CHAPTER II
A SURVEY OF RELATED LITERATURE

2.0 Introduction

The method of programmed learning has opened new vistas in the history of education in India since early sixties. The tendency of using this method of learning is increasing and the number of programmes prepared is also rapidly developing. The Indian Association of Programmed Learning (IAPL), The Department of Educational Psychology and Foundation of education in the NCEM, Delhi, and various departments of Education in Indian Universities such as Centre of Advanced Study in Education, M.S. University of Baroda have been doing remarkable progress in the growth of this field. The first experiment on programmed learning was started in 1965 in India in the schools of Delhi. This technique of PL was included by some major universities in their curriculum at Master’s or Bachelor’s degree in the development of Education and psychology around 1972. Maharashtra and Gujarat introduced this method of teaching-learning process in the curriculum of primary teacher’s training colleges.

So far as the research on Programmed Learning is concerned, in India these are confined to only some limited areas such as (a) programmed learning for different subjects, (b) programmed learning versus individual differences or instructional media, (c) programmed approach versus traditional approach to teaching, (d) different forms or different uses of PLM.
Shah(1964), Sharma, K.A.(1966), Sharma M.M.(1966), Desai(1966), Shah(1969) and SIE Ahmedabad (1970) used the intergroup method with an experimental group through PIM and the control group through the traditional method in their studies. They found that the group exposed to the programmed approach revealed higher achievement. The studies of Sharma, M.M.(1966), Kulkarni(1969) and SIE(1970) showed that the effectiveness of the Programmed Learning is not only found in terms of immediate gain scores but also in terms of retention score. The dimensions of research in Programmed Learning is widening day by day and therefore effective programmed materials are deserved to be constructed.

This new technology (PL) paves the way for significant ideas, theories and hypotheses valuable in formulation of problems and provides methods of research, background for selection of procedure and analytical interpretation. It is an important job for an investigator to know the up-to-date information on what has already been done in the field from which she will be benifitted in taking up a problem. Hence the programmer thought it proper to make an attempt to survey the related literature in the field of programmed learning. Below we survey the research contribution in Programmed Instruction made in India and abroad in different disciplines and particularly in teacher education.

2.1. STUDIES IN EDUCATION

Experiments in various fields of education have shown the effectiveness of programmed learning materials as an instructional strategy for teaching educational evaluation. Suthar, K.S.(1981) established that the PIM was superior to the traditional way of teaching, irrespective of different variables by his experiment.
on "A study of performance on Programmed Learning Material in relation to some psychological characteristics." Seshadri, M (1980) in his "An Experiment in the use of Programmed Instruction in Secondary schools" found that a duly validated instructional strategy having reproducible PLM as the major component with established long-range effectiveness can be developed. Mullick, S.P. (1979) in his "An inquiry into the relative effectiveness of Linear Style Book Format (BF) and Multi-Media Programmes" found that (i) the Linear style Book Format programme was suitable for lower level students in English of Class VI when the teacher-made test was used, (ii) B.F. programme was particularly suitable for lower-level students in English of Class VII and (iii) B.F. programme was particularly good to average level groups in general science. The effectiveness of structured lecture method over the conventional one can be seen in the study by Yadav and Govinda (1979). Sansawal in his "An Experimental study in Programmed Learning for teaching research methodology" found the effectiveness of PLM in terms of student's achievement on criterion test. Kapadia (1972) investigated the relationship between the immediate achievement and the retention scores on linear and branching programmes and some selected personality variables, viz intelligence, anxiety, self-sufficiency and introversion and extroversion. Development and validation of the linear programme learning material also formed the part of the investigation. Krishnamurthy (1972), like Shah (1971), on the basis of his investigation concluded that the correct answer prompt form was the most effective for students.
immediate achievement. Another study undertaken by Krishna Murthy (1972) was to test the hypothesis that different programme forms do not differ significantly in their achievement in terms of immediate scores or retention scores on the criterion test. The result of the study revealed that "response-prompt covert reading" was better than all others, both on immediate post test and the retention test. Branching form, was the least in effectiveness in terms of both immediate post-test and the retention test. The results implied that "response prompt covert reading" can be said to be the most efficient form, if one considers both the criteria of immediate post test and the percentage of retention.

It was suggested that the retention test should be a part and parcel of the development of programmed material. Nagar (1971) conducted a study to compare three different measures of learning, viz., recall, retention and utilization, obtained separately under two instructional treatments viz., Herbartion method and Programmed learning of linear type. The findings were that (i) the effect of treatment were highly significant at .01 level, (ii) the effects of intelligence, learning and the two methods of teaching were highly significant, but no evidence of significant effect of sex existed, (iii) two factors interactions of intelligence and sex, learning and methods of teaching, were highly significant, but the two factors interactions between intelligence and method of teaching, and a methods and sex were not significant; and (iv) interaction between instructional treatments and measures of learning was significant. Kulkarni (1966) conducted a study to
know which method of programming could have better impact on instruction for the development of an ability for a given group of students. He found that the treatment effects did not seem to be significantly different.

