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REVIEW OF RELATED LITERATURE
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INTRODUCTION :

    In the present chapter an attempt has been made to
review a few significant studies in the area of instructional
systems building and media effectiveness, with a view to
placing the present attempt in the context of such studies
and building up its rationale. As mentioned in the earlier
Chapter this study has tried to study the relative effecti-
veness of programmed filmstrips, programmed filmstrips with
teacher and the conventional teaching. Accordingly, studies
related to comparison of programmed learning with conventional
teaching have been reviewed to provide a criterion for
external validation, in a study, using programmed filmstrips.
Consequently, in the present study, conventional teaching
has been used as a criterion to establish the relative
effectiveness of the media under investigation. Also studies

which have received attention for review are programmed learning studies in the area of history teaching. The specific purpose of reviewing this set of studies has been to examine how programmed learning has been structured to accommodate for certain unique features which characterise the discipline of history. Basically, programmed learning is an individualised approach to learning. Nevertheless, due to certain organisational limitations, it may be necessary to deviate from the common practice and adapt programmed learning to the situations generated. This means that possiblities of using programmed learning in a variety of instructional contexts need to be examined. Programmed filmstrips patterned for group pacing are under investigation in the present study.

Another aspect of the study is that here, programmed learning is used not only in isolation but also in combination with other media e.g. the teacher. Therefore, studies, to review how programmed learning has worked in combination with other media, have a definite place in the present study. Further, since programmed filmstrips represent an audio-Visual medium, a few significant studies in audio-visual media too, have been explored. The review of these studies have been presented in separate sections in this chapter.

STUDIES RELATED TO PROGRAMMED LEARNING AND CONVENTIONAL
TEACHING :

Very often the effectiveness of a method is judged

by comparing it with another method. The following studies have compared the programmed learning technique with the conventional teaching.

Sharma (1966) developed a programme on "Earth's rotation and revolution" and compared it with the same lesson taught through the conventional method. The sample consisted of 138 students. It was found that the programmed learning group had secured a higher mean than that of the control group and the difference was significant at .01 level.

Shah (1969) developed a programme for the whole syllabus of Algebra for the 8th standard. The experiment was conducted in four schools in Ahmedabad. She also conducted the experiment on the pupils of Std. V. It was found that the average time taken by the experimental group was less than the average time taken by the control group. The means of the experimental group were significantly higher than the control group.

Patel (1970) used a programme in mathematics and compared its effectiveness with that of the conventional method. Shah's linear programme on "Additions and subtraction of directed numbers" was made use of on two samples chosen from the rural and urban areas. The subjects were the pupils of Standard VIII and the matched groups were formed on the basis of intelligence, age and sex in the

rural sample. In the urban sample, no matching was done. The results indicated that the experimental and control groups in both the samples did not differ significantly in their mean achievement in both teacher-made test and the criterion test.

Hartly (1972) reviewing 110 studies comparing programmed learning with conventional instruction, 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 the two methods; and the programmed instruction group did significantly worse than the other group in the remaining 15 cases. In India several studies of this category have been conducted in the late sixties and early seventies, especially at the centre of Advanced Study in Education, Baroda.

Mehta (1973) used a linear programme on "Reading English" on a sample of 252 children from six schools in Baroda. The two group experimental design, was followed. The results indicated that the experimental group which learned through programmed learning materials was better than the control group in both post test and retention test.

Govinda (1975) developed programmed learning material on Educational Evaluation" for the B.Ed. students of the

M.S. University of Baroda 69 B.Ed. students were taught under real classroom conditions. The results revealed that there was no significant difference between the experimental and control groups in four units and in the remaining two units the programmed learning group secured higher and significant mean.

Very few studies have been reported in the subject area of history. In the University of Madras, three students had developed and tested programmed learning materials in history. Jeyapal (1976) Chelladurai (1977) and Kannabiram (1978) had successfully developed programmed learning materials in history. Jeyapal and Kannabiran had developed linear programmes on the topics "The second world war" and "Akbar" respectively, Chelladurai developed a branched programme on the topic "The French Revolution". All these programmes were meant for the high school pupils of Tamilnadu and were prepared in Tamil.

