CHAPTER III

PROBLEM FOR THE PRESENT INVESTIGATION AND ITS IMPORTANCE

Problem for the Present Investigation

Problem for the present investigation reads as: "USE OF BRANCHING VARIETY OF PROGRAMMED LEARNING MATERIALS IN MATHEMATICS AS DIAGNOSTIC AND REMEDIAL TOOLS".

To deal effectively with the backwardness of a student in a particular subject, teacher must have detailed information about the backwardness. He must be conscious for the location of the backwardness. This can be done by proper diagnosis.

The teacher who is aware of this thing can take steps to avoid the backwardness by supplying proper remedial material.

The use of programmed learning material in classroom has changed the method of teaching. In this study, investigator has tried this technique. This study attempts to know the effectiveness of programmed learning material, particularly branching programming, as diagnostic and remedial tools.

This study throws new light for diagnosis and also
provides new technique for the remedy in mathematics teaching.

The student is the active participant in finding out his mistakes or the backwardness in the subject and after locating the point of backwardness, he finds out proper remedy which is provided with the material, by himself. The diagnostic and remedial work done by this technique is very concrete and interesting. This technique has its own importance, as we know that programmes in branching style use only those types of frame structures which require students only to select the correct answer from a given set and not to construct on their own. This type of facility of selection of the answer leads a student for better learning.

Why is This Problem Selected for the Investigation

As teachers of mathematics, we know the importance of diagnosis in the subject and we know how to provide follow up work. In our traditional way of diagnosis we are not able to give that much importance to individual differences which are there in students. We are not able to cater them easily. While, by this technique of branching programming, student can find his own mistake by selecting the answer and correct his mistake by remedial material which is already given in the frame, when he follows the instruction given against the choices. There he takes his own time to understand the content. He can proceed further
at his own rate.

Moreover, the branching style is more suitable for mathematics teaching. This style is based on reasoning. One has to provide reason even for correct answer. If correct then he is supplied with the material why he is correct. So, it develops reasoning. Mathematics is the subject of reasoning and logical thinking. Thus, diagnostic and remedial materials supplied by this style have very good effect in learning the subject, like mathematics.

So, in short, we can say branching style is more adaptive in its structure for individual differences among the students regarding content mastery and this style accommodates individual differences in learning ability of students by including remedial frames.

This problem throws new light for the diagnosis and to give remedy in mathematics.

For all such reasons the problem has been selected for investigation.

**Investigator's Qualifications to Do This Work**

Looking to the title of the problem, the investigator should have knowledge of programmed learning and the knowledge of the subject matter.

The investigator studied the behavioural psychology at the M.Ed. level. And in that the investigator
studied the development of programmed learning technique in details.

The investigator is a post-graduate in mathematics. He has long experience of teaching mathematics at school level as well as at the college level. He is well versed with the new development of modern mathematics as he has taught the subject in refresher courses of modern mathematics, conducted under the auspices of the Gujarat Government, at Borsad Education College, Borsad. He has also taught the subject in the refresher course for the primary teachers.

Moreover, he is a method master of mathematics at the Borsad Education College, Borsad.

So, looking to all these qualifications, he is fit to do this type of study.

The Objectives of the Investigation

1. To develop the programmed learning materials in branching style on the following units for standards V, VI and VII.

For standard V, the units are: (i) Properties of number, (ii) Factors, (iii) G.C.M., L.C.M., (iv) Exponents, (v) Line, (vi) Ray and (vii) Segment.

For standard VI, the units are: (i) Decimals,
(ii) Percentage, (iii) Profit and loss and (iv) Mensuration.

For standard VII, the units are: (i) Work, time and speed, (ii) Ratio - proportion and (iii) Shares, stocks.

2. To compare the achievement of students studying through PLM with those studying through conventional methods of teaching by matching the two groups in terms of intelligence and pre-test scores.

3. To determine the weaknesses of the students in mathematics with discussing with the experienced teacher and checking the answerbooks of the students.

4. To supply the remedial measures keeping in view the mistakes often committed by the students, through branching variety of the programmed learning material.

Limitations of the Study

1. This study was limited for forty students in each group, i.e., experimental and control groups of standards V, VI and VII of Sardar Patel Vinay Mandir, Vasad.

2. The subjects of both the groups (experimental and control) were not matched in relations with variables/
sex, socio-economic status and personality factors.

3. It was beyond the scope of study to prepare the branching programmes for all the topics of syllabus of mathematics of standards V, VI and VII.

4. Only those points were covered through branching programme which were not easily understood by the students of standards V, VI and VII for the selected topics.

Reviews of the Related Researches

A number of researches on programmed learning have been carried out all over the world with different groups of students by different investigators in order to know the effectiveness of programmed learning technique. Programmed learning in its earlier stages, was deemed solely as a technique of teaching in the classroom. So, earlier researches were on the comparative studies of programmed learning technique and conventional method of teaching. Now, it has captured many fields like health, medicine, family planning, defence, banking, etc.

Here are some useful reviews of researches for the present investigation.

