CHAPTER III

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REVIEW OF RELATED LITERATURE

3.1 INTRODUCTION

Before designing any study, it is necessary to make a detailed review of the literature relating to the area under consideration. It provides insight into the methods, measures, subjects and approaches employed by other research workers which in turn will lead to a significant improvement on the research design (Burns, 1997). It helps the researcher to have a clear perception of the problem in hand and to convert the tentative research problem to a detailed and concise plan of action. It also acknowledges its indebtedness to the past and shows clear linkages between what was known in the past about the topic and what was discovered in the present research.

It is a crucial step which invariably minimises the risk of dead ends, rejected topics, rejected studies, wasted effort and trial and error activity oriented towards approaches already discarded by previous investigations.

Therefore some of the studies which are related to the problem under study from abroad, India and Kerala have been included in this chapter.

3.2 CONCEPT ATTAINMENT MODEL

Sharma (1980) studied the effectiveness of CAM in terms of achievement of students on achievement test based on the concepts taught in Chemistry. It was found that the mean performance of the experimental and control groups on achievement test is not significantly different from each other.
Pani (1985) compared the effectiveness of reception strategy and selection strategy of concept attainment model in the teaching of science concepts. The study revealed that both reception strategy and selection strategy are equally effective in the attainment of science concepts.

Das (1986) studied the effectiveness of CAM in terms of teaching competence of pre-service student-teachers. The results of the study indicated that CAM is effective in developing the teaching competency of student-teachers. There is effective transfer of training and CAM had affected the teaching behaviour of student-teachers.

Gangrade (1987) compared the achievement of students taught through CAM and CM. The sample consisted of 104 VIIth and VIIIth class students of Science. The dependent variable of the study is the achievement scores of students in science of class VIIth and VIIIth taught through combination of CAM and CM with those taught through CM. The independent variables of the study are intelligence, attitude towards science, and previous year's achievement in science. The results of the study indicated that the combination of CAM and CM was significantly superior to CM in teaching Chemistry to Class VII students when the groups were matched in respect of intelligence, attitude towards science and previous year's achievement in science. The combination of CAM and CM in teaching Physics was significantly superior to CM, when the students were matched in respect of intelligence, attitude towards science and previous year's achievement in science.

Sushama (1987) studied the effect of concept attainment model and Biological Science Inquiry model. The findings of the study revealed that the concept
attainment model is the most effective with respect to the achievement of the students and Biological Science Inquiry is found more effective than the conventional method of teaching.

Louvet (1988) made a study on concept attainment model in foreign language classes. In his opinion the concept attainment model is a teaching strategy based on analysis of the nature of concepts and how they are acquired. Using this theory, three strategies for second language instruction have been developed: the reception, selection and unorganised materials strategies. The findings of the study revealed that concept attainment model is exciting for students, forcing them to think and participate. Specific examples are provided of how the three strategies can be used in the classroom.

Aggarval and Misra (1988) inferred from their study on the effectiveness of Reception Model of concept attainment for teaching Science Concepts that there is significant difference between the experimental and control groups with respect to their achievement in science. The achievement scores related to knowledge and understanding objectives of teaching for the experimental group are significantly greater than those for the control group members.

Chaudhari's and Vaidya's (1988) study focused on the attainment of concept through the teaching of concept attainment model and Mastery Learning Method. The results indicated that Mastery Learning Method is superior to concept attainment method, but concept attainment method and traditional method are found equally effective.
Chitriv (1988) made a study on the relative effectiveness of Bruner Strategies and Ausubel strategies on the various criteria of concept acquisition in Mathematics. The sample consisted of 127 eleventh grade students of science batch. The findings of the study revealed that Bruner's strategy was superior to traditional strategy for teaching concepts in mathematics. The Bruner's strategy appeared more suitable for teaching Mathematical concepts to eleventh grade students of all conceptual style preferences. But Bruner's and Ausubel's strategies were equally effective for teaching Mathematical concepts to eleventh grade students, so far as student's ability to acquire knowledge of concepts is concerned.

Sunal (1990) presents three models belonging to the Information Processing Family for teaching social studies to young children. The models can be used as needed with children at differing levels since each addresses a particular level of development.

Zacharia (1990) studied the effect of concept attainment model in the teaching of Economics in Standard VIII. The findings of the study revealed that concept attainment model is superior to the conventional method of teaching.

Joseph (1990) compared concept attainment model and Advance Organizer Model in the teaching of Physics in Standard VIII and found that Concept Attainment Model was more effective than Advance Organizer Model.

Johnson et al. (1992) evaluated that the concept attainment model gives students experience in conceptual thinking, by studying a particular concept inductively as students work together to come to be shared meanings of the concept and then reflect their thinking.
Pritchard (1994) considered concept attainment model as an interdisciplinary approach in which teachers guided students to derive an abstract, generic idea inductively using pattern recognition and categorising skills, and then help them deductively apply the concept in new situations.