Jeyapal was the first one to develop programmed learning material in history, in the University of Madras. His programme on "The second world War". Consisted of 170 frames. It was of a linear style. It was tried on pupils from three schools. He used the single group experimental design on a sample of 142 pupils. The results indicated that the pupils learnt better through programmed learning materials than the conventional method.

Chelladurai (1977) developed a branched programme on the topic "The French Revolution". It consisted of 78 frames. In the main stream there were 25 frames. The step size was big and at the end of each step there was a challenge provided, with two alternate answers. If the pupil chose the right answer each time he could complete the programme in 25 frames. If he went wrong, he was sent to the remedial frame where his mistake was explained. He was then made to have another choice. If his choice was right he was sent to the main stream. If not he was sent to the second remedial frame where he was given instruction in such a way as no mistake was possible again. He was than sent to the main stream. Thus the programme was prepared in the form of a scrambled book. It was tried on a sample of 140 boys and 90 girls chosen from 5 schools. It was found that the scrambled book was more effective than the conventional class-room method.

Kannabiram (1978) prepared a linear programme on the topic "Akbar" in Tamil. It consisted of 70 frames covering the four subunits of Akbar's reign namely, his career, conquest, administration and reforms. The noteworthy feature of this programme was the special emphasis placed on map work while teaching the subunit" the conquests of Akbar". A number of and outline maps, found place in the frames and the conquests of Akbar were shown one by one. Thus in each frame the pupil was shown the expansion of Akbar's empire till it reached its zenith. Two group experimental technique was made use of to findout its effectiveness. The pupils

were classified into experimental and control group after an achievement test in history. The groups were matched for mean and standard deviation in that test. The gain was computed by deducting the pretest score from the post test score. The sample consisted of 300 pupils out of which 100 were boys and 200 were girls. It was found that in two schools the experimental groups scored higher means which were significant at .01 level. In the other four schools the difference was not significant one noteworthy feature in this study was that the pupils' gain in knowledge, understanding and skill were tested separately. In understanding and skill the mean difference between the groups was not significant.

It may be inferred from the studies cited above, that no definite conclusion has been arrived at regarding superiority of programmed learning materials over conventional teaching. Nevertheless, PLM seems to be equally effective as the conventional method of teaching. It therefore makes possible the use of conventional method as an index against which PLM may be validated.

GROUP-PACING IN PROGRAMMED INSTRUCTION :

Though programmed learning is based on self-pacing, attempts have been made in a few studies to find out the effects of external-pacing and group-pacing in programmed instruction.

Folletti (1961) studied the effectiveness of learning from (1) live Vs taped lecture (2) Taped lecture Vs forced paced reading of a book (3) Force-paced book Vs self-paced book (4) Self-paced book Vs Scrambled book programme. He found no significant difference between learning fromlive and taped lecture but significant advantage of read material over heard material, a significant advantage of self-paced over class-paced reading and a significant advantage of plain book over scrambled book format.

Alter and Silverman (1963) compared written responding with reading under conditions of external-pacing and self-pacing and they found no significant difference between the two.

Carpenter, Green hill and others (1963) compared the effectiveness of a programmed course presented by (1) Teaching machine (2) Programmed text books (self-paced) (3) Filmstrips (Externally paced) (4) Conventional classroom method. There was no significant difference among the learning outcomes, except in the unit tests, where the programmed treatments produced higher scores and lower variance.

Dick (1963) studied the effects of paired and individual programmed instruction. He did not find any significant difference in the final examination, but retesting of 80% of the original subjects oneyear later resulted in significantly better retention by the paired group.

