A SURVEY OF THE RESEARCH STUDIES IN THE AREAS OF CONCEPT ATTAINMENT MODEL AND ADVANCE ORGANIZER MODEL

ABSTRACT
A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF

Master of Philosophy
IN
Education

BY
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Under the Supervision of
Prof. Mohd. Sharif Khan
Chairman

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1989
The primary objective of the schools is still to teach a school subject in its different forms. Teaching is often thought of as something that comes rather naturally to people who know their subject. In general, it is a simple process that produces simple outcomes. But teaching is an intriguing important and complex process. It takes place in a complicated social institution, which is filled with diverse people. It is a fluid interplay of events. One can not just know the subject and teach it, because the subjects themselves are ever changing. The physics of 1989 is not the physics of 1979. The art of today is not the art of 1930. In fact, teaching is a process by which teacher and students create a shared environment including sets of values and belief which in turn colour their view of reality.

The social movements now shaping the world were not imagined by the best minds of a generation ago. The teacher must learn to control five process of teaching, firstly, making and using knowledge, secondly, shaping the school, thirdly, teaching with strategy, fourthly, creating interpersonal climates and fifth, and lastly controlling a teaching personality. Bruner also emphasized four major features theory of instruction in effective teaching: (i) predisposition toward learning, (ii) structured body of knowledge, (iii) sequences of
material to be learnt and (iv) the nature and pacing of reward and punishment. It showed that a theory of instruction in teaching is concerned with how what one wishes to teach can best learnt, with improving rather than describing learning.

In classroom teaching there are the different instructional objectives for different class of students; and these instructional objectives vary greatly. We can refer Bloom's taxonomy of educational objectives which are categorised into three domains. These are cognitive, affective and psychomotor. To achieve these goals, different teaching strategies must be practiced.

Joyce and Weil (1985) have given four major families of models of teaching. These are: (i) Information Processing, (ii) Personal, (iii) Social, and (iv) Behavioural. In the point of view of teaching, a model of teaching is a plan or pattern that can be used to shape curricula to design instructional materials and to guide instruction in the classroom and other settings. The most important aim of any model of teaching is to improve the instructional effectiveness in an interactive atmosphere and to improve or shape the curriculum.

Since education is meant for all round development
in the child, synectic model would be needed; if objective is to eliminate anxiety and stress, Desensitization model of Walpe would be needed, and if the objectives is the development of the social skill than model like Group Investigation Model of Herber Thelen would be required.

The selection of model also can be dependent on curriculum requirement for example, a biology teacher may need the Inductive Model of Hilda Taba and Concept Attainment Model of Brunner and social studies teacher who proposes to teach about values would need Role playing Model of Fannie Schaftel and George Shaftel, which motivates to inquire into personal and social values. Some situation would require an application of a combination of model, that is, in social studies class, the teacher may have Inductive Thinking Model to help children master-map-skills and Group Investigation Model for criticizing social issues.

Each model of teaching has its different components. These are: Syntax, Social System, Principle of Reaction, Support System, Instructional and Nurturant Effect and Application.

The Selection of Models For The Survey of Research Studies

The investigator selected two models of teaching
for his research work. These are Concept Attainment Model of Jerome S. Brunner and Advance Organizer Model of David P. Ausubel. They belong with the same family i.e. the Information Processing Family.

Statement of the Study:

The present study precisely aims at:

"A Survey of The Research Studies In The Areas of Concept Attainment Model and Advance Organizer Model."

Assumptions of the Study:

(i) Proper research in any area is possible if the researcher is able to identify the areas in which work has been done in the areas in which there is a gap of knowledge.

(ii) It has been assumed that the research work related directly or indirectly with the problem of the researcher has been in India and abroad.

(iii) The studies collected during the survey provide the general awareness of the effectiveness of teaching at different level for different age group subjects.

(iv) If the models of teaching are selected for comparison from the same family, then meaningful comparison.
can be made.

Objectives of the Study:

The objectives of the study are:

(i) To collect the research studies in the areas of Concept Attainment Model and Advance Organizer Model.