Nelson (1995) constructed an instructional programme to study the effectiveness of concept attainment model using video disk images and Hyper cards. Students could organise and explore concepts based on Concept Attainment Model (CAM), which helps students learn to determine the characteristics of a category. Out of 52 preservice elementary teachers who took part in the experiment, 36 trainees preferred partistic strategy and 16 preferred a holistic approach. The study led to the conclusion that concept attainment was appropriate and more effective for the elementary school curriculum than the lecture method.

3.3 ADVANCE ORGANIZER MODEL

Ausubel and Fitzgerald (1962) studied the effect of an advance organizer, antecedent learning and retention of two unfamiliar sequential passage about Endocrinology. The use of advance organizers enhanced the learning of the material for those students with poor verbal ability. Knowledge of the first passage exerted significant influence upon the new information.

Ausubel and Yousf (1963) in their study concluded that previously learned relevant background knowledge significantly facilitated the learning of concepts and retention of the first of two parallely related, unfamiliar learning passages when the influence of verbal ability was controlled.
The primary educational goals of advance organizer model are to help students acquire and retain information and to strengthen their existing cognitive structure. One way analysis of variance with post-hoc comparisons was used by Allen (1970) to study the effects of advance organizer on learning and retention of 1Xth grade students of two Junior High schools. The findings of the study support the hypothesis that meaningful learning proceeds more easily when new concepts or concept meanings are subsumed under broader, more inclusive concepts. Furthermore, the nature of person’s understanding of the concept changes as it is associated with a wider array of concepts and specific prepositions.

Learning is an activity that cannot be shared, it is a matter of individual responsibility. Meanings on the other hand, can be shared, discussed, negotiated and agreed upon. Ideally the most powerful learning would be acquisition of strategies that apply to any grade level and to any subject matter.

Sternbrink (1970) used six interacting social studied classes of rural students of fifth and sixth grades. It was stated that the experimental group was given a conceptual advance organizer and a daily advance organizer. The control group received only the conceptual advance organizer. Sternbrink came to the inference that the experimental group showed significant difference in their performance in favour of the advance organizers.

Edward (1975) conducted a study to determine the effectiveness of advance organizer model which is applicable to subjects of all scholastic level or for a particular level of pupil who demonstrated a specific scholastic ability. The results of
the study indicated that it is beneficial for all levels of scholastic ability but it is more beneficial for short term achievement than long term achievement.

Graber (1975) examined the use of advance organizers and questioning as a method of teaching. Pretest–posttest experimental design was used for the study. The findings of the study showed that no organizer was superior to the other and there was no significant advantage over the level of questioning.

Lucas and Flower (1975) undertook a study to determine the effect of three types of advance organizers upon the teaching of biological concepts. The interaction effects of certain student variables were also subjected to study. The result of the study did not indicate any significant effect between the three types of advance organizers and scores on the achievement test. The interaction effects of the student variable also were found insignificant.

Travers (1976) evaluated the effects of using Advance Organizer in a laboratory inquiry oriented physical science course for non-science majors. The course independent of the use of advance organizers did not increase the performance of the students.

Kerston (1976) examined the effects of an advance Organizer on the learning and retention of learning material. It was found that there was no significant difference between advance organizer and control instructional material.

Smith (1976) studied the effect of Advance Organizers and abstract reasoning levels on learning and retention of post secondary Mathematics students. Advance Organizers seemed to have more effect on long range retention.
Lawton (1977) reported a very careful and complex investigation as to whether the use of advance organisers would affect the learning of social studies materials and also facilitates logical thinking in six and ten year old children. The findings of the study revealed that the effects are much stronger for the older children, especially with regard to transfer to thinking ability. If the material is presented with an organising structure, it will increase the probability of learning and retention of materials and also the potentiality of influencing the logical operations.

Thompson (1978) tried to determine the extent to which three types of expository organizers would facilitate the verbal learning and retention performance of selected fifth grade elementary school subjects. The three types of expository organizers were Simulation Advance Organizer, Abstract Organizer and Detailed Organizer. The organizers were developed in the area of Social Studies. The findings of the study supported the basic assumption of Ausubel’s subsumption theory that expository advance organizers did have a facilitative effect on acquisition and retention of novel prose learning material. The simulation abstract organizer group appeared to have facilitative learning to a significant degree.

Schwartz (1979) tried to grasp the effects of specially prepared Advance Organizer, level of relevant knowledge, subsumer present in learner’s cognitive structure and interaction of Advance Organizer and subsumer level on the learning of unfamiliar science related material at the college level.

The significant main effects provided support for Ausubel’s theory regarding the ideational scaffolding provided by the Advance Organizer and the
facilitation effect of learning new material when the relevant prior knowledge subsumers were available.

Meena (1979) studied the effect of written and graphic comparative Advance Organizers upon learning and retention from audio-visual presentation. This study supported the conclusion that providing the learners with Advance Organizers prior to viewing an Audio-visual presentation will enhance their ability to learn and retain instructional content material.