Frye (1964) while studying group Vs individual pacing
in programmed instruction found out that the time required to
complete programme by hetrogeneous group-paced group was
significantly greater than that of hetrogeneous, individually-
paced groups. The former took 325 minutes and the latter 240
minutes. The time required by hetrogeneous group-paced
group did not differ significantly from that required by
homogeneous individually paced group. The time taken was
255 to 221 minutes. The time required by hetrogeneous group-
paced group was significantly greater than that required by
homogeneous group-paced group (325 to 255 minutes). The
experiment provided evidence that homogeneous grouping of
students had some advantages if group pacing was adopted.

Another study on the effectiveness of pairing was
done by Dick and Segwin (1964) one group of students was
paired on the basis of similarily in dominance-submissi-
veness score; and the other group of the basis of dissimi-
larity. No significant difference was found in the results.

As can be seen from the studies reviewed in this
section, investigations have been made upon group-pacing
and self-pacing in programmed instruction. To facilitate
conduct of the present study, group pacing was selected.

PROGRAMMED LEARNING COMBINED WITH OTHER MEDIA :

Certain studies were made to find out the effectiveness

of programmed learning used in combination with other methods
especially with the conventional class-room techniques. The
additional inputs offered by the teacher pupil interaction
had resulted in better learning in many cases.

Goldbeck, Shearer, Compadu and Willis (1962) studied
the effects of integrating programmed learning with classroom
teaching. They found that programmed learning integrated with
conventional teaching was significantly better than the
conventional instruction.

Hatch and Flint (1962) studied the same and found
that on a criterion test at the end of the semester, there
was no significant difference in the group receiving program-
med instruction and conventional instruction. But the group
taught by programmed instruction integrated with con-ventional
instruction, performed about one standard deviation higher
than the group taught by programmed learning materials and
the group taught though the conventional method.

Bartz and Danby (1965) studied the effects of
supervised and nonsupervised programmed learning and found
that supervised study of programmed learning materials was
better than non supervised study of the same.

The research on media was given a new boost by the
experiments on mass communication done by Hovland, Lumsdaine
and Sheffield (1949) and Gagne (1965) proposed a taxonomy of

behavioural objectives and a related taxonomy of types of
learning, which have implications for the selection of media
for instruction. Gagne outlined eight types of learning, each
with its own rules, and arranged them in a hierarchy from
simple to complex on the assumption that each higher order
learning category depends on the mastery of the one below
it. With respect to selection of media, Briggs and others
proposed to seek ways to use a single medium for the optimum
length of time for the most appropriate set of objectives and
decide along the alternatives of group instruction, indivi-
dualized instruction, teacher conducted instruction and
automated instruction. An example of the combination of
programmed instruction with other device is given in a study
reported by Keisler and McNeil (1962). Cuisinaire blocks
were used in conjunction with an auto-instructional programme
to investigate the ability of first grade children to learn
mathematics in terms of algebraic structures.

Smith, Schgrin and Poorman reported on a multi-media
system used in conjunction with the Harvard physics project
which implemented many of the objectives of the Briggs
report. Answers were sought by designing, developing field
testing and evaluating a sequenced unit involving various
types of media and consisting of materials produced by project
physics in addition to programmed texts and commercially
available films. These experimenters reported that they
designed their multi-media system with the idea of changing
the traditional role of the teacher towards one of teacher

and guide. They found evidence of increased instructional effectiveness, particularly in individualised instruction. In the Indian context, studies to identify the conditions to use the PLM as a component of instruction have been undertaken by the Centre of Advanced Study in Education, M.S. University of Baroda. Using PLM as a major component, Yadav and Govinda (1977) evolved an instructional strategy for teaching the entire course on Educational Evaluation to B.Ed. students of the M.S. University of Baroda. On logical consideration of the broad objectives of the course, the instructional strategy conceived, involved the use of the technique of PLM, discussion, library work and practical work in proper combination. In this experiment all the one hundred and sixty eight students of the B.Ed. class (1975-1976) were considered as subjects for this study. Details regarding conduct of instructional work during this study areas follows.