(ii) To review the collected research studies under the area of Concept Attainment Model of teaching.

(iii) To review the collected research studies under the area of Advance Organizer Model of teaching.

(iv) To know the general effectiveness of teaching realised through these two models of teaching.

Delimitation of the Study:

(i) The models of teaching is a very wide area in teacher education. It has its four families. The study was limited to only first family of models of teaching that information processing family.

(ii) The study was further limited to only two models of teaching, Concept Attainment Model and Advance Organizer Model taken from the same family of models of teaching.
Source of Data:

The following sources have been used in collecting research studies:


Sample:

The sample of the present study consisted of 18 research studies in India and 100 research studies outside India made on Concept Attainment Model and Advance Organizer Model of Teaching at M.Phil. and Ph.D. level.

Method of Study:

A critical interpretative and evaluative study of the available research studies on the Concept Attainment Model and Advance Organizer Model has been made. The researcher has classified the research studies made on Concept Attainment Model and Advance Organizer Model in India and outside India into the following nine categories:

(ii) Problem Solving and Reasoning: Correlating and Integrating Post-Experience.

(iii) Appraising Scholastic Achievements.

(iv) Measuring Intelligence and Aptitudes.

(v) Appraising Social Relationship.

(vi) Language and Thought.

(vii) Facilitating Motor Skills.

(viii) Children With Special Needs.

(ix) Teaching and the use of Symbols.

Research Studies in India:

After the study of the different research studies in India classified under different categories which have been conducted on Concept Attainment Model and Advance Organizer Model in teaching — learning process, the researcher arrived at the following conclusions.

Before adopting any model of teaching, one should first know the understanding level of reaction towards the model. Passi (1985), Passi, and Singh and Sasanwal (1986), Bihari (1987), and Satpathy (1987) in their research studies found the significant favourable change among
teacher-educators as well as student-teachers towards the understanding of reaction towards the theoretical aspect of Concept Attainment Model and Advance Organizer Model.

In the research study of Satpathy (1987) Advance Organizer Model was found more effective to implement whereas the research study of Passi, Singh and Sasanwal (1986) showed significant difference in the implementation of the model.

The research studies had been conducted in India on both the models in the classes of VII, VIII, IX, X and XI with the subject of science and mathematics with both the sexes.

The research studies of Pandey (1981) and Satpathy (1987) showed that teaching behaviours were conducive to better concept learning and Das (1986) investigated that CAM was effective in developing teaching effectiveness. Bihari (1987) and Pandey (1987) observed the importance of giving background information and feedback to the students which has favourable effect on participation level.

Personality factors did not influence the model competency of CAM as well as the achievement of students in AOM which were supported by Antimadas (1986) and Senapati (1986) respectively. However, the research study of Pani
(1985) found very little effect of personality factors on achievement of students in CAM.


The Intelligence plays an important role in the achievement of science. It has been supported by the research studies of Budhisagar (1986), Gangrade (1987) and Rajoria (1987). However in the study of Gangrade (1987) besides intelligence, the second major factor which had effect on achievement of science was attitude towards science. The minor contribution was of achievement-value-anxiety and the previous year achievement in science. In the study of Rajoriya (1984) the comparison was made in the Rural and Urban students in respect of intelligence, attitude towards science teaching, achievement-value-anxiety and previous year achievement on science and it was found more favourable in rural students than urban students.

Research Studies Outside India:

After the study of the different research studies outside India classified under different categories which
have been conducted on Concept Attainment Model and Advance Organizer Model in teaching-learning-process, the researcher arrived at the following conclusions.

**Concept Attainment Model:**

Under this model, the researcher arrived at the following conclusions.

The research studies had been conducted outside India on Concept Attainment Model in the classes I to XII and at Graduate level in the subjects of Sociology, Biology, Mathematics, Educational Psychology, Science, Teacher Education, Course, Business Law, Humanities and Management, etc. These studies have been conducted on the boys as well as girls.