Dena (1980) tested the effects of using a graphic advance organizer before, during and after reading on the comprehension of written test. The findings of the study revealed that the retention context was strengthened at below level, at level and above level readers. It did not facilitate the comprehension of single theme text but it did facilitate the comprehension of multi-thematic text.

Morganett (1980) also found a significant effect of Advance Organizer in testing the level of knowledge on learning and retention of Social studies content.

Giles (1981) compared the effects of Advance Organizers and clustering as mediators of learning in lesson presented at a planetarium. The clustering treatment and the advance organizers treatment each produced significantly higher performance than the control treatment.

Hadhighi (1981) tried to find out the effects of underlined cues, Advance Organizers and post organizers on meaningful prose learning. It was reported that both advance organizers and underlined cues facilitated meaningful prose learning.
Korzenowski (1981) tried to find out the effect of interspersed questions, advance organizers, and post organizers on good and poor comprehenders. It was found that the post organizer provide more helpful in the immediate recall of ideas.

Aman (1981) investigated the effects of the use of an advance organizer on transfer in programmed instruction situation. The results of the study indicated that the use of advance organizer was more effective in reducing the magnitude of error on posttest scores.

Borne (1982) conducted a study on three instructional method on Ausubel's concept of meaningful learning specially the effectiveness of advance organizers and no advance organizers using an expository passage. The findings of the study revealed that the use of advance organizers had a significant effect on delayed retention level readers but in the case of above level readers the advance organizer exerted no significant influence.

Noel (1983) studied the influence of advance organizers in a systematically designed lesson to teach rule-using behaviour on rule-learning to problem solving situations. The findings showed that while students benefit from systematically designed instruction to teach rules, advance organizers incorporated in that instruction do not necessarily enhance learning transfer.

Mahajan (1983) made the objective of his study to see the effect of Ausbelian study on advance organizers on the learning of formal operational stage students with concrete operational stage students. It was found that there was
significant interaction between the cognitive level and the absence or presence of organizers, at least as far as the immediate posttest was concerned.

Vasu (1983) conducted a study on the effectiveness on Ausubelian approach over conventional approach and the Ausubelian approach was found far superior to conventional method of teaching Biology in secondary schools.

Chitriv (1983) ascertained the comparative effectiveness of Ausubel and Bruner strategy on the criteria of concept attainment and concept acquisition in Mathematics. The strategies of Ausubel and Bruner were found equally effective for teaching Mathematical concepts to the eleventh grade students.

George (1984) also investigated with the conventional method of teaching. The major findings of the study indicated that Ausubelian approach of content organization was superior to conventional approach of teaching.

Livingston (1984) investigated the effects of advance organizer and direct instruction passages for high and low ability grade students in the learning and retention of meaningful verbal material. The findings of the study showed that there was no significant difference between the treatment means. The high ability grade students in the advance organizer group achieved significantly higher scores than the low ability grade students.

Dennis (1984) investigated the effectiveness of advance organizers and repetition on the achievement in a high school Biology class. The findings of the study revealed that there was no significant interaction between treatment on the two dependent variables. However, there was a significant gain in achievement by students in all groups from pretest to posttests.
Alexander (1984) arrived at an inference from his study on the correlative effects of learning style preference on learning of anthropological concepts when an advance organizer was used. While the advance organizer was used it did not account for any variability in the achievement scores.

Bhalwankar (1985) made a study of the effects of Expository and Guided Discovery methods of teaching on achievement in Mathematics of students of different intelligence levels. The major objective of the study was to find out the differential effects of guided discovery and expository methods of teaching Mathematics. It also studied the retention span of guided discovery and expository methods of teaching Mathematics. The retention effects of the content material were studied by administering the same test after three weeks of the conclusion of the experiment. The major and interaction effects of the treatment were studied by using the statistical techniques viz., 't' test, ANOVA and ANCOVA.

The major findings of the study were, the guided discovery and expository methods were equally effective on knowledge, and comprehension objectives with respect to immediate test and retention test. The expository method was found more effective than the guided discovery method on application objectives with respect to students of high intelligence.

Carnes (1985) investigated the effects of advance organizers and various sizes of groups of subjects on achievement, retention and rate of learning. It was found that the students working in groups of three or four achieved significantly better rates of learning than students working alone, while no significant differences in achievement or retention were observed.
Swarup, Budhisagar and Rajoriya (1987) studied the effect of two instructional materials with Advance Organizer and without advance Organizer in terms of pupils achievement and found that the instructional material with Advance Organizer was more effective.

Rajeria (1987) also conducted a study on the effectiveness of advance organizer on the achievement of students of standard VIII in science. The experimental group with AOM is found superior to control group with traditional method.

Rajoriya (1986) studied the effect of instructional material with and without advance organizers and study habits on achievement of B.Ed students. The findings of the study revealed that the Advance Organizer had a facilitative effect on the achievement of the students. The instructional material integrated with Advance Organizer was found more effective than the instructional material without Advance Organizer.

Panda (1986) compared the effectiveness of Advance Organiser and Set Induction on Learning. The major objectives of the study were to determine the effects of Advance Organizer and set induction on achievement. The findings of the study revealed that there is no significant influence of interaction between method of instruction, criterion test and between sex and criterion test.