2.2 STUDIES IN OTHER SUBJECTS

Most of the researchers are interested to see the effectiveness of PLM in different subjects and a number of studies have been undertaken by the researchers in fields other than education. But as time passed on, various studies were conducted in various style of programming, mode of responses, prompts and cues and to find out the effectiveness of PLM not only in the achievement scores in the immediate post test scores but also in the retention scores in the delayed test. A number of studies undertaken in various disciplines under programmed learning are briefly given in the following paragraphs.

2.3 STUDIES IN MATHEMATICS

Inamdar, J.A. (1981), in his "A study of the Effectiveness of the Programmed Learning Strategy in the subject of Mathematics for Standard VII in relation to some Psychological Correlates" found the programmed learning technique as superior to the conventional technique. Shah, J.C. (1981) in his "To Develop and Try Programmed Material in Mathematics for Students of Class V in Gujarat State", found that the reactions of the students and the teachers were favourable. Pandey, I.D. (1980) in his "Use of
Programmed Instruction on Teaching Mathematics at Primary Level, found that (i) the group following the programmed text differed significantly from the other two groups both in respect of immediate and delayed achievement (ii) The group following the programmed text was significantly superior in retention to the subjects following the traditional method without home assignment and the traditional method with home assignment and grading. Gosain (1977) in his investigation "A Linear Programme on Elementary Algebraic Concepts in relation to step size and Three levels of Taxonomic categories for standard VI" reported that small step programme was more effective with regard to achievement in knowledge and comprehension categories. Patel (1977) developed an "Auto Instructional Programme in some units of Geometry for Class VIII and found out its effectiveness. He reported that Programmed Learning Material was found to be effective when compared to traditional way of teaching. Patel (1975) structured Auto-Instructional programme in Geometry for standard IX to test the effectiveness of PIM in relation to different variables and found the superiority of the PIM over the traditional method.

2.4 STUDIES IN LANGUAGE

Saharwal, V.K. (1978) in his "A study of the Comparative Effectiveness of Programmed Auto-learning vis-a-vis other Methods of Teaching English as a second Language in relation to L-1 and L-2 Achievement" found the effectiveness of PIM over other methods of teaching.
Vasantha and Vijayakumar (1978) made a study of the intellective and non-intellective differences in learning selected structures in English through programmed learning material in VIII standard. They reported that there was a significant positive relationship between achievement in English and learning of English structures through PL.

Mehta (1978) made an attempt in developing a programmed reading material in English for standard V and testing its effectiveness. The findings revealed that children taught programmed reading text learned better and retained more than their counterpart taught conventionally by the class teacher.

Sethi (1976) undertaking a study of a programme in English spelling in relation to visual and auditory presentation, reported that the auditory mode was superior to the visual mode in presentation of the programme in English spelling to Class X students of English medium schools.

Chandrakala (1976) in her study on 'Different methods of teaching Sanskrit Grammar to the high school classes' noted that the three treatments viz. Programmed instruction, Lecture method and Traditional method were equally effective in terms of student's performance. Baddi (1975) compared the programmed instructional method with that of conventional teaching method in the learning of language in VI standard and concluded that there were some definite advantages found in the programmed learning method over the conventional method.

2.5. Studies in Geography

A very few studies were made in Humanities particularly in the discipline of Geography. Navi, N.S. (1981) developed a programmed
text in Physical geography for high school students and covered 124 students of Class IX. Ninety-five percent of the learners answered correctly. 95 percent of the 1,391 frames and in the unit test scored between 85 percent and 91 percent. The opinion expressed by the students was found to be favourable towards the programme.

Verma (1977) undertook an experimental study of interaction effects of the styles of programming response mode and Taxonomy Categories in Geography for standard VIII. The programmed material was developed in Geography on "Earth as a Planet." He found that Branching programme was more effective to linear programme. But linear programme was more effective at knowledge level whereas branching programme was more effective at comprehension level.

Singh (1973) in his investigation of 'Formal and Thematic prompts in a linear programme in Geography on map reading for Class VIII' found that the thematic prompts were more effective as compared to formal prompts. Hussain (1977) developed a programmed learning material in Geography on 'Factors affecting Air pressure' and studied its effectiveness under supervised and non-supervised conditions in rural and urban areas.
Sarma (1966) prepared a programme in Geography on the 'shape of sun and Earth', 'Earth's rotation and Revolution', 'North and South poles' and 'Latitudes and Longitudes' and compared it with the traditional method of teaching. From his report it was found that the programmed learning material was superior to traditional method.

2.6 Studies in Science

A number of studies have been made in the discipline of Science. Man, B.S. (1981) studied the effect of unit test scores and retention following the programmed material in a segment of physics. He had a sample of 762 male students. He found that the immediate retention, one week retention, six-week retention of students going through PLM with test was better.

Sharma and Ahiya (1978) made an attempt to see the effectiveness of PLM over traditional method through a linear programme in Chemistry.