The PLM was utilised to give the students the basic knowledge of the units. Books for reference with necessary details were given for their library work of which they maintained a record. For each unit, practical work sessions were organised. After this a discussion session was provided for each unit wherein the subject matter of the respective units, performance in criterion tests and other points raised by students for clarification, were discussed. Evaluation of the instructional strategy as a whole had been done on the basis of performance in criterion tests,

feedback sessions, practical work assignments and the comprehensive tests. The results revealed that nearly 50% of students scored 75% and above on the comprehensive test which is generally considered as performance with distinction.

Another study was conducted by Sansanwal (1977) in which the investigator evolved an instructional strategy for teaching a course on "Research Methodology" to M.Ed. students and M.Sc. (Home Science) students of the M.S. University of Baroda. PLM was used to impart the basic knowledge of the subject, and library work was directed as in the study by Yadav and Govinda (1977). In order to develop certain other abilities such as the ability to identify, select and organise relevent material, to react to others' views, tolerate and evaluate others' ideas, seminars and discussion sessions were organised at regular intervals, wherein the students were encouraged to present their dissertational work. Further, the social awareness of students had been awakened by highlighting and discussing in seminars, topics of immediate social significance in the educational field. The effectiveness of the instructional strategy as a whole was studied the terms of students' performance on criterion tests and the comprehensive test. It was found to be effective to the extent that 70% of the students obtained above 70% marks on all criterion tests. The effectiveness of each component of the strategy was studied by observing the students' reactions to the extent that every component

helped in studying, and computing the average percentages
of responses under the four categories, viz., helped very
much, helped to some extent, did not help much and did not
help at all. From these observations, it was noted that
the integration of library work with the PLM, followed by
discussion had enriched the instructional activity andis an
evidence of the effectiveness of the combined use of those
instructional componants.

Another similar study is being conducted at CASE by
Menon (1977), for evolving a multimedia approach to teaching
at the Post-graduate level. Jeyalakshmi (1977) and Bhat(1978)
have evolved programmes for a few units in the course of
educational psychology for B.Ed. students. There are a few
other ongoing studies which are being conducted at the
secondary school level. Joseph (1978) has developed a pro-
gramme for teaching English grammer at secondary school
level. Seshadri (1979) had prepared programmes for an
entire academic year. Consisting of two semesters, in
Algebra, for the high school pupils. The study has resulted
in the development of a duly validated instructional strategy
with PLM as its main component. This study is of significance
for the present investigation since the role of the teacher
has been emphasised. Although PLM developed for the study
was self instructional, the teacher was involved at the stages
of introduction of each unit, tutorials and feed-back sessions.
The necessity of teacher involvement was indicated through
this study. Studies are being conducted by Vardhini (1977),

Ravindranath (1977) which aim at the development of multi-media instructional modules for teaching science at secondary school level.

STUDIES IN THE AUDIOVISUAL MEDIA :

It is a well known fact that Audio-visual methods are effective in promoting learning.  But very little has been done, in the field of research, to identify which physical characteristics contained within the various types of visual illustrations are most effective in facilitating the pupil to achieve the educational objectives.  Since there are no definite rules or principles that enable a teacher to select the type of visual illustration best suited for instruction, it seems evident that the instructional media that stress the visual channel would profit from a programme of systematic evaluation.  Allen (1960) Hoban (1960) and Schramm(1960) have studied that extensive research needs to be conducted on the p-hysical characteristics of pictorial illustrations that lead to increased learning and to the attainment of specific educational objectives.