Budhisagar (1986) studied the effects of treatment on overall achievement of students on criterion tests and reaction towards the instructional materials. The study was designed on the lines of posttest only central group design. The major findings of the study were: The advance organizer method was found
superior to programmed learning material and traditional method. Further it was found that low intelligent students could be taught effectively with the help of Advance Organizer method.

Senapathi (1986) compared the relative effectiveness of Advance Organizer Model and Programmed Learning Material and their interaction effects of personality variables on achievement of students. The results of the study indicated that the advance organizer model was found more effective than programmed learning material and conventional method of teaching. The personality variables did not affect the achievement of the students.

George (1990) compared Concept Attainment Model with Advance Organizer Model in the teaching of Physics in Standard VIII and she found that CAM was more effective than AOM.

Pandey (1990) studied the effectiveness of Advance Organizer and Inquiry Training Model for teaching Social Studies to class VIII students. The major findings of the study revealed that with regard to achievement score, the difference between AOM and ITM was not significant. Compared to the conventional method of teaching, the achievement score was significantly different in AOM.

Preetha (1990) also observed identical results for the objectives of comparing the effects of AOM, ITM and conventional method of teaching in terms of pupils' achievement in Mathematics. It was found that AOM and ITM were equally effective in terms of pupils' achievement.

Dr. K. P. Chakravarty (1994) showed from her study that Advance Organizer enabled the teacher to convey a good deal of information as meaningfully and
efficiently as possible, while allowing for student acquisition and retention of information.


In the latter part of the 1990's certain studies were reported on the effectiveness of AOM as a teaching strategy. The studies conducted by Gopakumar (1995), Raj (1995), Samuel (1995), Thomas (1995), Varghese (1995) and Muhammad (1996), tried to find out the effectiveness of AOM with that of the Conventional Method. In all these studies AOM was found more effective than the traditional method by taking achievement as a dependent variable.
Mathew (1997) tried to compare the efficacy of Advance Organizer Model with conventional Method of teaching Mathematics at secondary school level. The Advance Organizer Model was more effective in terms of students' achievement.

Kurian (1997) made an experimental study on the effect of Advance Organizer Model with conventional Method of teaching. In teaching Chemistry, Advance Organizer Model was found superior.

3.4 INQUIRY TRAINING MODEL

Schrenker (1976) reported that inquiry training resulted in increasing understanding of subject matter, productivity in creative thinking and skills for obtaining and analysing information. He reported that it was not more effective than conventional method of teaching in the acquisition of information but that it was as efficient as recitation or lectures accompanied by laboratory experiments. Inquiry training is successful in promoting cognitive development, increasing content mastery, enhancing inquiry spirit, producing gains in mental ability scores and developing process skills.

Wilson's (1976) process model of inquiry is the one which identifies several sets of processes as key elements of inquiry. The major shift in emphasis from product to process approach in teaching has wide application in all aspects of educational practice, curriculum planning, instruction and evaluation. The process approach will help the students to obtain a full understanding of the processes of learning and to understand the content material with meaning.
Most students lack skills and strategies in learning how to learn. They are told what to learn, but not how to learn it. This deficiency is quite acute and causes serious handicap in their future studies. The concept of meta-cognition has been an important and influential development in the contemporary study of cognition.

March (1978) studied the influence of Inquiry Training on intellectual development, achievement and I.Q. of Biology students and found that this approach was successful in increasing content achievement of the students.

Elephant (1980) and Dais (1995) conducted similar type of studies related to Inquiry Training Models of teaching. In both studies, the achievement of the student in Inquiry training Models was compared with that of the traditional method of teaching. Students taught through Inquiry Training Method were found superior in the achievement.

Maria (1981) evaluated the effectiveness of the use of Inquiry instruction to foster creativity in intermediate grade students. It was reported that the experimental group taught by the Inquiry Model trained teachers scored significantly better than the control group students.

Passi (1981) made a study on the development of Inquiry teaching skills through the teaching models for different families of models.

Lott (1983) compared inductive and deductive teaching approaches through testing the effectiveness of Inquiry Training Method and Advance Organizer Methods of teaching. The results of the study indicated that there were essentially no differences between the two approaches. However, inductive approach had positive
effects with intermediate level students and was more useful when higher level of thoughts and learning experiences were given to the students.

Wagner (1984) also investigated the relationship between achievement of science students in the IVth and Vth standards related to Inquiry approach and recitation approach. The major findings of the study revealed that the Inquiry approach was superior in terms of total achievement scores of the students.

Amodu (1984) made a comparative study of the teaching of Biology Inquiry VS Traditional approach in Nigerian Secondary schools. The results of the study revealed that students in the Inquiry group attained a significant level of achievement compared to the students of the traditional group.

Yove (1985) conducted a study on the effect of cognitive development, age and inquiry strategy on elementary school students scholastic achievement. The major findings of the study indicated that cognitive development was a critical factor in the efficacy of Inquiry strategies.

