CHAPTER 1

INTRODUCTION

Title

The title of the thesis is:

"To prepare Programmed Learning material on the topics 'Introduction to Algebra' and 'Solving Simple Equations', in Marathi, and to study in what different ways it can be used to maximise performance and retention of students, if these topics are introduced in lower grades i.e. grade 5 and grade 6 in Maharashtra, where these topics are not conventionally taught".

The Problem

The problems in education can be classified under three categories: problems regarding what is to be taught, to whom it should be taught and how it is to be taught. We have to tackle these problems in the context of Indian conditions.

What is to be taught? The advancement of knowledge in subjects like mathematics and science is reaching new heights and a lot of new curriculum in these subjects has already been introduced in advanced countries. In India we are still following outdated curricula. It has been rightly observed by the Education Commission (1966) that at the primary and secondary levels the mathematics syllabi need to be revitalised and brought up to date.
Some of the subjects in the old curriculum do find place in the new curriculum, but these are taught in upper grades. Some topics such as set theory etc. are taught at the college level. If with the introduction of new curriculum it is thought necessary to introduce topics like these in lower grades, where they are not conventionally taught we will have to find out ways and means by which we can do this effectively.

While doing this we will also have to take note of prevailing conditions in Indian education. Because of the demands of mass education, increasing number of students are coming from rural and urban areas with different socio-economic and cultural backgrounds. This does not allow a teacher to presume a common background on the part of students, in order to build on the new topics. Individual attention to these students is also not possible because the teacher pupil ratio in schools is around 1 : 50. In colleges it is still larger.

Under these circumstances can we accept the challenge and devise some techniques by means of which we can teach effectively new curricula and that too in lower grades? For this we will have to depend on effective teaching methods.

The time has come for teaching method to be designed on the knowledge of learning process. This needs specifying conditions which are demonstrated to be related to learning, generating those conditions in the classroom, and validating the effectiveness of the strategy used in terms of students' learning. In particular we will have to do the following:

(a) Specify in advance in behavioral terms, what the learner is expected to do at the end of instruction.
(b) Specify what the learner is able to do at the beginning of instruction.
(c) Arrange the sequence of tasks, starting from the entering behavior and leading the student effectively towards the terminal behavior, using appropriate principles of learning.
(d) Show that this sequence produces a measurable and consistent effect on the learner.

This is Programmed Learning approach. As Markle (1967) puts it, "We define an instructional program as a reproducible sequence of instructional events designed to produce a measurable and consistent effect on the behavior of each and every acceptable student".

In preparing programmed learning material the emphasis is on this approach. How this approach is used in preparing the programmed learning material used in this study, is discussed at a greater length in Chapter 4.

In a classroom situation programmed learning material can take care of the following components in the teaching-learning process:

(1) To present some information and then a question based on that information.
(2) The learner responds to it.
(3) The learner is informed whether he is right or wrong.
(4) To present the next bit of information on the basis of the learner's previous performance.

A teacher cannot carry all these functions paying individual attention to each and every student in a classroom of 50 students. However with the use of programmed learning material to take care of these functions, a teacher is left free to take care of other functions such as motivating students,
maintaining discipline etc.

Other advantages of the programmed learning method are:

1. The method is individual based and it adjusts to individual differences.
2. It allows self-pacing and ensures higher proficiency.
3. Any number of students can be trained at a given time (depending on the availability of material).
4. It eases the shortage of good teachers. It can also be a real aid to a teacher's job of controlling the learning environment.
5. It can be used for regular classroom instruction, for remedial work, for out-of-class study and also with other media or in conjunction with a human teacher.
6. It can develop self-study habits.
7. It is a convenient tool in the hands of a researcher in teaching learning process.

Devising effective teaching methods also includes a study of how to maximise performance of students by using different amounts and types of repetition.

The specific objectives of the study are:

1. To prepare Programmed Learning material in Mathematics in Marathi, the topics being (a) Introduction to Algebra (b) Solving Simple Equations. These programmes would contain new curriculum in Algebra, wherever possible, without totally discarding the present day curriculum.
2. To evaluate the programmed material in terms of products of instruction and time taken by students to go through the programme, sequence progression, error rate etc.
3. To study whether these subjects can be introduced in lower grades where the given topic is not conventionally taught, i.e., in grades 5 and 6.
(4) To test specific hypotheses regarding student variables such as entering behavior as is measured by a pre-test, scores in school subjects like Marathi (Mother tongue), Mathematics and Grand total in all subjects and time taken to go through the programme and the relation of these to post-instructional performance.

(5) To test specific hypotheses regarding method variables such as different revision treatments, their effect on performance and retention, their effect on performance and retention and scores on three different occasions.