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H  
A  
P  
T  
E  
R

## VI

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**SUMMARY, FINDINGS, AND SUGGESTIONS**

- 6.1 Introduction
- 6.2 Objectives of the study
- 6.3 Hypotheses of the study
- 6.4 Try out study
  - 6.4.1 Objectives
  - 6.4.2 Sample
  - 6.4.3 Procedure
  - 6.4.4 Results
- 6.5 Final study
  - 6.5.1 Sample
  - 6.5.2 Design of the study
  - 6.5.3 Tools employed in the study
  - 6.5.4 Procedure
  - 6.5.5 Statistical techniques used
- 6.6 Findings
- 6.7 Suggestions for further research

## SUMMARY, FINDINGS, AND SUGGESTIONS

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### 6.1 Introduction

The present chapter is devoted to provide a summary of the total investigation reported in the previous chapters which comprises objectives of the study, hypotheses of the study, try out study, final study, statistical techniques used for the analysis of data and the findings. Efforts have also been made in this section to offer a few suggestions for carrying out further researches in this area.

The present investigation is an experimental study which deals mainly with the relative effectiveness of the four programme forms, viz., linear overt, branching, skip and response prompt; and the relationship between certain personality variables and performance of the students on posttest. The statement of the problem is as follows :

"An Experimental Study in the Use of  
Programmed Learning Material in the  
Classroom".

### 6.2 Objectives of the study

- (1) To study the relative effectiveness of the four forms of programme, viz., linear overt, branching, skip and response prompt in terms of

22

- (i) performance of the students on the posttest
  - (ii) time taken to complete the programme.
- (2) To study the difference in mean achievement of the students when adjusted for their reading comprehension.
- (3) To study the relationship between performance of the students on posttest and
- (i) reading comprehension
  - (ii) academic motivation
  - (iii) dependency
  - (iv) total adjustment
- on each form separately.
- (4) To study the relationship between performance of students on posttest and
- (i) home score
  - (ii) school score
  - (iii) peers score
  - (iv) teachers score
  - (v) general score
- on each form separately.

23

- (5) To study the relationship between performance of students on posttest and
  - (i) pretest
  - (ii) programme time (time taken to go through the programme)
  - (iii) attitudeon each form separately.
- (6) To study the relationship between posttest and
  - (i) programme time
  - (ii) attitudeon each form separately.
- (7) To study the relationship between attitude and programme time on each form separately.
- (8) To test the significance of the means of
  - (i) posttest score
  - (ii) programme time score
  - (iii) reading comprehension score of the two groups of the boys and girls in each form separately.
- (9) To test the significance of the means of
  - (i) posttest score
  - (ii) programme time

24

(iii) reading comprehension

of the high and low academic motivation students  
in each form separately.

(10) To study whether there is any significant difference  
in the

(i) mean posttest score

(ii) mean programme time

for different levels of dependency of all the forms  
together.

(11) To study whether there is any significant difference  
in the

(i) mean posttest score

(ii) mean programme time

for different types of attitude of all the forms  
together.

(12) To study the attitude of the students towards programmed  
learning.

### 6.3 Hypotheses of the study

It has been hypothesized as follows :

(1) There is no significant difference in the mean performance of the students on the posttest of the four forms of the programme.

- .25
- (2) There is no significant difference in the mean time taken on the four forms of the programme.
  - (3) There is no significant difference in the mean performance of the students on the posttest of the four forms of the programme, when adjusted for their reading comprehension.
  - (4) There is no significant relationship between performance of the students on the posttest and
    - (i) reading comprehension
    - (ii) academic motivation
    - (iii) dependency
    - (iv) total adjustmenton each form separately.
  - (5) There is no significant relationship between performance of students on posttest and
    - (i) home score
    - (ii) school score
    - (iii) peers score
    - (iv) teachers score
    - (v) general scoreon each form separately.