Katiyal (1985) studied the effect of Inquiry Training Model with Traditional Model as regards the learning outcomes and also to the reaction of students to the new approach. From this study she came to the inference that the experimental group was significantly higher in the scholastic achievement. The reaction of most of the students was highly favourable to the new approach.

Dubey (1986) studied the effect of inquiry training Model against the Traditional Method of teaching. The inference drawn from this study was in favour of Inquiry Training Model, while the relationship between intelligence and post test scores was not significant.
Dudge and Wang (1986) made a study on the effectiveness of Inquiry Training Model on the achievement and the instructional objective understanding. The results of the study indicated that Inquiry Training Model was very effective in terms of understanding.

D Lina and Sugandhi (1986) conducted several pilot studies to find out the feasibility of the models of teaching especially Inquiry Training Model. To master Inquiry training Model of teaching it was found necessary to practise the skill involved in handling the various phases of the model. The skills essential for the Inquiry training were classified into ten sub-skills. The major objective of the study was to find out and identify the relative difficulty level of the skills needed to master Inquiry training and to prepare instructional materials for the identified skills.

The major findings of the study were the identification of the skills which needed special attention in the process of mastering inquiry skills. Participants on the whole found it difficult to frame experimental questions in the third and fourth phases of the model.

Pandey (1986) conducted a study on the effectiveness of Advance Organizer Model and Inquiry Training Models of teaching for VIIIth standard Social Studies students.

The major objective of the study was to compare the effective of Advance Organizer Model and Inquiry Training Model with conventional teaching method in terms of pupils' achievement in Social Studies. Purposive sampling technique was used in the selection of sample population. The statistical techniques used for the study were ANOVA, t-test and Chi-square test.
The major finding of the study was the difference in means of gain scores in the achievement due to Inquiry Training Model was significant at 0.01 level.

Sushama and Singh (1987) conducted a study on the comparative effectiveness of Concept Attainment Model and Biological Science Inquiry Method in the achievement of science in Secondary level. The findings of the study revealed that Concept Attainment Model and Biological Inquiry Model were equally effective in the teaching of science at secondary level.

Edelstein and Caro (1987) made an investigation into the factors affecting inquiry learning and concept attainment among the high school students.

Dutt (1989) studied the effect of problem solving strategies and problem solving abilities in the achievement of science in the secondary school students. The problem solving abilities and problem solving strategies led to the development of higher mental abilities like analysis, application and cognitive development.

Lekha (1989) in her study concluded that the Inquiry approach was more effective than text book approach in the scholastic achievement of VIIth standard students.

Indiradevi's (1989) study also indicated the superiority of Inquiry Approach to Formal Approach.

Jayasree (1990) compared Inquiry Oriented approach with formal approach in the teaching of Mathematics. The major findings was that there was significant difference between the two approaches.
Preetha (1990) conducted a study on the effectiveness of Advance Organizer Model and Inquiry Training Model in the teaching of Mathematics in standard VIII students. The major findings of the study revealed that both type of Models viz., Advance Organizer and Inquiry training were equally effective in the teaching of Mathematics and both of them were more effective than traditional method of teaching. Considering the instructional objectives, Advance Organizer Model was more effective than Inquiry Training Model in the attainment of instructional objective viz., application. But in the case of knowledge and understanding both the models were equally effective.

Passi, Singh and Sansanwal (1991) conducted a three-phase study in the area of Models of Teaching to test the workability, feasibility and efficacy of Models of teaching especially certain selected models belonging to the Information Processing Family viz., Concept Attainment Model and Inquiry Training Model. The strategy operated in three main phases. In the first phase, orientation programme was organized to develop theoretical base and deeper understanding of the innovations. In the second phase, research design and tryout at the institutional level was developed. During the third phase, the data was pooled and subjected to statistical analysis.

The major objective of the training cum research project was to provide training to teacher educators on different models of teaching and to see the feasibility of the application of the models especially Concept Attainment and Inquiry Training Models in the Indian classrooms.

Sixteen colleges of Education and University Departments of Education from different parts of the country participated in the project. The models
of teaching strategy were accepted favourably by teacher educators, students and student teachers. The findings of the study revealed that it was more economical and effective than the traditional method. The authoritarian teacher-dominated classrooms were transformed into environment characterised by pupil’s questioning during the Inquiry Training Method. In the same way the symbolic passive learning through routine lecture method got transformed into conceptual learning through a game like teaching method called Concept Attainment Model. In both the cases, students turned into active participants in the classroom discourse.

Faicheney and Needham (1994) made a study on how to infuse inquiry training approach into teacher training programmes. Incorporating observation technique and qualitative methods to Inquiry training methods, he illustrated the goals and objectives specified for the social studies curriculum.