Intelligence and Achievement on PLM

The research results in this regard do not help one to draw definite conclusion as to the relationship between intelligence and achievement through programmed learning.
Alter studied the relationship between intelligence and retention of material learnt through programmed instruction. He found that more intelligent students performed better on the retention test than less intelligent students.1

Lambert, in his study, found that intelligence was the most significant variable in immediate subject matter acquisition through programmed instruction.16

Hatch and Flints' study evaluated academic intelligence measures as predictors of subject matter achievement in both programmed and conventional teaching.9

Read and Hyman reported that high ability learners did better on programmed rather than on conventional instruction, while low ability students did better in conventional rather than in programmed instruction.23

Bhusan administered Jalota's Intelligence Scale with a programme on educational statistics to 42 B.Ed. students. Product-moment coefficient of correlation between post-test and intelligence scores was found to be significant at .01 level indicating that higher the intelligence of the students better the chances of benefitting by the programmes.3

Goel undertook an investigation to study the difference in the error rate on the programme and criterion
scores for students at different intelligence levels. She found that students of above average intelligence made significantly higher scores on the criterion test than those belonging to average and below average intelligence levels.7

Kapadia studied the relationship between the immediate achievement and the retention scores on linear and branching programmes and some personality variables including intelligence. The results indicated that intelligence was positively related to immediate achievement scores as well as retention scores on both types of programmes. The relationships were found to be significant at .05 level.12

Stolurow conducted a study on twenty gifted students who participated in problem-solving institute. Their learning experience consisted of studying self-instructional programmed materials over a six week period. He found that mental age of students did not correlate significantly with the post-programme achievement scores.27

Ferster and Sapon6 and Porter21 found little or no relation between IQ and achievement of learners taught by self-instructional device.

Research literature in the field of programmed learning abounds with reports of studies involving comparison of programmed learning and other method of instruction. Some of the studies conducted to compare the effectiveness of programmed learning technique with conventional method
of teaching have been reviewed in the following paragraphs.

Comparison Studies

In 1960’s, the comparison experiments were conducted to establish the effectiveness of programmed learning as an instructional technique. Many of the studies have compared programmed learning and conventional method of teaching.

Hartley reviewing 110 studies comparing programmed instruction with conventional method of teaching reported that in 41 studies programmed instruction group was significantly superior to the other in terms of test results, however, in 54 studies results did not indicate any significant difference between programmed instruction and conventional method, and programmed instruction group did significantly worse than the other group in remaining 15 cases.

Researches conducted in foreign countries, regarding the comparison of programmed instruction and conventional method, concluded that in majority of the studies programmed instruction is superior to conventional method.

Little17, Angell and Troyer2, Jenson11 and Pressey22 with a host of other scholars report experimental findings pertaining to the assessment of instructional effectiveness of programmed learning done with the help of punch board device and usual class teacher. Most of these studies acclaim superiority of programmed learning group
over the control group, i.e., usual class teaching group.

Skinner proved the superiority of programmed learning over the conventional teaching, because it not only catered for individual differences and provided immediate reinforcement even in complex verbal learning situations but it also could, at the same time, cope up with phenomenal number of contingencies which needed during instruction.

Ferster and Sapon⁶ found the programmed learning group faster than and superior to the conventionally taught, the mean time of the former group being 47.5, as against 48 hours of the other group, besides almost the same amount of time spent on homework.

Evans, Glaser and Homme while evaluating the relative effectiveness of sequenced learning in programmed textbook formal with conventional textbook presentation of the stimulus material, found former group making higher achievement scores and lesser variability in performance than the conventional group.⁵

Indian researchers conducted a large number of studies comparing programmed instruction and conventional method. Kulkarni and Kapadia reviewing the research work done in the country at doctoral and institutional level concluded that the majority of the studies were comparison studies.

Shah conducted the systematic research study in
the field of programmed learning in India. Shah conducted the first systematic research study in the field of programmed learning in India. It was found that the programmed group did significantly better than the group taught by the conventional method.¹⁴

Patel conducted an investigation with a view to find out the relative effectiveness of programmed instruction and conventional method for teaching directed numbers in mathematics to students of standard VIII.¹⁸

He separately conducted an experiment with a rural sample and with an urban sample. Findings of the study, reported separately for the two samples, revealed that in both cases programmed instruction and conventional method groups did not differ in their mean achievement on the teacher made test as well as on the criterion test.

Shah and Krishnamurthy conducted a study which is of comparative nature. They found the programmed materials to be as effective as the traditional method of teaching.²⁵

Sharma gave a programme on 'sets' to a group of students of class IX. He divided the class in two parts. One group taught through usual method and other group taught through programmed learning method. He taught the same topic to both the groups. Comparing the performances of the two groups on a post-test, he concluded that the difference was not significant.²⁶
Kulkarni's study revealed that achievement of pupils is greater in a particular subject if the lesson is revised by using a programme, compared to other conventional methods of revision or no revision at all.\textsuperscript{14}

There are very few studies found in branching style.

Hussain studied the effectiveness of linear and branching programmes in two situations - rural and urban, and under two different conditions - supervised and non-supervised. The analysis revealed that the linear supervised treatment was superior to all other treatments in the urban situation. In the rural situation, branching supervised treatment was superior to all other treatments. Linear non-supervised treatment is significantly inferior to all other treatments in urban as well as rural areas. The analysis also indicated that linear programmes work well when given under the supervision of the teacher. Branching supervised and non-supervised treatments proved to be equally effective, though the branching supervised treatment was slightly better than branching non-supervised treatment.\textsuperscript{10}

Krishnamurthy undertook a study to compare different forms of programmed learning material. He found that branching form is the least effective in terms of immediate post-test. It does not significantly differ to a high degree with at least certain forms like linear overt, skip-programme, etc.\textsuperscript{15}
From the above reviews, nobody can say definitely that programmed learning method is superior to conventional method or conventional method is superior to programmed learning method. Sometimes, it has been revealed that either method is as good as the other.

Many studies have been done, on comparison with programmed learning, particularly linear programmed style, and conventional method. But very rare studies have been conducted for the comparison of branching style with conventional method. Here in this study the investigator has tried to compare the two methods, programmed learning method of branching style and conventional method for diagnostic and remedial purposes.

References