26

- (6) There is no significant relationship between performance of the students on posttest and
- (i) pretest
  - (ii) programme time
  - (iii) attitude
- on each form separately.
- (7) There is no significant relationship between pretest and
- (i) programme time
  - (ii) attitude
- on each form separately.
- (8) There is no significant relationship between attitude and programme time on each form separately.
- (9) There is no significant difference in the means of
- (i) posttest score
  - (ii) programme time score
  - (iii) reading comprehension score
- of the boys and girls in each form separately.
- (10) There is no significant difference in the means of
- (i) posttest score
  - (ii) programme time score

27

(iii) reading comprehension score

of the high and low academic motivation students in each form separately.

(11) There is no significant difference in the

(i) mean posttest score

(ii) mean programme time

for the different levels of dependency of all the forms together.

(12) There is no significant difference in the

(i) mean posttest score

(ii) mean programme time

for the different types of attitude of all the forms together.

#### 6.4 Try out study

The present investigation involves the use of four forms of programme namely linear overt, branching, skip and response prompt. The topic selected for this study was that on 'thermometers' from physics. Krishnamurthy (1972) developed different programme forms for this topic along with pretest and posttest. When these programme forms were developed this topic was included in the syllabus prescribed for the ninth standard. But at the time of the present investigation it was included in the syllabus for eighth



28 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.

#### 6.4.1 Objectives

The objectives of this try out study were as follows :

- (1) To study the suitability of the programme forms in terms of
  - (a) performance of the students on the posttest, and
  - (b) error rate on the programme form.
- (2) To estimate the time required by students for completing each form.

#### 6.4.2 Sample

The population under study consisted of standard eighth students of English medium schools of Baroda. 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 standard eighth from this school were included as the sample for the study. These students were randomly divided into four groups by using the table of random numbers. In total forty eight students went through the pretest, programme, and posttest. Six students dropped out in between.

### 6.4.3 Procedure

At first the pretest was administered to all the students who constituted the sample of the try out study. Then they were randomly divided into four treatment groups by using random numbers. 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 posttest was given to students immediately after the completion of the programme. The time taken by each student to complete the programme was recorded.

### 6.4.4 Results

- (1) Majority (above 91.67%) of the students got above 60 per cent marks on the posttest in each form.
- (2) The error rate on each form ranges from 8.3 to 16.6 per cent. Since truly errorless learning cannot be expected, the above error rate can be considered low.
- (3) The mean time required for linear overt form is 97.33 minutes, branching form is 93.83 minutes, skip programme form is 96.81 minutes and response prompt form is 93.30 minutes.

### 6.5 Final study

The results of the try out study showed that the programme forms are suitable for the present population under

30 investigation. Therefore all the programme forms were used as they were.

#### 6.5.1 Sample

Three schools from amongst those with English as medium of instruction were randomly selected from Baroda for the main study. These were the Shreyas school, the Convent of Jesus and Mary and the Baroda high school. All the 301 students of eighth standard in these schools constituted the sample. The students from each school were randomly divided into four groups. There were seventy five students in each group except in one where there were seventy six students. Table 6.1 shows the treatmentwise distribution of sample.

Table 6.1 : Treatmentwise distribution of sample

School	Treatments				Total
	Linear overt form	Branching form	Skip programme form	Response Prompt form	
Shreyas	18	20	19	18	75
Convent of Jesus and Mary	30	27	29	29	115
Baroda High School	28	28	27	28	111
Total	<u>76</u>	<u>75</u>	<u>75</u>	<u>75</u>	<u>301</u>

### 6.5.2 Design of the study

One of the main aim of the investigation was to study the relative effectiveness of the four forms of the programme. To achieve this objective four groups were necessary. Therefore, as mentioned in the sample of the final study the students in each school were divided into four equal groups by using the table of random number and further each group was randomly assigned to one of the programme forms. The same procedure was followed in all the schools. The technical name of this design is random replication.

### 6.5.3 Tools employed in the study

#### (1) Junior Index of Motivation (JIM Scale)

This is to measure the academic motivation of students. Academic motivation is the motivation which relates to learning in an academic setting. It was prepared by Frymier (1970).

#### (2) Pre Adolescent Adjustment Scale (PAAS)

This is to measure the adjustment of the students. Adjustment is defined as the individual's orientation towards his parents, teachers, peers, school and himself in terms of satisfaction he derives from his interactional relationship with the significant others and himself. It was prepared by Udai Pareek and others (1970).