Gopakumar (1995) conducted a study of similar type by comparing the academic achievement of the students taught through Advance Organizer Model and Inquiry Training Model on Mathematics achievement at Secondary school level. The major objective of the study was to compare the effectiveness of both the methods on achievement in Mathematics at Secondary level with special reference to the instructional objectives-knowledge, understanding and application. The findings of the study revealed that achievement in the Inquiry Training group was significantly higher than that of the Advance Organizer group on achievement in Mathematics. But in the attainment of instructional objectives both the methods showed no marked difference.
Rakes (1996) evaluated the use of internet as a tool in inquiry training model. It was found that the concepts of information literacy and resource based learning could be used to design lesson plans and assess the learning outcomes.

Flavell (1997) studied the effects of meta-cognitive strategy training and learning styles on analysing and deep processing ability of students. The sample of the study consisted of 150 fresh college Arab students who were enrolled in three different sections of Arabic language class. Two of these sections were taught with meta-cognitive strategies and one with semantic mapping on their reading comprehension achievement in Arabic. This study explicitly dealt with the cognitive processes that were required for learning and problem solving. This training strategy was accepted by students favourably. The significantly positive results indicated that a conceptual framework for functional cognitive load theory and meta-cognitive theory were more effective in the learning.

3.5 INFORMATION PROCESSING MODEL

Fick (1953) states that man's discriminating capacity rate appears to be relatively stable or fixed between two or three bits/second.

In Miller's (1956) opinion, the overriding question is however not the limitation of human information capacity, but how to utilise his capacity to its fullest extent. He developed the technique of 'chunking' for expanding and improving memory.

Broadbent (1958) came to the conclusion that since human beings have a limited capacity to process information, they tend to filter out inconsequential
stimuli and concentrate on what impresses them as important enough for further processing.

Broadbent is also aware of the defects of the stage models and he analyses the problems of the Information Processing Models. In his opinion the assumption of linear model is an unrealistic notion because information may be reacting in a variety of ways in a person. The mode of interacting on the same information is different for different individuals on different occasions. The third problem is termed as cascading which means that there is also the problem of defining the stages i.e. where does one end and the other begin? In the light of these problems Broadbent proposed the Maltese Cross Model. In Maltese Cross Model there are four arms for the cross. The joining part of the four arms is called the central processing system. The important function of the central processing system is to translate information from one of the cross to a form usable by another arm of the cross. In Maltese Model, the sensory store works in the same way as the sensory store in the earlier Information Processing Model. The interesting property of Broadbent’s Model is that information can travel in a variety of ways throughout the system. In principle, the process can be initiated anywhere in the system and can influence any other part of the system.

According to Peterson and Peterson (1959) information in permanent memory is stored in codes that reflect different modalities in the environment. Information in the permanent memory is highly organised. It can be pictured as a complex network similar to those used in working with computers.
Gibson (1969) distinguished between two different meanings of the word ‘Information’. In his opinion, information does not consist of signals to be interpreted, but of structural invariants which need only be attended to.

Information processing psychologists suggested several models of the relations between different cognitive processes. Certain studies were reported on the Information Processing Models and the cognitive process of learning. The studies conducted by Clubok (1986), Abdusalam (1989), Unruch (1990) and Carifio (1993) analysed the cognitive factors involved in the process of learning. Initially, physical signals are changed into a form through the process of transduction and then the iconic storage takes place in the sensory information store. After the pattern recognition the next stage is the short term memory stage or working memory stage. The final stage is the long term memory stage or permanent memory.

Eugen et al. (1979) states that the major goal of Information Processing Models in the classroom are the following:

i) The development of intellectual capabilities such as the ability to reason and think more logically.

ii) The acquisition of content and

iii) The mastery of methods of inquiry.

Hilgard and Bower (1979) suggests three basic forms of information stored in permanent memory in the form of codes that reflect different modalities in the environment and the information is encoded in a hierarchical array or in the form of
networks. Concept is the basic form of information. The second form of information is propositions. The third form of information is schema or script.

Jose (1980) conducted a study on cybernetic approach to instruction. The analysis revealed that cybernetics acts as a connecting link between information processing, communication and control. The survey provided adequate evidences to show that the goals and dynamics of information processing can be applied with appropriate medications to instructional situations, so that the efficacy of Mathematical instruction can be increased several fold.

Shineman (1980) investigated the effect of information behaviour on student-teachers having similar or different conceptual level on the initial and final information processing behaviour. Significant differences were found between high and low conceptual level student-teachers on information processing ability.

Anderson (1983) describes a neuro-mathematical model of human information processing and its application to science content acquisition and to possible future research. In his opinion the information processing capacity means the psychological capacity of the central nervous system or modality. For this there is a lack of any direct measurement, however, it can be inferred or derived from the information rates observed in experiments. Fortunately the discriminative ability of man appears in a relatively stable manner.

Wangner (1984) studies the process theories of complex human behaviour. The knowledge that results from processing of information depends upon the type of processing. It can be seen that physical stimuli such as light, heat, pressure or sound are picked up by a person and stored briefly in a short term sensory.
If any of the information is attended to, that information is conveyed from the short term sensory storage system to the long term memory. Information in the short term memory, if rehearsed or encoded, can be kept as the focus of attention or passed on to the long term memory.

