REVIEW OF LITERATURE

CHAPTER 2

REVIEW OF LITERATURE

The concepts of Educational Technology have been increasingly applied both in India and abroad to improve the quality of education. As each technological innovation emerged, educators sought to determine its utility and to compare the effects of its use with those of the already existing modes of instruction. A number of studies have also been conducted on development of programmed instructions and their effectiveness to improve the learning ability of students.

Though, programmed instruction is not new in India and a number of researches have been carried out in the recent past, this present study is the first in the area of Clothing and Textiles in India and so it was felt necessary to include some theoretical review on Educational/Instructional Technology.

This Chapter on Review of literature is broadly divided into two sections - theoretical review and review of research studies, which were further divided into a number of sub-sections.

2.1 Theoretical Review

The theoretical review has been presented under the following heads.

2.1.1 Development of Educational Technology.

2.1.2 Definitions of Educational Technology

2.1.3 Trends in Education System.

2.1.4 Educational Technology in India.

2.1.5 Some Principles of Learning.

2.1.6 Characteristics of Programmed Instruction.

2.1.7 Advantages of Programmed Instruction.

2.1.8 Some Generalizations from Theory and Research.

2.1.1 Develpoment of Educational Technology

Education is the development of the power of adaptation to an ever changing social environment. It involves the transfer or communication of information, knowledge and skills from one point (the source) to another (the receiver). Until recently tthis progress depended on the spoken word in the form of lecture delivered by the teacher, supplemented by printed material and was occasionally fascilitated by the use of audio-visual aids (104).

The development of a technology of the instructional process is not very old. In the pre-industrial phase, while industry was principally at the handwork level, the instructional process in educational relied upon such devices as the slate, the blackboard, chalk and limited single text

books with few illustrations (27).

The "Industrial Revolution" in the begining of the 19th century brought about great changes in the industrial sector but a similar type of revolution did not occur in education, and instructional technology with a few exceptions remained at the pre-industrial level.

During the period from 1900 to 1950, technology only washed lightly upon the shores of instruction. By the end of this period American education had the potentiality of a mass production technology. First, television, both closed circuit and broadcast was chosen as the prime hardware. This was due to the basic concept of mass production, usually stated in terms of shortage of teachers, large classes, and quality instruction. It was in 1955 (approx.) that the Ford Foundation gave a sharp push into the mass production technology, and for the first time, made provision for a technology of systems to go along with the hardware.

Educational Technology, today, is widely accepted as the application of systems approach in the systematic design of a learning system, and as a method or apporach combined with the appropriate and necessary media and materials to bring about improvement in teaching-learning-evalution process.

It concerns with the efforts to provide appropriately designed learning situations which bring to bear the best means of instruction. The means of instruction may involve

modification of the learners' environment through techniques of presentation, arrangement of learning activities and organisation of the social and physical surroundings. Its major purpose is to facilitate and improve the quality of human learning.

Educational technology can be thought of as a science of techniques and methods by which educational goals can be realised. It is the science on the basis of which various strategies and tactics could be designed for the realisation of specific goals.

Educational Technology is as wide as education itself : it is concerned with the design and evaluation of curicula and learning experiances and with the problems of implementing and renovating them. It is a rational, problem solving approach to education, a way of thinking sceptically and systematically about teaching and learning.

Educational Technology is neither technology in education nor technology of education, but both. It is the sum total of all educational facilities, media, methods and techniques for optimizing learning. It involves facilitation of learning through resource mobilization and utilization of learning principles. In this sense, Educational Technology, particularly in the developing countries, means how best the available resources are utilized for optimizing learning. This concept has potentialities to make education effective and mass-based and bring in desirable functional changes in

the structure of education.

The principal role of educational technology is to help improve the overall efficiency of the teaching/learning process. In education and training, improved efficiency can manifest itself in the following ways :

(a) increasing the quality of learning, or degree of mastery;

(b) decreasing the time taken for learners to attain desired goals;

(c) increasing the capacity of teachers in terms of numbers of learners taught, without reducing the quality of learning;

(d) reducing costs without affecting quality.

A 'technology of education' approach to educational technology involves a systematic, scientific approach to a problem, together with the application of appropriate scientific research, both from 'hard' sciences such as physics and electronics and from social sciences such as psychology and sociology.

Educational technology is mostly understood as the technology of education, which involves the designing or selection of appropriate hardware and software to backup a particular strategy in order to achieve a given set of educational aims and objectives. In some cases, this may

involve the use of highly sophisticated equipment such as video or computers; in others duplicated worksheets may be all that are required.

In any case, it is important that the educational development or innovation has been systematically planned and executed. It is this "systems approach" to educational technology which is at the heart of the technology of education, making it flexible enough to react to new knowledge about the process of human learning and also to new developments in teaching learning approaches and methods.

The systems approach to the design and analysis of teaching/training situations is the basis of the great majority of modern educational technology-related developments.

In context to educational technology, a system is any collection of inter-related parts that together constitute a larger whole. These component parts, or elements of the system are intimately linked with one another, either directly or indirectly, and any change in one or more elements may affect the overall performance of the system, either beneficially or adversely.

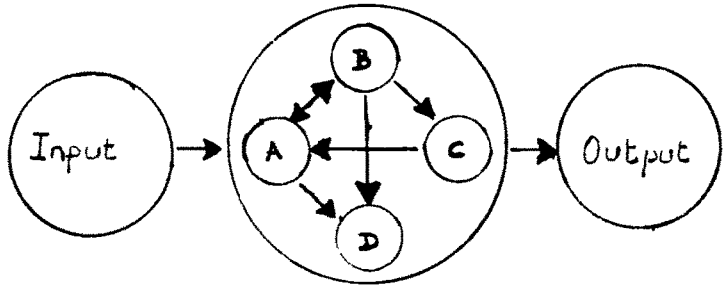

Fig 1: A typical system

Figure (1) shows a typical system in which elements A,B,C,D are related to or dependent upon each other as shown. Some inter-relationships may be two-way, while others may be one-way only. These elements may themselves be capable of further break down into smaller components, and may thus be regarded as sub-systems of the overall system.

2.1.2 Definitions of Educational Technology

A number of definitions of Educational Technology have been put forward by different people/institutions.

1. The Council for Educational Technology for the United Kingdom puts the definition as -

   "Educational technology is the development, application and evaluation of systems, techniques and aids to improve the process of human learning.

2. National Centre for Programmed Learning, U.K. defines it as -

   "Educational Technology is the application of scientific knowledge about learning, and the conditions of learning, to improve the effectiveness and efficiency of teaching and training. In the absence of scientifically established principles, educational technology implements techniques of empirical testing to improve learning situation".

3. Commission on Instructional Technology, U.S.A. puts it as -

"Educational Technology is a systematic way of designing, implementing and valuating the total process of learning and teaching in terms of specific objective, based on research in human learning and communication and employing a combination of human and non-human resources to bring about more effective instruction".