One current assumption contends that the more realistic a presentation is, the more effective the transmission of the desired message.  Finn (1953) and Dale (1969)  have recommended that for instructional purpose the more realistic or life like the stimulus material is, the greater the probability it has for facilitating learning.  Several

theories have been developed from this point of view. The
Iconocity theory of Morris (1946), the sign similarity
orientation developed by carpenter (1953) the theory of
pictorial perception proposed by Gibson (1954) and the cone
of experience of Dale (1969) are some of the theories based
on such a point of view. The basic assumption held by each
is that learning will be more complete as the number of
cues in the learning situation increases. But research has
given rise to another theory also. Miller and others (1957)
contend that it would be a mistake to assume that one cue
added to another would increase learning by linear increment.
Their argument is that additional cues or excessively
realistic cues may be distracting or possibly may "evolve
competitive responses" in opposition to the desired learning.
Such cues would be considered interference and would reduce
rather than facilitate learning. Accordingly Bruner, Good
now and Austin (1956) and Travers (1964) have suggested that
learners do not need a wealth of stimuli in order to recog-
nize the attributes of an object or situation that place it
in a particular category. The Travers Report (1964)
maintaining that "merely confronting a person with stimuli
identical to those emitted by the real environment is no
guarantee that useful information will be retained." It
further states that the realistic presentations of much
content provides unnecessary detail and that the real
objective of visual education is "not so much to bring the
pupil into close touch with reality, but to help students
become more effective in dealing with reality". Travers

and his associates feel that this can be done effectively by symbols. Broadbent (1958) 1965) has opined that the reduction of learning as the cue stimulation increases, is caused by a filtering process in the central nervous system which prevents many of the realistic stimuli from receiving active reception in the brain. Jacobson ($1951_a$, $1951_b$) supports this point of view and states that the brain is capable of utilizing only minute proportions of the information perceived. The studies of Livingstone (1958, 1959, 1962) indicate that receptor sensitivity to stimulus may be reduced or inhibited by the processes of the central nervous system. Attenave (1954) supports the view that the function of the perceptual machinary is to reduce rendundant stimulation and to encode incoming information so that only the essentials travel through the central nervous system to the brain. The studies of Black (1962) have found that simple line drawings containing a minimum of detail, are more effective for teaching visual discriminations than pictures containing a great amount of detail. Dwyer (1967, 1968) has found out in his medical programme that simple line drawings are most effective than detailed shaded drawings. Leith's (1968) studies show that the lower ability children are profitted more from concrete illustrations as opposed to abstract presentation.

All these studies show that pupils learn through visual presentation of the subjectmatter. The versitality of the visuals is indicated by the review of the studies. The present study has recognised this aspect and therefore visual aids

have been incorporated.

## THE IMPLICATIONS OF THESE STUDIES :

Programmed learning has been tried on pupils of all
levels. It has been used alone or in combination with other
methods of instruction. The researches point out that a
number of combinations can still be made to ensure better
learning.

The survey of researches done in this field reveals
a few gaps that are yet to be filled in. The development
of programmed learning materials has not been done at the
same rate in all subject areas. The field of history
offers vast scope for the development of such materials and
so much can be done in this field to develop and validate
such materials, at all levels.

Again most of the studies have been done to measure
the knowledge objective but the development of the other
higher cognitive abilities like understanding, application,
skill etc. are yet to be studied. Programmed learning
materials must be made use of where learning is possible
and more such materials are media.

Most of the studies are individual paced. Very few
studies have been done in group pacing. The few studies
done in this field indicate that group pacing is possible
and so more studies are needed in this area also.

Programmed learning is often compared with the conventional method. In many cases the learning achieved through programmed learning is significantly higher than the other method. Combination of teacher's narration with programmed learning is another area which needs attention. The teacher's role in a class which learns through PLM, the teacher pupil interaction are all positive factors which enable the pupils learn better. Such combinations must be tried in different subject areas and at all levels of learning.

Lastly, the combination of visual education with the programmed learning is another area which needs attention. Visual presentation with the needed amount of details to suit the needs of the pupils is something worth trying. Researches in this area are also needed.

A media effectiveness study in the teaching of history, as has been planned in the present investigation, would throw light on the potential of different media in evolving an effective system of instruction in the teaching of history with reference to particular instructional objectives. Further, results of the study would provide evidences which would assist teachers in instructional decision-making in history. Also it would provide guidelines for planning longterm studies in teh the area of history teaching.

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