Baveja (1984) conducted a study on Information Processing Models of teaching in the Indian classrooms taking the Concept Attainment Model and Inductive Thinking Model for his study. The results of the study indicated that the students who studied lessons through models showed better conceptualisation ability than the control group that studied through conventional method. The retention ability of the experimental group was also significant.

Ponic (1986) studied the effect of concept attainment model in manipulating visual cognitive process affecting concept attainment by the learner. The sample consisted of 71 university undergraduate students. No significant difference existed among the treatment groups.

Dimit (1988) studied 35 information acquisition strategies of college students in relation to a number of social, demographic and psychological variables. Factors like sex, birth order, number of siblings, IQ and achievement in Mathematics, language and science were not associated with the selection of a particular strategy whereas type of the family, Parent's income, and their education appeared to be significantly associated with the selection of strategies.

Saq (1988) conducted a review study of research on the Information Processing Models of teaching. The findings of the study revealed that most of the studies were undimensional, although the concept was multidimensional. Most of the
studies were focused upon single teaching strategy while a few studies compared the efficacy of various teaching strategies.

Remadevi (1992) studied effectiveness of Information Processing Models and mastery learning techniques in the teaching of Chemistry at the Higher Secondary level. The results of the study emphatically showed that both the teaching techniques were found superior to the conventional method of teaching. The pupils taught through information processing and mastery techniques did not differ significantly with respect to the acquisition of knowledge and comprehension.

Yoo-soyung (1997) in his book on the necessity of Information Processing Model as functional tools discusses the role of information processing model as a necessary tool to enhance creativity. The author investigates the role of information processing ability in enhancing human thinking process and the relationship between creativity and intelligence. Evidence of integration in human cognition, the function and structure of the cerebral cortex etc. In his opinion information processing models are necessary for enhancing students' creativity. It is necessary for students to be exposed to a multi-information environment.

Remadevi (1998) reported from her study on the effect of Information Processing Models in the teaching of Chemistry in the Secondary and Higher Secondary students that the students taught through Information Processing Models of teaching were found superior to the students taught in the traditional method of teaching. The attitudinal change of the pupil coming under the experimental group was highly significant.
3.6 INTELLIGENCE AND ACADEMIC ACHIEVEMENT

Research studies conducted in the field of instructional strategies, teaching-learning process, creativity and cognitive style preferences etc. stressed the decisive role of intelligence. The findings of these studies confirmed the positive and significant relation of intelligence with academic achievement. There are enough evidences for a consistent and dependable relationship between academic achievement and intelligence. The correlation between the two variables varied from study to study, but the bulk of them ranged between coefficient 0.30 and 0.80 (Thorndike and Hagen, 1961).

A summary of 24 studies was reported by Sharma (1974) in which a measure of intelligence was found to be related to general school achievement.

Kemp (1964); Payne and Pyier (1965); Guilford (1966); Nair (1968); Nair, Madhavan (1968); Paul (1969); Vernon (1969); Anandavalli (1972); Thakur (1972); Lalithamma (1973); Abraham Mercy (1972); Holtz (1972); Sharma (1974); Dhami (1974); Masih (1975); Hyzodik (1975); Resnick and Glaser (1975); Garkhar (1976) and Acharvalu (1978) reported a positive and significant relationship between intelligence and academic achievement.

Between 1980 and 2000 many more studies were conducted in this area and the findings also confirmed the significant relationship between intelligence and academic achievement. Shivappa (1980); Sternberg (1980); Srivastava (1980); Menon (1980); Jenson (1981); Singh (1981); Shah (1981); Marck (1981); Kumari (1991) and Sharma (1982) reported a positive and significant relationship between intelligence and academic achievement.


Simpson (1999) examined the relationship between academic achievement and intelligence, creativity, motivation and gender role identity of gifted children. The findings of the study revealed that intelligence and motivation were the key factors in academic performance of gifted children, but creativity was not a key factor in the academic performance of the gifted children. The results also suggested that gender role identity was not a key factor in the academic performance of the students. The findings of the study revealed that there were positive and significant relationship between creativity, intelligence and scholastic achievement, and creativity and intelligence were the functions of the brain and were considered to be the cognitive aspects of human behaviour.
3.7 ATITUDE TOWARDS LEARNING GEOGRAPHY AND SCHOLASTIC ACHIEVEMENT

One of the important goals of instruction is to prepare students to use skills and knowledge they have acquired and to prepare them to learn more about the subjects they have been taught. One way of reaching this goal is to send students away from the learning experience with a tendency to approach rather than avoid the subject of study (Robert, 1990). Learned behaviours are rarely permanent they are shaped, reshaped and modified by new experiences. Attitudes are established through learning. An attitude comprises three components, viz., cognitive, emotional and behavioural (Lester, 1985). An attitude of a person towards some thing is, in fact, a reflection of his views and beliefs about it. The attitude of a person towards something affects and influences his performance also.

Studies conducted by researchers established this fact more thoroughly.