4. According to Sampath et al in Introduction to Educational Technology (93).

Educational technology, in its wide sense as understood today, includes "the development, application and evaluation of systems, techniques and aids in the field or learning". As such its scope encompasses educational objectives, media and their charcteristics, criteria for selection of media and resources, management of resources, as well as their evaluation.

2.1.3 Trends in Education System

Two major trends in the educational system can be identified, which lead in opposite directions.

The first is the trend towards a mass instructional technology and is governed by machines and systems suitable for that purpose. Formost is television, of which there are

four instructional types :

(a) broadcast on an educational channel,

(b) broadcast on commercial channel,

(c) closed circuit in which live instructions are used either to supplement instruction or to provide direct instruction exclusive of classroom teachers, and

(d) closed circuit in which filmed lectures are distributed as replacement for classroom teachers. In all cases, the idea is to reach more students with fewer teachers or to obtain "quality' instruction.

In opposition to this trend of mass instruction is a growing technology for individual instruction. This trend includes the following items on an ascending scale of sophistication.

(a) individual reading papers and similar devices,

(b) individual viewing and listening equipment for existing slides, film strips, motion pictures, and recording,

(c) language laboratories of all types,

(d) specifically programmed printed material such as Scrambled text books, and

(e) true teaching machines of the Skinner or Pressey type containing carefully worked out verbal or pictorial programmes with various ingenious mechanical or electronic arrangements to test student reaction and inform him of his progress, errors, etc.

Most of the devices and systems of the new technology require programming, which is a matter of extreme organisation.

2.1.4 Educational Technology in India

The Educational Technology Programme is essentially aimed at improving the quality of education and widening access to education through the utilization of the media of mass communication and all institutional technology. The governments' interest in improving the quality of education by the use of technological aids and devices goes back to 1947, when the audio-visual scheme was introduced in the educational films and sound broadcasting, in addition to the other projected and non projected aids.

A second begining was made in 1971-'72, with the development of the Educational Technology Project as a new scheme for the Fourth Five-Year plan. This project was intended to stimulate the use of television as well as other instructional media notably the radio and the film, to improve the quality of education. However, the scheme was formulated with a distinctly differet emphasis, the objective being to create an infrastructure necessary for the utilization of television facilities for education which were to become available under the Satellite Instructional Television Experiment and also under gradually expanding terrestrial TV in the country.

Although the scheme was initiated in 1971-'72, it took off only with the launching of The Satellite Instructional Television Experiment (SITE) in 1975-'76.

The Educational Technology Cells provided support for a proper use of educational television programmes in primary schools. They also assisted in the organization of the evening TV programmes broadcast for other sectors of the population. They prepared, translated, printed and distributed support materials and supervised and evaluated the experiment in the participating schools. They also assisted in the planning of programmes and training of script writers. Some Educational Technology cells undertook indepth studies of the impact of educational TV programmes, and found that the progress of the Educational Technology Programme had been hindered by certain factors (104) :

(i) Lack of adequate staff.
(ii) Absence of Co-ordinating Mechanism.
(iii) Inadequacy of Physical Facilities.
(iv) Unsatisfactory Pattern of Assistance.
(v) Lack of Acceptance.

Educational Technology is relatively new in India and its methods and concept have not been fully understood by all concerned. This has resulted in slow acceptance of the Educational Technology Programme.

The National Council of Educational Research and Training (NCERT) is the main centre of activities in the

field of Educational Technology in India. They have initiated a number of research projects aimed at developing learning systems for formal education as well as non-formal education in rural area. It has also taken up action-oriented research to develop need-based curricula and instructional resource materials for television and radio instruction for children in rural areas, in the age group of 5 to 12 yrs. Research on the design and development of a module for in-service training of science teachers has also been undertaken. Another project which the council has initiated is the design and development of distance learning system - 'Open School' - for education upto secondary grade level.

In addition to The NCERT, many universities in India have set up training, development and research programmes in programmed learning and educational technology. Prominent among the universities which have introduced courses in programmed learning and educational technology at different levels and have been undertaking research and development are the Himachal Pradesh University, Kerala University, M.S. University of Baroda, South Gujarat University, Delhi University, Meerut University, S.N.D.T. Women's University and Punjab University. The Technical Teachers Training Institute at Madras and some of the State Institutions of Education have been playing a leading role in research, development and training in the area of programmed learning and educational technology.

2.1.5 Some Principles of Learning

Psychologists for about a century, have spent a considerable portion of their research effort toward an understanding of the learning process, chiefly by studying the variables which influence the rate of learning and forgetting. Out of this effort has come a number of reliable principles of learning which can be utilized to design an efficient learning situation.

Carr (16) has phrased some principles of learning in non-technical terms, which were originally put forward by Skinner in 1954 and Gilbert in 1958.

1. Learning takes place most rapidly if the student is actively engaged with the subject matter.

2. Learning is most effective if the student develops the skills and knowledge in a form which will readily generalize to the "real life" situation for which they are intended. (Usually this means that they must learn to construct correct answers to questions, rather than merely be able to recognize them).

3. Learning takes place most rapidly if immediate "knowledge of results" is given for each response.

4. Learning takes place most rapidly if the subject matter is organized in a hierarchc form. (Lessons should begin with very simple problems, for which the student already has necessary skills and knowledge. Gradually

the difficulty level may be raised until the desired level of proficiency is obtained. The subject matter should be presented in steps so small that the success of the student on the next step is practically guaranteed).

5. Receiving frequent "knowledge of results" keeps students working at the assigned task.

6. Since learning takes place in individuals, the learning situation should be designed so that each student may proceed at his own pace.

2.1.6 Characteristics of Programmed Instruction

Programmed instruction involves controlled, carefully specified and skilfully arranged learning experiances. It is the technique of self-instruction in which all of the instructional load is carried by teaching machines or programmed texts.

Programmed instruction is a new path towards automation and individualised instruction. It is an application of principles of behavioural sciences and technology in the field of education.

It utilizes the principles of reinforcement to make certain that learning actually does occur. The programme embraces both the factual matter of the subject and the skills involved in learning patterns, using every aspect of

reinforcement theory to lead a student to a full understanding of its material. Significant contributions have been made to the theory of programming by Sidney L.Pressey, Robert M. Gagne, Robert Mager and B.F. Skinner.

According to Sampath et al. (93), there are five major characteristics of programmed instruction :

1. The subject-matter is broken down into small steps called 'frames' and 'arranged sequentially'.

2. Frequent response is required of the students.

3. There is immediate confirmation of right answers or correction of wrong answers given out by the student.

4. The content and sequence of the frames are subejcted to actual try out with students and are revised on the basis of data gathered by the programmer.

5. Each student progresses at his own pace without any threat of being exposed to any humiliation in a heterogeneous class.

A programme should not be mistaken for a text book. A programme is actual instruction itself and the student's success or failure depends on the programme. It sees to it that the student does learn and takes the blame on itself for the students failure.

Although Sharma (104) and Lysaught and Williams (67) share the same views on characteristics that describe

programmed instruction, they have not stated them in such specific statements.

2.1.7 Advantages of Programmed Learning

Shah & Dewal (99) feel that PLM has the following five distinct advantages over conventional teaching.

