternatives were given and the students were required to select one out of the two. In the other the students had to complete the items of their own. For the multiple choice type, there were four alternatives. The students had to select the appropriate one out of the four. The posttest consisted of forty questions. Each of them carried one score. Hence the maximum score for the criterion test was forty. Posttest is given in Appendix 'C'.

3.7 Procedure

At first the pretest was administered to all the



students which constituted the sample of the try out study. Then, they were randomly divided into four treatment groups by using the random numbers table. The four programme forms were assigned to the treatment groups randomly. All the students in each group were given one copy of the programme. The students read the instructions given in the programme before they started working. Also, it was made sure by asking them whether they had followed the instructions. Each student worked independently and took his own time. The posttest was given to students immediately after the completion of the programme. The time taken by each student to complete the programme was recorded.

3.8 Results and discussions

The objectives of this study have been stated in the beginning of this chapter. The results related to each objective have been presented separately. However before reporting the results objectivewise it is essential to report the result of pretest which is the base for the programme. The distribution of scores obtained on the pretest is given in Table 3.1.

48 Table 3.1 : Score distribution on pretest

Score out of 22	Score out of 100	Frequency	Frequency percentage
22	100.00	25	52.08
21	95.45	17	35.42
20	90.90	6	12.50
0 - 19	-	0	0

N = 48

From Table 3.1 it can be seen that in the pretest 52.08 per cent of students scored 100 per cent marks, 35.42 per cent of students scored 95.45 per cent marks and rest 12.50 per cent of students scored 90.90 per cent marks. It is evident from this result that all the students have done extreamly well in the pre-test. It indicates that students possess the necessary prerequisites for going through the present set of programmes.

The first objective, as mentioned was to study the suitability of the programme forms. For studying this, two criteria were used. The first criterion was the performance of the students on the posttest. The results related to this criterion are given in the following section.

Posttest results

The percentages of the posttest scores were

49 calculated for the sample under study. The whole sample was categorised into three classes. The first was the percentage of students getting above 75 per cent, the second was the percentage of students getting between 50 per cent and 75 per cent and the third was the percentage of students getting between 40 per cent and 60 per cent marks. This has been given in Table 3.2.

Table 3.2 : Formwise percentage of students scoring 75 per cent, between 60 per cent and 75 per cent, and between 40 per cent and 60 per cent

Percentage of posttest score	Percentage of Students			
	Linear Overt	Branching	Skip	Response prompt
Above 75	75.00	58.33	25.00	75.00
Between 60 and 75	16.67	41.67	66.67	25.00
Between 40 and 60	08.33	00.00	08.33	00.00

The table shows that in branching form and response prompt form 100 per cent of students got above 60 per cent marks whereas in linear overt form and skip programme form 91.67 per cent of students got above 60 per cent marks. Even though theoretically it can be expected that all the students should get 100 per cent, practically it is impossible because

50 the classroom consists of different types of students such as slow, average and fast learners. It may be seen from the Table 3.2 that a vast majority of students have scored above 60 per cent marks. It may thus be considered that students performance is fairly satisfactory, which speaks of the suitability of the four forms as instructional material.

The second criterion for studying the suitability of the programme form was error rate on programme. The error rate is expressed in terms of percentages. The error rate on the linear overt form was calculated framewise. The Table 3.3 shows framewise the error rate on the linear overt form.

Table 3.3 : Framewise error rate on the linear overt form (N=12).

Frame No.	Percentage of errors
17	16.66
20	08.30
70	08.30
71	08.30
74	08.30
75	08.30
189 B1	08.30
209-3	08.30

51 This table shows that error rate on this form ranges from 8.30 per cent to 16.66 per cent. It also shows that the students made errors only on a few frames. Ideally we expect no error for such a programme form. In practice it may rather be difficult to attain; even the best student makes a few errors, it may be due to extraneous factors.

However the error rate should be kept as low as possible. In the light of these remarks, it may not be inappropriate to consider the above error rates low.

The framewise error rate on the skip programme form was calculated. The Table 3.4 shows framewise error rate on the skip programme form.

Table 3.4 : Framewise error rate on the skip programme form (N=12)

Frame No.	Percentage of errors
26	08.30
13	08.30
92	08.30
105	08.30
133	08.30
145	16.66
157	08.30
248	08.30

52 This table shows that the error rate on this form ranges from 8.30 per cent to 16.66 per cent. Also it shows that the students made errors only on a few frames and they did not make errors on the rest of the frames. As stated earlier truly errorless learning is probably impossible to attain. Therefore, the above error rate can be considered low.

The error rate on the branching form was calculated by the mistakes made on the exercise frames. The table 3.5 shows the error rate on the branching form.

Table 3.5 : Error rate on the branching form (N=12)

Exercise No.	Percentage of errors
4a	08.30
4c	08.30
6v	16.66
15.3	08.30
17.4	08.30

This table shows that the error rate on the branching form ranges from 8.30 per cent to 16.66 per cent. Also it shows that the students made errors on a few exercise frames and they did not make errors on the rest of the exercise

53 frames. As mentioned before even the best student makes a few errors and therefore few errors are to be expected. In respect of the response prompt form the question of error rate does not arise, as the students have only to copy the responses already provided.

While administering the test to the students, the investigator remained present to make sure that they studied the programmes according to the procedure explained to them. It was found that none of the students copied the responses on the contrary they were serious about the purpose because it was explained to them that the purpose of administering the programme was not to test them, but to test the adequacy of the programme. An informal conversation with the students revealed that the vocabulary used in the programme was within their knowledge and the style of presentation of materials was adequate.

The criteria for the suitability of the programme forms were (1) performance of the students on the posttest; and (2) error rate on the programme. The above results show that the achievement of the students on all forms were high and error rate on programme was low. It was also revealed that the language was suitable. It can be concluded that the forms are suitable for the population under study. Therefore, the programme forms were not modified.

The second objective was to estimate the time required for each form. The table 3.6 shows the mean time

54 taken by the students in going through the various programme forms.

Table 3.6 : Mean time taken for each form

	Linear overt form	Branching form	Skip programme form	Response prompt form
Time in minutes	97.33	93.83	96.81	93.30

This table shows that from among all the forms the response prompt form took the minimum time and the linear overt form took the maximum time. The time taken on different forms ranged from 93.30 minutes to 97.33 minutes. The estimation of the mean time on each form helped the investigator to schedule the time for the final study.

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