Sodhi (1977) in his study "Evaluation of Programmed Learning in Chemistry in relation to Taxonomy of Educational objectives, intelligence and personality traits at the higher secondary level", reported that (i) the PLM through branching frames was superior to lecture method in terms of total achievement. (ii) The PLM of linear style was superior to lecture method in respect of overall achievement and achievement in categories of application, analysis, synthesis and evaluation, but no significant difference was marked for knowledge and comprehension categories. The studies
of Kuruvilla (1977) also favoured the superiority of Branching programme.

Shitole (1976) developed a programmed learning material in Agricultural subjects for Marathi-medium secondary schools and found out its utility for different categories of studies and found the superiority of the PLM over the traditional method.

Pandya (1974) found PLM more effective than the traditional method in his study on Physics subject with X class students of Secondary Schools.

2.7 Foreign Studies

A number of studies have been undertaken in programmed learning almost in all sectors of learning in the developed countries.

Howe and B. Du Boulay (1979) through their studies on "Micro processor Assisted learning: Turning to the Clock Back?" gave description of variety of programmes such as, 'Application programme, stimulation programme, Drill and practice programme, Tutorial programmes, computer modelling and administrative programme. They derived the conclusion that application programme gave overwhelming performance in the school sector. While stimulation programme assumes greater importance in higher education sectors.

Roy Duff (1979) undertook a study on "Teaching computing to building Technology students" and provided programming exercises and lectures and continued the experiment for some years.
His findings were that the programming exercises had positive advantages and the feeling of achievement generated by successful runs of their own programme provided a very strong incentive for most students to solve their own problems.

Dixon and Taylor (1979) in their investigation "The use of projects in the Teaching of Management studies" reported that in undergraduate management studies programmes is most valuable as a casptone to help students to relate different areas of knowledge.

Robert William (1977) in his study entitled "Programmed Instruction for Creativity" reported that the groups taught with the help of the problem-solving instruction through PLM obtained higher scores in all parameters except in cases 7 out of 80.

San-Yun, Tasi and Norval, P. Phol (1977) in their investigation, "Student Achievement in Computer Programming Lecture Vs computer aided Instruction" reported that for computer assisted instruction (CAI), teaching the learning environment was equal to and more effective than the traditional lecture format for the college students.

Veits (1971) in his investigation "the result of a four year study of programmed Instruction, in a tenth and eleventh grade English Class" revealed that the experimental group had double improvement over the control-group.

2.8 Studies in teacher education

The research in teacher education is of very recent origin. Researches in this area have been undertaken only for about
last two and half decade. Quantum of educational research in teacher education is increasing progressively during the decade particularly in areas like student-teacher characteristics, curriculum, micro-teaching, context variables relating to instruction, etc. The first survey of research in education identified 45 studies in educational research. The second survey of research in education covering the period 1973-78 identified 63 studies and the third survey (1978-83) has recorded 660 studies in educational research. However, conspicuously the exists a wide research gap in the educational orientation which highlights the future programme of research. A.G. Das and J. Dubey have reported this gap in their "Teacher Education" - a trend report in third survey of research in education. Sharan and Dubey (1981) in their surveys point to the inadequacy in teacher training syllabi and absence of a system of continuous revision. Rai (1982) compared the programmes of teacher training colleges with regard to the practising schools. Srinivas and Gupta (1980) when outlining the progress and problems of teacher education in India highlight the inadequacies in pre-service and inservice teacher education, respectively, in India.

Detail survey of related literature however reveal that there are various fields relating to teacher education which remain untouched by the researcher. These include (i) the evaluation of alternative models of teacher education along with their effectiveness reflected in teacher effectiveness in the institutions where they secure teaching positions after the graduation.
of their training, (ii) the transaction of the teacher education curriculum, for example - competence-based Teacher Education, Performance-based Teacher Education, Modular Approach etc., (iii) variables related to the community context as well as the classroom context in teacher education. Again there are some fields where only a limited number of researches have been done. Some of such examples are the areas (i) curriculum development and transaction in teacher education, "researches relating to the modalities and practices in teacher education" etc.

Another field for research where no attempts have been made till now is "process-product research in teacher education". The product variables cover student-teachers' immediate outcomes like achievement, in-theory attitude and skill.

Survey of related literature also shows another noteworthy fact that although programmed materials have been prepared in various disciplines no research attempt is ever made to establish the effectiveness of the use of programmed learning material for imparting instruction in teacher training courses.

2.9 Conclusion

The tendency and usefulness of using the method of programmed learning is increasingly growing and the number of programmes prepared is also rapidly developing. Survey of related literature reveals the fact that programmed instruction have been used usefully almost in every discipline like language, Geography, Science, Mathematics etc—wherever an instructional strategy for teaching-learning activity is involved.
However the educational reviews on the trends, loop-holes and needs of educational research in pre-service and in-service teacher education establishes the fact that there exists a wide gap in this line of educational orientation. This highlights the fact that educational technology as a means of improving effectiveness of teacher education is an area which requires immediate research.