1. With PLM students learn at their own speed. In conventional teaching all students are forced to move at one uniform speed.

2. PLM requries a student to focus his attention on a small amount of material at a time. In conventional teaching most of the teachers put before the students big chunks of learning material which often become incomprehensible to the students.

3. PLM requires each student to respond to each segment of material. In conventional teaching most of the students remain uninvolved for most of the time and sit as passive listners only.

4. PLM gives immediate knowledge of results. This works as a feedback and helps students to evaluate themselves. The PL technique makes evaluation an integral part of instruction.

5. For the first time in the history of instruction the quality of instruction can be controlled. PL can ensure quality eduaction.

These veiws have been supported by Misra (72) and Percival and Ellington (87), but Misra has been more specific in his statements as given below :

1. An expert programmer and a subject matter expert can reach a large number of students in a single operation.

2. Misconceptions held by minimally qualified instructors will not hamper the learning of the student.

3. Through immediate correction further errors do not lead to complications in the learning sequence.

4. The slow but intelligent learners are not at a disadvantage in catching up with the class.

5. The fast learners can save time and utilize it for more useful educational experiances.

6. No embarrassment or group pressure is caused to a student who has not got enough skills to start with.

7. The need for seperate examination is greatly reduced.

8. Early and continued success experiance augments student motivation.

9. Good instructors get more time for better use than performing rote drills.

10. It is advantageous for home education.

11. It is advantageous for remidial instruction.

2.1.8 Some Generalizations from Theory and Research

Programming is the process of arranging the material to be learnt in a series of small steps designed to lead a student through self instruction. A programme is the completed route to mastery of the subject for which it has been prepared and is ready for the student to follow. It makes use of the reinforcement theory put forward by Skinner in 1954. This theory leads to certain generalizations pertaining to programmed learning, which have been complied by Lysaught and Williams (67) as follows :

1. An individual learns or changes the way he acts by observing the consequences of his actions.

2. Consequences that strengthen the likelyhood of repetetion of an act are called reinforcements.

3. The more quickly reinforcement follows the desired performance, the more likely the behaviour will be repeated.

4. The more often reinforcement occurs the more likely the student will repeat the act.

5. Absence or even delay of reinforcement following an action weakens the probability that the act will be repeated.

6. Intermittent reinforcement of an act increases the length of time a student will persist at a task without further reinforcement.

7. The learning behaviour of a student can be developed or shaped gradually by different reinforcement - that is, by reinforcing those behaviours which should be repeated and by withholding reinforcement following undesired acts.

8. In addition to making repetition of an act more probable, reinforcement increases a students activity, quickens his pace, and heightens his interest in learning. These may be called the motivational effects of reinforcement.

9. A students behaviour can be developed into a complex pattern by shaping the simple elements of the pattern, and combining them into a chainlike sequence.

In short reinforcement theory provides a rationale for believing that a complex body of learing can be seperated into its smallest components through which the student can be taught to master the subject matter reinforcing or not reinforcing his responses to successive steps, according to the accuracy or inaccuracy of his replies.

From the review of researches conducted in the field of programmed learning, the following generalizations or tentative statements have also been concluded by Lysaught and

Williams (67).

(1) Programmed learning can be effective; students have learned successfuly from it.

(2) Programmed learning can reduce student effor; proper analysis followed by suitable revision of the material can decrease errors even further during the learning process.

(3) It is a learning programme which tends to level the differences in the learning capacities among students; while all students exposed to the programme may demonstrate achievement, the gain seems to be more conspicuous among the lower portion of the class distribution. This might result from both the varying time limit, which permits the slow learners to progress at their own rates of speed, and the fact that any programmed sequence tends to impose a ceiling on what anyone can learn.

(4) Individual learning time may vary widely since students work at their own speeds.

(5) Predictability of individual success may decrease because slow learners and others may perform better on programmed material than would have been indicated by previous behaviour on other methods of learning.

(6) Motivation to learn indeed may increase because of students immediate knowledge of success.

2.2 Research Review

Researches related with this study have been presented under three main headings.

2.2.1 Studies conducted in subjects/areas other than Home Science.

2.2.2 Studies conducted in other departments of Home Science except Clothing and Textiles.

2.2.3 Studies conducted in Clothing and Textiles.

2.2.1 Studies conducted in subjects/areas other than Home Science.

Under this section, the investigator has presented studies conducted in subjects other than Home Science. These studies have been carried out at the school level, college level and also for teacher training programmes.

A study was conducted by Hussain (44) at the M.S. University of Baroda on "Development of programmed learning material and studying its effectiveness". In this research, the use of linear and branching programmes under supervised and non supervised situations was studied on a sample of 184 pupils - boys and girls - of standard IX, studying in five schools, of which three were rural and two were urban. The students were randomly assigned to four treatment groups - linear supervised group, linear non supervised group, branching supervised group and branching non supervised

group. Analysis of convariance was used for the purpose of achieving statistical control over the initial differences in terms of intelligence which was supposed to affect the level of achievement of the students.

The programme was found to be effective. The findings also revealed that supervision is necessary for the linear style of programming. In non-supervised situations branching programmes are more effective, irrespective of rural or urban areas.

Krishnamurthy (59a) conducted a study in which he prepared seven forms of programme on 'thermometers'. They were (1) linear overt form, (2) linear covert form, (3) response prompt reading form, (4) response prompt writing form, (5) branching form, (6) skip programme form, and (7) hybrid form. The purpose was to study the relative effectiveness of these forms. The sample consisted of three hundred and twenty-two pupils drawn from standard eight of English medium secondary schools of Baroda city. The results of the study revealed that response prompt reading form was better than all others, both on immediate posttest and retention test. Branching form was least in efficiency in terms of both immediate posttest and retention test. The linear covert form and response prompt covert form were the groups with highest loss when retention was considered. Linear overt form, branching form and hybrid form facilitated better retention. The results implied that response prompt reading form can be said to be the most efficient form, if

performance on a 'programme'. Hence, it can be said that the Programmed Learning Materials may cater to the needs of pupils having different personality trials.

Similarly, Kapadia (53) studied the relationship between personality variables and achievement of pupils on PLM. The four variables studied were intelligence, anxiety, self-sufficiency and introversion-extroversion. As many as 11 schools of Baroda city were randomly selected, and all thhe pupils of Std VIII were included in the sample. The finidngs of this research advocates the use of Programmed Learning Material for pupils having varied personality characteristics. It also suggests that rather than confining ourselves to two popular styles of programming viz., linear and branching, efforts should be made to evolve different styles so as to make Programmed Learning more effective and suitable for Indian conditions.

Shah and Krishnamurthy (100) studied the relative effectiveness of the programmed lesson and the traditional method for teaching addition and subtraction of directed numbers in both rural and urban schools, and found that programmed material does not hinder the performance of the students in any way and it is at least as effective as the traditional method of teaching. They also reported that a teacher with programmes at his/her reach has the added advantage of attending to the individual needs of both the under achievers and gifted children.