132

### (3) Pre-Adolescent Dependency Scale (PADS)

This is to measure the dependency of the students. Dependency is defined as the tendency to seek the help of others in making decisions or in carrying out difficult actions. This was prepared by Udai Pareek and others (1970).

### (4) Reading Comprehension Test

It is to measure the reading comprehension of the students. It was prepared by Singh (1972).

### (5) Attitude Scale

It is to measure the attitude of the students towards programmed learning. It was prepared by Govinda (1975).

#### 6.5.4 Procedure

At first the pretest was administered to all the students who constituted the sample of the final study. Then the different programme forms were assigned to the four groups in each school randomly. The students were asked to read the instructions. And, it was made sure that they understood them. They worked independently and took their own time to complete the programme. The time taken by each student to complete the programme was recorded. The posttest was given immediately after the completion of the programme. When all the students completed the posttest, JIM Scale, Pre-adolescent Adjustment Scale, Pre-Adolescent Dependency Scale, reading

133

comprehension test, and the attitude scale were administered one by one. The instruction for each tool were given separately. The same procedure was replicated in all the schools.

#### 6.5.5 Statistical techniques used

- (1) Percentiles were calculated to study the effectiveness of each form in terms of students' performance on posttest.
- (2) To study the relative effectiveness of the four forms of the programme the statistical techniques used were analysis of variance and t-test.
- (3) To study the difference in mean achievement of the students when adjusted for their reading comprehension analysis of covariance was applied.
- (4) To study the relationship between certain personality variables and achievement of the students the statistical techniques used were partial correlation and product moment correlation.
- (5) Analysis of variance was applied to study whether there is any significant difference in the means of
  - (a) posttest score
  - (b) programme timefor different levels of dependency of all the forms together.

- 134
- (6) Analysis of variance was applied to study whether there was any significant difference in the means of
    - (a) posttest score
    - (b) programme time scorefor different types of attitude of all the forms together.
  - (7) The t-test was applied to test the significance of the means of
    - (a) posttest score
    - (b) programme time score
    - (c) reading comprehension scoreof the boys and girls in each form separately.
  - (8) The t-test was applied to test the significance of the means of
    - (a) posttest score
    - (b) programme time score
    - (c) reading comprehension scoreof the high and low academic motivation students on each form separately.
  - (9) In order to know the percentages of the students who are having positive, neutral and negative attitude towards programmed learning percentages were calculated.

## 6.6 Findings

- (1) Eighty per cent of the students who have learnt through the linear overt, branching, skip programme and response prompt forms have scored 80 per cent or above respectively.
- (2) Of the four forms, branching form is significantly more effective than the linear overt form, when the performance of students is taken as criterion. According to the mean performance of students on posttest the rank order of the forms are as follows, in the descending order.
  - (a) branching form
  - (b) response prompt form
  - (c) skip programme form
  - (d) linear overt form
- (3) Branching form is relatively more effective than all the other forms, when time is taken as the criterion of effectiveness.

According to the time criterion, linear overt form is least effective of all the forms.

When time is taken as the criterion of effectiveness the rank order of the forms are as follows in the ascending order.

- (a) branching form
- (b) skip programme form



- (c) response prompt form
  - (d) linear overt form
- (4) The average time required by teachers to teach the topic 'thermometers' is three hours. But the same content is taught in less time by programmed learning material.
  - (5) Linear overt form is relatively less effective than all the other three forms, viz., branching, skip and response prompt, when adjusted for the reading comprehension.
  - (6) There is positive and significant relationship between performance of students on posttest and reading comprehension on each form separately.
  - (7) There is no significant relationship between performance of students on posttest and academic motivation on linear overt, branching and response prompt forms.
  - (8) There is positive and significant relationship between performance of students on posttest and academic motivation on skip programme form.
  - (9) There is no significant relationship between performance of students on posttest and dependency on each form separately.