Studies conducted by Roy & Dighe (1977), Zacharia (1977), Ray (1990), Robert (1990), Shaw and Doan (1990), Simpson and Liver (1990), Morrell (1992) and Gopinadh (1996) reported a positive and significant relationship between attitude and academic achievement.

3.8 LEARNING ENVIRONMENT AND SCHOLASTIC ACHIEVEMENT

Quite a large number of studies have been conducted to explore the decisive role of home and school environment in the scholastic achievement of students at secondary and higher secondary stages.

Sekhar (1980), Shah (1981), Iverson, Barbara and Walberg (1982) and Ghakhar (1983) identified the intervening variables in the scholastic achievement of the students. In their opinion the home learning environment and classroom learning environment exerted a significant influence on the academic achievement of the students.

There were enough evidences for a consistent and dependable relationship between the academic achievement and learning environment made available for the students. Marioribanks (1983), Lindeman (1984), Rajput (1984), and Doctor (1984) identified the correlates of academic achievement and school and home environment influence. The findings of their study revealed that the student's scholastic achievement was affected by their school and home environment.

Bridgeman and Dorothey's (1985) study examined the effect of learning environment on students academic achievement. The study revealed that there existed a positive and significant relationship between learning environment, and attitude of the students toward the subject and the scholastic achievement.
Khoury and Voss (1985), Hooda and Paul (1986), Soto (1986), Sujatha and Yesodhara (1986) and Van De Griff (1986) studied the effect of classroom and home learning environment of High school students. It was found that various school and home learning environment variables were strongly correlated with attitude toward the subject concerned, curriculum, class climate, friends, community and physical environment.

The study conducted by Doctor (1987) to examine the classroom psyche and their achievement revealed that the educational and home environment was related to the acquisition of knowledge and their scholastic achievement.

Studies by Gyanani (1988), Tamir (1988), and Wilkinson (1988) showed that classroom climate and home environment of the student influenced the performance of the students. The findings of the study revealed a significant and positive relationship between academic achievement and classroom environment.

Dimit (1990); Laly (1991); and Ponnamma (1993) studied the influence of personal, home and school environment on students academic achievement. They identified that the direct and indirect effects of parental involvement in the academic matters provided suitable environment and healthy study habits for the students.

Rajalakshmi (1995); Thejovathy (1995); and Andrew and Erick (1996); showed that home environment, social climate and other environmental factors exerted a significant influence on students scholastic achievement and a positive and significant influence existed between home and school, social environment and overall achievement of the students.
Luther (1999) studied the effect of student's perceptions of classroom, social and family environment and academic self concept. A multiple correlation revealed a statistically significant positive relationship between learning environment and academic achievement.

3.9 SOCIO-ECONOMIC STATUS AND ACADEMIC ACHIEVEMENT

Researchers have identified that the performance of a student in education is a positive function of the socio-economic status of the student and his parents. Many studies were conducted to bring out the influence of SES on achievement. The investigator has gone through the previous studies pertaining to the SES variables under study which establish the relationship between them. Some of the important studies are reported below:

Studies conducted by Coster (1959), Washburne (1959), Curry (1962); Mathur (1963), Choptra (1964), Pavithran (1965), and Warrer (1966) revealed the pervasive influence of SES on academic achievement. The major findings of the study showed that there existed a positive and significant relationship between the SES and academic achievement.

James (1983), Nilimakumari (1984), Rajput (1984), Sharma (1984), Mehrotra (1986); Lee (1986); Narrang (1987); Yadav, and Verma (1988), Singh and Sharma (1989) conducted studies on relationship between SES and academic achievement. The major findings of the study revealed that there existed positive and significant relationship between SES and academic achievement.

The purpose of the studies conducted by Jegeda (1990), Chandra (1990); Remana (1990) and Safeena (1995) was to find out the relationship between SES and academic achievement. These studies also attempted to analyse the factors of behaviour patterns which were influential in different SES schools and made a comparative study of the academic achievement of the students. The studies were concluded with certain inferences regarding the role of SES on academic achievement.

Thampuratti (1995) investigated the relations between SES of the creative high achievers and creative low achievers in Mathematics. The findings of the study revealed that the material conditions did not significantly alter the scores in any variable. The educational status of the family members had a significant effect upon the academic achievement of the child. Another finding of the study was that the factors of cordial parental relationship, democratic attitude of parents, acceptance and encouragement given by the parents showed a direct, positive and significant relationship between achievement and creativity.
3.10 CONCLUSION

Some of the Information Processing Models have been investigated more thoroughly than others. Many investigators have undertaken studies on Advance Organizer Model. Some researchers were interested in finding out the relative effectiveness of a particular model of teaching over the conventional method of teaching. Similarly several studies have been conducted to decide the effectiveness of more than one model with the help of appropriate statistical techniques. Still, there are some who feel that research in the area of models of teaching is still in its infancy. Precious little have been done to find out the effectiveness of Information Processing strategies in general and by taking each model separately, indicating the need for undertaking studies of the present type.