Govinda (34) developed a programmed text on educational evaluation and experimentally studied its effectiveness as instructional material for B.Ed. students. The experiment involved comparing the achievement effects produced by the programmed text with that produced through lecture method. Comparison was made unitwise as well as by considering the Programmed text as a whole.

The effectiveness of the Programmed text, as a whole was studied by obtaining two indices, namely, mean performance on comprehensive test and mean of the combined criterion test scores. Achievement of students who learnt through the Programmed text and those who learnt through lecture method did not differ significantly in respect of both the indices. This indicated that the Programmed text as a whole, was as effective as the structured lecture method adopted in the experiment.

The attitude of the students towards programmed learning as a method of instruction was also studied and found that 80.0 percent of the students had a favourable attitude while 14.29 percent were neutral and 5.71 percent had unfavourable attitude.

Kuruvilla (60) studied the relative effectiveness of four programme forms, viz., linear overt, branching, skip and response prompt; and the relationship between certain personality variables and performance of students on the post test.

Findings of her study revealed that 80 percent of the students who learnt through the four forms of the programme have scored 80 percent or above marks. Branching form was found to be more effective than the linear form. A positive and significant relationship was seen between performance on post test and (1) reading comprehension, (2) academic motivation, (3) adjustment towards peers, (4) pre test performance, and (5) adjustment towards teachers. There was no significant relationship between performance of students on post test and attitude towards programmed learning on each form separately. Seventy two percent of the students who learnt through the different forms of programmes had a positive attitude towards programmed learning.

Sansanwal (94) evolved an instructional strategy for teaching a course on research methodology' to M.Ed. and M.Sc. (Home Science) students of the M.S. University of Baroda. PLM was used as a component to impart basic knowledge and components, namely, library work, discussion and feedback sessions were used additionally. Findings of the study revealed that PLM along with added components was very effective in teaching research methodology. The added components played a major role in making the students more self-confident.

Hiob (40) designed and tested a self-instructional manual to enable college level instructors with very little background in instructional design to produce instructional

modules which involve higher level cognitive skills. Six college level instructors were asked to design modules using cognitive skills and step by step guidance provided by the manual. These instructors received no additional formal instruction regarding module design.

The completed modules were evaluated on a critenion-referenced evaluation form by six evaluators. Results suggested that the manual was effective as a learning experience.

Seshadri (98) developed an instructional system, using PLM as the major component, for teaching Algebra at secondary school level. She added other components also to her instructional system, like introductory lecture, excercises and assignments, tutorials, summary, mathematical games and group activities, and feedback sessions. Her findings showed a positive significant relationship of achievement with intelligence when the effect of academic motivation and study habits were partialled out. Such a relationship was not observed between achievement and academic motivation and study habits seperately. She concluded that intelligence has a positive influence on achievement and that instructional strategy should incorporate alternative approaches, remedial teaching and increased flexibility in order to expect mastery learning in the students.

David (19) studied the effectiveness of programmed instruction and conventional method in the teaching learning

process in mathematics. The topic selected was on indices. Standard VIII pupils were selected as the sample. Forty-four students were divided into two groups - experimental and control. The raw scores obtained in the pre-test and post-test were statistically analysed for the results, which showed that the programmed instruction method was significantly effective in the teaching of indices. In the development of manipulatory skills, the conventioal method had greter effectiveness. Both methods were equally effective in the development of application ability. Programminng helped release the teacher for the more appropriate function of a guide for the slow learner.

Gupta (35) undertook a study to determine the comparative efficency of programmed instruction and conventional class-room method for the teaching of biology unit : "The endocrine glands of man".

The study is based on an experiment which involved the application of the two teaching methods. The experiment was conducted on 66 class VIII girl students of Banasthali Vidyapith Higher Secondary School. The girls formed two sections of 30 and 36 of the school population.

The two sections were given the Jallotta's mental ability group test. As both the groups were found to be similar with respect to intelligence, no changes were made in the two sections. Two tests were given to both the sections; one was achievement test and the other was the entry level

behaviour test. The former was given as a pre-test and to set a reference point for the final achievement.

Findings revealed that the mean socres of both the groups in all the areas were almost equal. Therefore, both the teaching methods seem to yield similar results.

In 1989, Bickford (11) conducted a study at the Florida State University to determine the effects of a systematic application of motivational principles to the design of printed instruction on the motivation and achievement of rural high school students.

The students who received the redesigned, motivationally enhanced version of the lesson achieved more and were more motivated than students who received the original lesson. Results suggest that the systematic application of motivational principles to the design of printed instruction can improve student achievement and motivation.

Menon (70) evolved a multimedia instructional strategy to teach a course on educational technology to post graduate and research students and studied its feasibility in terms of reproducibility under different resource conditions. Attempt was made to study the functioning of the approach in conditions prevailing in a real classroom situation. Hence a single group design was adopted where the multimedia approach was tried out over a long period of time with an aim to study the extent of educational influence the approach would have

made on the students, by collecting evidences through various techniques. Any sort of experimental control other than the manipulated variables was not exercised.

Performance of students on criterions tests pertaining to each unit and the comprehensive criterion test during the two tryouts were considered measures of validating the multimedia strategy. During the first tryout more than 90 percent of the learners among research students and slightly less than 90 percent of the learners in the M.Sc (Home Science) group have scored more than 60 percent in the comprehensive criterion test. In the next tryout only one group consisting of M.Ed. and M.Sc. (Home Science) students learnt through the multimedia strategy and 90 percent of them scored 75 percent marks and above.

Attitude of the students were measured at four stages of their instruction. The attitude of learner towards multimedia approach remained favourable throughout, indicating the learners' acceptance of the multimedia strategy to a great extent.

The study was found to be feasible and the multimedia approach could be used to provide instruction in educational technology to post graduate students in education and related disciplines like Psychology and Home Science.

Jayalakshmi (50) conducted a study in 1985 on systematising instructional modules in Educational Psychology

at B.Ed. level in which PLM was used as a basic component and was successful in giving the basic knowledge. The modules were found to be effective instructional strategies for learning Educational Psychology and could be used in any institution with marginal changes. The modules on the whole gave a good motivation to study and learners experienced a gain in the grades. They have been helped in acquiring a better knowledge about certain classroom techniques like discussion.

Khan (56) conducted a study with the purpose to design a self-instructional training package to enhance the competencies of Non-formal Education (NFE) teachers in Rajasthan. The training package was designed for use by both the experienced as well as the aspirant teachers who intend to work as NFE facilitators. A pre-test and post-test design was used for experimentation.

The self-instructional training package developed under this research was composed of eight independent but inter-related components. These packets were developed on the basis of the analysis of the literature on NFE and research findings. Each packet begins with general goal, specification of behavioural objectives and ends with self-evaluation test. For testing the effectiveness of the package, criterion test was developed and administered before and after the treatment.

Findings of the study revealed that a series of such cost-effective packages could enable the NFE facilitators to understand concept and philosophy; learn techniques of curriculum development; prepare teaching aids; and overcome the shortage of competent trainers. The use of educational technology could attract clientele and effective evaluation could provide feedback.