37

- (10) There is positive and significant relationship between performance of students on posttest and adjustment on the linear overt form.
- (11) There is no significant relationship between performance of students on posttest and adjustment on branching, skip and response prompt forms.
- (12) There is no significant relationship between performance of students on posttest and adjustment towards home on each form separately.
- (13) There is no significant relationship between performance of students on posttest and adjustment towards school on each form separately.
- (14) There is no significant relationship between performance of students on posttest and adjustment towards peers on the branching, skip and response prompt forms.
- (15) There is positive and significant relationship between performance of students on posttest and adjustment towards peers on linear overt form.
- (16) There is no significant relationship between performance of students on posttest and adjustment towards teachers on branching, skip and response prompt forms.
- (17) There is positive and significant relationship between performance of students on posttest and adjustment towards teachers on linear overt form.

138

- (18) There is negative and significant relationship between performance of students on posttest and adjustment towards 'general' on linear overt form.
- (19) There is no significant relationship between performance of students on posttest and adjustment towards 'general' on branching, skip programme and response prompt forms.
- (20) There is positive and significant relationship between performance of students on posttest and pretest on linear overt, branching and skip programme forms.
- (21) There is no significant relationship between performance of students on posttest and pretest on response prompt form.
- (22) There is negative and significant relationship between performance of students on posttest and programme time (time taken to go through the programme) on skip programme form.
- (23) There is no significant relationship between performance of students on posttest and programme time on the linear overt, branching and response prompt forms.
- (24) There is no significant relationship between performance of students on posttest and attitude towards programmed learning on each form separately.
- (25) There is no significant relationship between pretest and programme time on each form separately.

139

- (26) There is no significant relationship between pretest and attitude towards programmed learning on each form separately.
- (27) There is no significant relationship between attitude towards programmed learning and programme time on each form separately.
- (28) There is no significant difference in the mean posttest score of the boys and girls on the linear overt form and skip programme form.
- (29) There is significant difference in the mean posttest score of the boys and girls on branching form and response prompt form. Performance of boys on posttest is significantly higher than that of girls on the branching form whereas on response prompt form performance of girls on posttest is significantly higher than that of boys.
- (30) There is no significant difference in the mean programme time of the boys and girls on linear overt, skip and response prompt forms.
- (31) There is significant difference in the mean programme time of the boys and girls on the branching form. Boys have taken significantly higher time than the girls on branching form.
- (32) There is no significant difference in the mean reading comprehension of the boys and girls on each form separately.

40

- (33) There is no significant difference in the mean performance on the posttest of the high and low academic motivation students on linear overt, branching and skip programme forms.
- (34) There is significant difference in the mean performance on the posttest of the high and low academic motivation students on response prompt form. High academic motivation students scored significantly higher than the low academic motivation students on posttest.
- (35) There is no significant difference in the mean programme time for the high and low academic motivation students on each form separately.
- (36) There is no significant difference in the mean reading comprehension for the high and low academic motivation students on branching and skip programme forms.
- (37) There is significant difference in the mean reading comprehension for the high and low academic motivation students on linear overt and response prompt forms. High motivation students scored significantly higher than the low motivation students on linear overt and response prompt forms.
- (38) There is no significant difference in the
- (i) mean posttest score
  - (ii) mean programme time

41

for different levels of dependency of all the forms together.

(39) There is no significant difference in the

(i) mean posttest score

(ii) mean programme time

for different types of attitude of all the forms together.

(40) 72.37 per cent of students who went through linear overt form, 72.00 per cent of students who went through branching form, 74.67 per cent of students who went through skip programme form and 77.33 per cent of students who went through response prompt form are having positive attitude towards programme learning.

#### 6.7 Suggestions for further research

In the light of the experience gained, and the findings mentioned, the investigator deems it worthwhile that there is need for further probing. Below are given some suggestions for further research in this area.

(1) An inquiry may be made using the same programmed learning material for the students of the other states like the present investigation.

(2) An inquiry may be made to study the relationship between performance of the students on the posttest and certain

42

other personality variables which are not taken for the present investigation.

- (3) Programmed learning materials of different kinds for various levels can be prepared and its relative effectiveness can be studied.
  - (4) Programmed learning materials for different subjects can be prepared and an inquiry may be made to study whether effectiveness of a programme is in any way related to the difficulty of the content covered.
  - (5) An inquiry may be made to study the effectiveness of programmed learning materials with discussions, seminars and library work.
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