The objectives of a study conducted by Padhan (77) were to find out whether there exists any significant difference -

(1) in academic attainment of high and low achievers, and

(2) in the attitude of high and low achievers, as influenced by Programmed instructions.

Since the study was based on the high and low achievers, all the 45 students of class IX of Sohela High School, in Sambalpur district of Orissa were taken as the experimental sample for the study. Linear style programme on 'Solar System' was administered to ascertain the academic achievement of students. An attitude scale developed and validated by Gupta (1984) was adopted for the study. It was found that programmed learning method is effective for both high and low achievers, and both the high and low achievers have a positive attitude towards programmed learning.

Sharma (103) undertook a study to compare the modular teaching strategy with traditional teaching. A module on the

topic 'Democracy' for teaching of Civics was developed by employing content-cum-methodology approach. Forty two B.Ed. students were divided into two groups. An experimental group was taught through the use of module, whereas the control group was taught the same topic through traditional teaching. After completion of the topic, the criterion test was administered to both the groups on the same day at the same time.

To compare the modular teaching with the traditional teaching in terms of achievement of student teachers on criterion test t-test was employed. Results showed that the modular teaching strategy is more effective than traditional teaching.

Scott (96) conducted a research which focuses on -

(1) the effects of three instructional strategies on students comprehension of and written responses to literature,

(2) the effect of students' reading ability level with the instructional strategies, and the interaction of reading ability level with instructional strategy,

(3) the effects of pretreatment on comprehension, and

(4) the effects of at-risk condition on students' responses to literature.

Two designs were used. Students were randomly assigned to three treatment groups and a post-test control group. Subjects were measured over six short stories in the first design and three short stories in the second, post-test design.

Findings showed that in the post-test condition, the teacher-directed schema questions strategy is most effective, followed by the inferencing and predicting strategy. Active comprehension with schema theory questions is least effective. Pretreatment is beneficial for below average readers. Data indicate the role of the teacher is critical.

2.2.2 Studies Conducted in other Departments of Home Science except Clothing and Textiles

Like other subject areas, Home Science/Economics has also participated in of researches on instructional materials and have found them an effective method of teaching. Under this sub-heading are included research studies conducted in India and abroad in all departments of Home Science except clothing and Textiles which will be dealt with under the next sub-heading.

An exploratory study was carried out by Everette (26) to study the use of programmed instructions for teaching ninth grade nutrition. A programme was developed for the purpose and was evaluated by home making teachers, students, teacher educators and nutritionists. It was then revised on the basis of their suggestions.

To test the programme, it was given to two groups of ninth grade students. Post test scores were compared for the groups using the programmed instruction and the groups taught by the conventional methods. The groups using programmed instruction scored higher at .05 level of singinicance.

Previous learning as measured by pre-tests, IQs and reading comprehension scores were analysed. No statistical interaction was found between these variable factors and post-test results. Thus it was concluded that the higher scores for the experimental groups were due to the programmed instruction developed for the study.

Banowich (7) conducted a study on development and evaluation of a programmed instruction unit on leavening agents for use of a seventh grade home economics course. An experimental and control class (matched according to IQ) were used to evaluate the effectiveness of programmed instruction unit. Both the classes were also divided into high, central and low IQ groups. The control class studied from the regular text book. Whereas the experimental group used the programmed learning material for self study.

A pre-test, post test and retention test were given to each student to measure the differences in the gain of knowledge between the experimental and control group and also to establish which IQ group was most successfully improved in their retention of the subject matter presented as a result

of using programmed instructional unit.

After pre-testing it was found that all the experimental groups had a higher mean gain than the control group. The experimental high IQ group, showed the greatest gain over its counter part in the control group, however the experimental low IQ group showed the least amount of gain.

The purpose of the study undertaken by Parish (80) was to develop a series of programmed self-instructional materials for the area of food service in vocational home economics job training. The units which were programmed included : sanitation, personal hygiene, safety, general nutrition, cookery terms, basic measurements and menu terms. Thirteen food service teachers, teacher co-ordinators, a few students and members of an in-service workshop group reacted to this material. They all felt that it was a useful tool and favoured the use of similar type material in their classes. They felt that testing of material in a regular class-room situation is needed and programmed instructional materials need to be developed in other areas of home economics and for different ability levels.

Murphy (75) undertook a study to develop programmed instruction modules in food for college level from which students could learn effectively and efficiently without direct instructor participation. Students attitude towards the use of programmed instruction and relationship between -

(1) ability to learn and learning through the modules,

(2) ability to learn and attitude towards programmed instruction,

(3) ability to learn and retention when programmed instruction is one means of learning,

(4) attitude toward programmed instruction and learning and

(5) between attitude and retention were investigated.

Low error rates and high gains in scores indicated that students learn well by the use of programmes. Better students learned more than poor students, and those with more ability retained more at the end of the semester, but there were no significant relationships between any other pair of variables. Student attitudes were quite favourable toward programmed instruction.

Waldron (115) the feasibility of producing a "canned" workshop for the continuing education of dietitians that could be used at district level, independent of professional instructors.

Before conducting the workshop, data collection instruments were field tested by registered dietitians. Necessary changes were made in the instruments. The pre-test,treatment, post-test technique was used, with the 't'-test used to analyze the significance of the difference of the means.

All participants completed evaluation of the workshop giving it a positive rating indicating the materials to be relevant, worth while and needed by the profession.

The purpose of the study conducted by Stout (108) was to establish the level of cognitive functioning (ability to recall facts and apply knowledge) and attitudes of students in classes taught by two different modes of instruction : Expository and Guided Discovery. Residential energy resource management was selected as content. For each mode, modules of ten lessons each were developed, validated and pilot tested. Lessons were prepared by two specially prepared teacher-researchers from January through May 1977 in 12 Iowa High School Home Eco. classes with a total of 170 students of whom 136 were female and 34 male. Each class received one treatment from one teacher in a completely randomized factorial design.

Data were gathered for each student regarding grade level, sex, and grade point average for the semester prior to the treatment. A specially developed attitude measure was administered on the first and last days of the treatment. An Energy Management Achievement test containing knowledge and application subsets was administered on the eleventh day in each class.

Both subjects (N=170) and classes (N-12) were used as experimental units in seperate analyses. Findings for each showed no significant difference in the attitude or

achievement scores as a result of two treatments or teachers. Although total time varied, it made no significant difference in results.

Based on the lack of significant difference in the attitudes and achievement of students and classes due to the mode of instruction or teacher, the researcher recommended that such field studies be continued with much the same teaching model but with the following adjustments : control of student abilities, a more equal representation of male and female students, inclusion of a test for long term retention and transfer of knowledge, flexibility in time for teaching and size of classes, and use of regular class room teacher to carry out each mode of instruction to provide for varying competencies and personality traits.

Crook (18) studied the effectiveness of an instructional packet for vocational home economics teachers obtaining directed work experiance. The purpose of the study was to design, implement and evaluate an instructional packet that would relate work experience and course assignment to vocational teacher's role without the need for close personal supervision by a teacher educator. The learning packet was developed and utilized with eleven students who enrolled in the vocational Home Economics Education Practicum work experience course at Kansas State University spring term 1978 and 25 students who enrolled in the summer, 1978 term. The students were randomly assigned to the experimental group

(use of packet with course assignments) and the control group (use of course assignments only) in the spring term. all procedures followed in the spring term were repeated for the summer term research group.

The post-test only, control group research design was used for data treatment. Data were analyzed using analysis of variance measures. Results from the data showed significant statistical differences between the experimental and the control group in terms of satisfaction with course procedures and course assignments, confidence in ability to relate work experience to teaching, and perceived knowledge and skills gained.

Findings of the study suggest that the learning package is an effective method to utilize in a work experience course to help students relate work experience and course activities to a vocational teacher's role.

The purpose of the study conducted by Elliot (24) was to investigate home economics teacher's professional use of instructional media in their classrooms. This was accomplished by means of a survey of teachers' attitudes toward knowledge of,and report of availability and use of instructional technology. Independent variables consisted of teachers' age, educational background, teaching experiance, and course work completed in preparation and/or use of instructional technology. The study attempted to determine if the grade level taught, size of the school, or

accessibility of a media specialist or center influenced the use of instructional technology.

Major findings showed that if a media specialist was employed, the teachers reported they used more instructional technology, and that more media equipment was available to them than was true for those teachers who taught in schools where a media specialist was not employed.

Home economics teachers who reported more media equipment available to them tended to have a more positive attitude toward instructional technology.

Parlikar (81) undertook a study at Baroda to establish the suitability of PLM in promoting Home Science education for adolescent girls. It was an experimental design using three methods of study. In two of the three experimental conditions PLM was used. Under the first condition it was used for self-study, that is, for auto-instructional purpose, whereas under the second condition it was used as an aid to conventional method of teaching. In the third condition the students were treated with the conventional method of teaching namely the lecture-cum-discussion method. A purposive sample of 45 students in each group was drawn from the five divisions of IXth class from the Maharani High School for girls.

The variables considered in the study were intelligence for which the Desai-Bhatt intelligence test was used. The overall class achievement scores and scores on achievement

in Home Science were taken from the cumulative record cards of the previous year, i.e., VIIIth class. For judging the extent of preparation for entering the experimental conditions scores on pre-test were considered. the socio-economic-status was arrived at on the basis of the points earned on the inventory prepared by the investigator. Time taken was categorized on the basis of mean time taken by the group of adolescent girls under study.

Data were collected in terms of immediate and delayed retention tests given on completion of each sub-unit as well as the whole unit respectively. Mean and 'F' value for simple and two way analysis of variance was computed to study the variations of IRT and DRT scores in general.

Findings of the study revealed that developing a PLM in Home Science was feasible and its use in promoting Home Science Education was possible. It was found to be suitable for use by adolescent girls. Its use for self-study as well as an aid was more suitable for immediate retention and its use for self-study was suitable for delayed retention. The students with high and medium level of intelligence and achievement found it more suitable for self-study.

A comparative study by Ankleshwaria on different strategies to teach nutrition to the Home Science College students of varying intelligence was conducted at the M.S.University, Baroda in 1980. This study aimed at developing and comparing relative effectiveness of three

instructional strategies in terms of achievement of the instructional objective, with a major emphasis on teaching only a part of the course on "Elementary Foods and Nutrition". Findings of the study revealed that learning is effective when students were taught through a strategy composed of several components. In other words, the results support the view that presentation of content matter through a strategy is a key towards mastery level learning, as it maximizes the fulfilment of all the functions of an instructional process.

The primary purpose of the study conducted by Hames (38) at Texas was to develop a model to assess the implementation of the content component of curriculum in Home Economics subject matter in selected schools in Ontario, Canada, and to develop instruments to accomplish this purpose. The development of the instruments was a significant aspect of the study since there were no instruments available to achieve the primary purpose of the study. Data regarding differences in importance ratings were not significant enough to support the total rejection of the null hypotheses. Significant differences in importance ratings were found between the importance ratings assigned by teachers and students for five items. For all five items, a larger proportion of teachers considered the topics very important than did the students. Findings of the study indicate that the model can be used to assess the implementation of the content component of curriculum.

Pecoraro (86) conducted a study at the Louisiana State University with the purpose to develop a module on interpersonal skills for home economics teachers in Louisiana and to evaluate it in two teaching modes. The study consisted of two phases : Phase I consisted of the development of the module. Phase II consisted of the implementation of workshop in ten parishes at which the module was tested and evaluated. Teachers in each parish were randomly assigned to one of the two groups, self-instructional or trainer-directed. Fifty-five teachers participated in the trainer directed course and fifty-three teachers participated in the self-instructional mode.

Findings revealed relative lack of superiority of one mode of presentation over the other. Evidence gathered in the study supports consideration of a self-instructional mode as an option in inservice education.

At the Pennsylvania State University, Abotsi (1) proposed a model to extend the knowledge of Winneba Specialist Training College, Ghana, in Home Economics education to approximately 25 families a year within the Winneba community. The program provided an out-of-school informal education in nutrition, sanitation, and literacy to those families. The focus of attention was on women who have several needs, yet no access to formal education.

The skills in nutrition, sanitation, and literacy would enable the women to plan and feed their families nutritious and well-balanced meals, maintain healthy and sanitized environments and practice basic communication skills both oral and written in their daily undertakings.

If 40 percent or more of the participants completed the program and carryout the intended skills, so that positive changes are seen in their lives, the model would be judged effective and perceived as having significant impact on the lives of the people.

Joshi (52) aimed at developing and studying the effectiveness of teaching a course "Introduction to Home Science Education and Extension" through the multimedia stategies to the 1st yr. Home Science students of the Faculty of Home Science, Baroda, in relation to the selected student characteristics. The media selection charts presented by Andersons provided the basis for the selection of media for the two strategies.

Strategy I consisted of Programmed learning material, visuals (like charts & diagrams) and printed material on lesson content.

Strategy II consisted of Programmed learning material, slides (with taped commentry) and taped lectures (with visuals).

Experimental treatments were assigned to the classes rather than the individuals due to the administrative problem of adjusting classes. The experiment consisted of pre and post-test design. After the post-test, data on students attitude towards multimedia strategy were collected.

Results showed that the two strategies were very effective which was evident from the scores of the pre-test and the post test. With regard to the variables also, no significant differences were found in the effectiveness of both the multi-media strategies in relation to their intelligence, competence in English, stream of study at higher secondary school level and attitude towards multi-media strategy.

Odhuno (76) conducted a study at the university of North Carolina to develop a global perspectives module to be incorporated into an existing course and to test the effectiveness of the unit in terms of changes in knowledge and attitudes of Home Economics university students. Knowledge and attitude scores of two groups of students, one of which has been exposed to the module and another which had not, were compared. An analysis of covariance was used to test for significant differences in the mean cognitive and attitude scores between the experimental and control group. The gains of the experimental group were found to be statistically significant.

The study on "validation of a self-instructional food service inventory control system module" by Kim (58) at the Iowa State University was designed to

(a) develop an inventory control system achievement test for students in a food service management information systems course,

(b) develop a self-instructional module on inventory control systems, and

(c) evaluate the module using a non-equivalent control group design.

The experimental treatments were lecture and self-instruction; both treatments were developed based on the content analysis leading text books. An achievement test, an attitude inventory, and a demographic questionnaire also were designed to assess the effects of the experimental treatments.

To measure the effectiveness of the instructional methods, an experiment was conducted with two classrooms. The module was utilized by the self-instructional group. For the lecture group, the six content areas were presented from outlines developed for the self-instructional module. From the data obtained, the self-instructional method was judged as equally good as the lecture method. The students in the self-instruction group had overall favourable attitude towards the module. The researcher felt that further use and

study of this method for teaching college students and practitioners seem justified.

2.2.3 Studies Conducted in Clothing and Textiles

A number of studies have been conducted on instructional materials in Clothing and Textiles, as presented in the following few pages, but all of them in foreign countries. These studies have been conducted at the school level, college level, for home makers and for disadvantaged adults, and all of them seem to have learnt effectively from them.

Murphey (74) conducted a study on evaluation of by-passing as a technique for adjusting a self-instructional clothing programme to initial individual differences. The purpose of the study was to initiate a by-pass system into self-instructional clothing programme developed as a part of the U.S.Office of Education Co-operative Research No.5-1042 and to appraise the gated programme using a field test as a source of data.

Preparation of the gated programme included -

(1) the division of the programme frames into small sections of frames which could be by-passed,

(2) designation of criterion frames in the section as gate frames,

(3) the designation of gate frames into student-controlled

and teacher-controlled gates and

(4) the development of an answer booklet for the gated programme including instructions for using the by-pass.

An answer booklet for both gated and ungated form of the programme, a time and error record and a student reaction form accompanied the program. Fifty seven first year Home Economics students in two junior high school classes were randomly assigned to one of the two clothing programme experimental conditions :

(a) using the by-pass,

(b) not using the by-pass.

Findings indicated no significant difference between the two groups with respect to five variables related directly to mastry programmed teaching and the gated programme were generally unfavourable in both the groups. Students did agree that programmed teaching is good; however, they indicated that the teacher can teach better than a programme can teach and that programmed instruction was monotonous including boredom to learn.

Schank (95) studied the use of self instructional programme on basic sewing skills by adult women, supervised in their homes. The purpose of this study was to determine the usefulness of a self-instructional program. Sewing step-by-step in teaching adult women to sew in their homes without the supervision of a teacher. The programme was developed as

a part of the U.S. office of Education Research Project No-5-1042.

Requirements for eligibility of the participants were that the women be high school graduates who had not constructed a blouse or a dress unsupervised since completion of their high school. The ten participants who completed the programme were interviewed about their experience and their blouses were evaluated quantitatively, using a scoring device previously developed.

Score compared favourably with scores of high school students who followed the programme when making blouses in the class-room. There was wide range in the number of weeks required for completion of the programme. Reaction to the programme was generally favourable. This study demonstrated that women can learn to sew using a self instructional programme unsupervised in their houses, if they are adequately motivated.

White (120) studied the effectiveness of self-instructional sewing program when used with disadvantaged adults. The purposes of this study were -

(1) to examine the problems and successes experiance by five disadvantaged adult women as they used a self-instructional programme, sewing step-by-step, to construct a blouse and

(2) to study the problems non-home economics person would encounter in administering the programme.

Requirements for participants in this study were that each subject be -

(1) disadvantaged, (2) willing to attend classes, (3) a beginner in sewing, having had no independent sewing, and (4) able to read aloud specified frames of the programme. The participants were contacted through local service agencies.

At the completion of the programme each participant had constructed a blouse. The blouse was scored using a rating scale which had previously been developed. The scores of the blouse constructed by the participants compared favourably with scores of blouses constructed by high school students in the previous field study. All participants as well as the administration had a positive attitude towards this method of learning. The results of this study indicate that this programme can be used successfully by disadvantaged adults.

Lewis (65) conducted a study to develop the objectives and generalizations for use in self-instructional programme blouse pattern. The study aimed at developing objectives and generalizations for self-instructional programme on selection and use of commercial blouse pattern in home economics for industry students. It further aimed at determining whether the procedures selected for use by vocational Home Economics teacher were in agreement with the procedures selected for

use in self-instructional programme. The investigator conducted a survey of vocational Home Economics teachers in North Carolina to ascertain their opinions concerning grade placement of stated generalizations.

An opinionnaire was developed and mailed to 150 vocational Home Economics teachers in North Carolina during 1964-65 school year. In seven of the nine groups, teachers were in agreement with procedures used in self-instructional programme in relation to pattern selection. The majority of the teachers had their students transfer more pattern marking to the fabric than was done when the self -instructional programme was used. Some of the objectives formulated for study needed some changes for clarity, competence and agreement with generalizations.

Moebes (73) conducted a study on organization of content for self instructional programme for the construction of a blouse. The purpose of the study was to organize the subject matter for self -instructional programme for construction of a simple blouse. The organization of the content of the programme included the analysis of construction procedures into component skills which must be mastered by students in order to construct a blouse, the selection procedures to be submitted to the writers of a self instructional programme, and the grouping of the procedures into learning units suitable for programming.

The procedures for attaining the objectives of this study included an analysis of construction procedures recommended in selected published material, the construction of three experimental blouses, interview with six inservice Home Economics teachers and consultations with accepted authority in the field of clothing const.

The organized subject matter was presented to the writers of self instrutional programmes in the form of series of learning units representing the major tasks necessary for the construction of the blouses.

The learning units for the construction of the blouses submitted to the programmers were in the following order :

(1) stay stitching (2) pressing, (3) darts,
(4) seams, (5) facings, (6) attaching facing,
(7) sleeves and (8) hems.

Wissink (121) conducted an experiment in the use of programmed materials in teaching clothing construction. The purpose of the experiment was to develop some programmed materials which could contribute to students independence in learning clothing construction techniques and lessening of the class time spent in clothing const. techniques.

Data were collected from students in pairs from two ninth grade classes with eleven studnets each. Six basic construction techniques were taught to one class with the demonstration method and with teacher follow-up help. The

second class was taught with the use of different types of programmed material and little or no teacher follow-up help.

Data recorded included time used to complete each technique, number of referrals to teacher, to materials and to other sources and the kind of questions asked.

Data indicated that use of programmed material which allowed students to work at their own speed resulted in use of less time to complete the technique. Fewer referrals were made to the sources other than instructional material, thus allowing the teacher more time to observe the progress of the class since fewer questions were asked, and quality of construction was as good as or better than that achieved when programmed material was not used.

Time spent to develop programmed materials was deemed justified since they can be repeatedly used by successive groups of students.

Johnson et al (51) conducted a research on "Using Programmed Instruction to teach a skill for transfer" at the University of North Carolina at Greensboro. The purpose of this study was to compare the performance of students taught by a self-instructional programme in which they were guided to perform laboratory tasks and to achieve cognitive objectives with the performance of students taught by the traditional laboratory demonstration method of teaching.

Specific objectives of the study were (1) to develop a self instruction program in the area of clothing construction for teaching a skill at the levels of learning which guide the student to an understanding of the processes involved and which prepare the student to transfer learnings to a new task, and (2) to appraise the self-instruction programme by conducting a field experiment in which programme - taught and teacher-taught sections of classes were compared.

The programme was developed for use with students who had little or no sewing experiance. Six schools were selected at random from a list of schools within 45 miles radius of Greensboro. In each school the class was randomly divided into two sections. Self instruction programme was used with the experimental section and the control section was taught by the home economics teacher.

Four tests and one rating scale were developed for use as criterion variables in this study. Differences between program-taught and teacher-taught sections within each school on each variable were analyzed using the t-test. In general these t-values were significant in each school for each variable. When the different variables were considered together, large differences between the teacher-taught and programme taught sections were clearly evident, the programme taught sections being superior.

A study was conducted by Reich and Berman (91) at the Pennsylvania State University. U.S.A. in 1971 with the main

objective to develop a programmed self instructional course in basic clothing construction at the college level. The programme aimed at integration of manual skills with formal knowledge and thus guide the student to an understanding of the processes involved.

One hundred and eight students were exposed to a combination of linear and branching method of programmed instruction. The whole subject matter was broken down into 20 catagories. The programmed part of the course was divided into sixteen sections consisting of 17 to 44 frames each. The total programme consisted of 434 frames.

Tests were also designed to measure the knowledge in the sewing machine, the pattern, and the construction techniques. These measures helped in placing the students at high, medium and low experience level of entering course. It made it possible to determine the degree of students improvement as a result of mastering the course through programmed learning material.

Findings of the study revealed that students were very enthusiastic and also performed very well on paper and pencil tests of conceptual learning, demonstrating their formal knowledge. It was found that clothing construction seems well suited to a self-instructional programme where the programme is written for understanding concept formation, motor skills and transfer of basic learning rather than strictly for recall of information.

Guzelian (36) conducted a study at the Pennsylvania State University on "Conceptual level as a determinant of mastery in a self-paced programme in basic clothing construction". The specific focus of the study was to test a self pacing manual in clothing construction which allowed for students with differing abilities to achieve minimum mastery while at the same time meeting certain product standards. It was necessary to use a method by which students could achieve mastery and develop an appreciation for standards. The answer was a multi-media program in which students were guided to achieve cognitive objectives by actively investing individual understanding. The study centered on experiences which required integration of cognitive, affective, and psycho-motor learning.

Subjects studied in this experiment were classified as functioning at either high or low conceptual levels and their performance in various phases of the course compared. The results indicated that the individualized mode emphasized in the course allowed pupils at both conceptual levels to function effectively. With minor exceptions there were no differences between the groups on any of the criteria.

Diggs (21) took up a project at the Oklahoma State University to develop, test and evaluate individualized instructional materials to provide instruction for potential apparel shop enterpreneurs during an open entry exit pilot study, and finally to revise and make recommendations for the

continued use of the materials in traditional and non-traditional educational settings. Characteristics that contributed to or hindered learning were identified for each module, other instructional materials and programme procedures. Evidence of achievement or lack of achievement were analyzed by identifying the extent to which enterpreneurial concepts were applied. Characteristics identified as hindrances to learning and evidences of insufficient concept application provided the theoretical base for drawing implications and making suggestions for changes in instructional material and procedures.

Taylor (112) conducted a study at Texas with the purpopse of developing and evaluating a comprehensive self instructional manual for teaching basic construction principles and skills in a college introductory clothing construction course.

The procedure for developing the manual involved many stages. The selection of topics included in the manual and the determination of organization and format were a result of a process which involved examination of college clothing curricula, and the administration of a questionnaire designed to solicit information from persons knowledgeable in clothing. The individual lessons were designed to encompass informative material, clothing construction activities, evaluative procedures and self-tests.

The testing process consisted of a -

(1) Pilot test composed of four students enrolled in a college independent study clothing construction course;

(2) a class room test in college introductory clothing construction course which involved two laboratory sections, one section which used the manual was compared to the other which did not use the mannual ;

(3) an evaluation in a graduate level course by persons from a variety of backgrounds with professional experience in clothing construction ; and

(4) a class room test in a university introductory clothing construction course which was compared to two classes of the same course which had been taught the previous session without the manual. In the class-room testing situation, pre-test scores, post-test scores, garment grades and grade point average were utilized to evaluate the manual's effectiveness as a teaching device.

Results of the statistical analysis revealed no significant differences between the students who used the manual and the students who did not use the manual. However the t-values indicated the probability that 75 per cent of the times the students who used the manual would perform better than students who did not use the manual. Also results of the correlation analysis indicated that students

with a 2.7 or a better grade point average accomplished more with the manual than students with 2.7 or better G.P.A. Who did not use the manual. The consistently higher scores of the experimental group on the post-test, post-test minus pre-test, and garment grades indicated that the manual was effective as an improved teaching tool.

Fletcher (28) conducted a study with the purpose to explore the feasibility of individualized modular instruction as an alternative to a traditional lecture-demonstration method for teaching ten selected aspects of flat pattern design in a college course.

Ten sets of individualized instruction materials were developed according to a systems approach model designed at the Florida State University. The materials were tested and revised in a three stage formative evaluation prior to class-room use. The instructional value of the materials was analyzed by comparing performance results of 24 students taught in a traditional 'lecture-demonstration' class with performance results of sixteen students taught by the individualized instruction material.

A pre-instruction attitude and post-instruction attitude were taken. Performance test scores and learning time were compared between methods of instruction and experiance levels to determine instructional value to the materials.

The students taught by individualized instruction had higher average test scores than the students taught by lecture-demonstration on all ten performance tests. Learning time data showed that the individualized instruction students used an average 141 minutes for all ten units of instruction compared to a total of 156 minutes used by the teacher of the lecture-demonstration class.

Students in both groups expressed favourable attitudes toward the flat pattern design course before and after instruction. Students also expressed favourable attitudes toward the instruction they had received.

Performance test results suggested that the students working on the individualized instructional material at their own pace had higher levels of mastery of the selected flat pattern design principles and teachniques than students taught in a traditional teacher-paced lecture-demonstration manner.

Warden and Brandi (119) developed and evaluated a series of individualized modules for selected fundamental skills used in clothing construction was randomly selected from the six sections offered during a given term. The hypothesis stated that there would be no difference between a control group (traditional lecture demonstration) and an experimental group as measured by clothing construction experience in cognitive, performance and attitude scores. Statistical analysis included 't' test based upon experience

score, analysis of variance, and chi-squre test for attitude questionnaire on all variables by group and experience level. Results indicated that :

1. individualized instruction may be a more effective mode of instruction than lecture - demonstration ;

2. integrating individualized instruction into a regular class situation can be managed with some degree of success ; and

3. the instructional modules were effective instructional tools.