Marliave (1976), and Ponik (1986) found the insignificant effect of these strategies of Concept Attainment Model on the efficiency of learning performance of the subjects.

The selected factors like abilities, Span of attention rote memory, task, reasoning domain, deduction and spatial scanning and cooperative conditions showed effect on Concept attainment process and it had been supported by the studies of Lamke (1965), Billeh (1969), Kyle (1971), David (1973), Simpson (1975), Bachman (1979), and Ceballos (1986). However, Rattavina (1977) found that there was a greater importance of information processing at the adolescent level, than at the elementary grade level.

Effective meaning of body of knowledge and instructional feedback had been found more effective for facilitating performance of the learners in the research studies of Mascolo (1967), Carol (1968), and Overstreet (1970).

Carol (1968) and Lawrason (1972) found that there was significant relationship between cognitive behaviour/level and performance.

The significant interaction/participation effect had been found in the research studies of Carol (1968), David (1973), Loarn (1974), and Lee (1983) while Kyle (1971),
and Gilmore (1985) found insignificant interaction/participation effect in concept attainment process.

Kyle (1971) also found that the level of achievement-anxiety had effect on concept understanding, and Cason (1972) found that the violation of assumption resulted into slow learning.

Schaeffer (1971) and Peters (1973) found significant relationship between vocabulary/comprehension and concept attainment while Bordelon (1978) and Fulton (1981) found insignificant difference between comprehension and concept attainment; however, Bordelon (1978) found a significant relationship between reading comprehension and listening comprehension.

It had been found by Schutz (1969), Henkin (1977), Rottavina (1977), Huzum (1983) and Woodworth (1985) that the Concept Attainment Model was also responsive to the needs of the learning disabled/mentally retarded learners in problem solving situation and in attainment of several concepts in teaching-learning process.

Tamper (1969) and Clifford (1972) found that subjects with the high grade point average had effect on concept learning.
Advance Organizer Model:

As far as the Advance Organizer Model is concerned, the researcher arrived at the following conclusions.

The research studies had been conducted outside India on Advance Organizer Model in the classes of III to XII, undergraduate level and graduate level in the subjects of Social Studies, Physics, Mathematics, Industrial Course, and Psychology. These studies had been conducted both on boys and girls.


Borine (1982) and Mahajan (1983) found in their
research studies that there were significant differences between cognitive level and advance organizer.

The effect of advance organizer due to ability level had been found in the research studies of Hershman (1971), Saretzky (1975), Goodman (1977) and Livingston (1984).

The research studies of Brune (1982) and Change (1982) showed that advance organizer facilitated comprehension for learning by disabled students both in narrative and expository modes, while the research study of Steinbrink (1970) did not indicate significant effect of advance organizer on achievement of disabled learners.

The significant interaction/participation level had been found in the research studies of Caponechi (1973), Murchison (1975), Saretzky (1975), Mahajan (1983), but on the other hand Ethirveerasingam (1971), Mxt (1972), Felker (1973), Kather (1975), Goodman (1977), Kneen (1979), Makdooom (1983), and Dennis (1984) found insignificant interaction/participation level in conducting the advance organizer model in their research studies.
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ALIGARH
1989
CERTIFICATE

This is to certify that the accompanying dissertation entitled "A Survey of Research Studies in the Areas of Concept Attainment Model and Advance Organizer Model", submitted by Mr. Mujibul Hasan Siddiqui in partial fulfilment of M.Phil. (Education) Degree of Aligarh Muslim University, Aligarh, is his original contribution, he prepared this dissertation under my guidance and supervision.

I consider this dissertation fit for submission.

Professor Mohd Sharif Khan
(Supervisor)
Chairman, Dept. of Education,
"Teaching is an activity which is designed and performed for multiple objectives, in terms of changes in pupil behaviours. Pupils have multidimensional personalities having different learning styles. The common implication of both these facts is that the teachers should use different strategies of teaching matching the objectives of teaching and pupils' learning styles and personality dimension. The teacher education programmes in India, however, prepare the teachers for one or a few fixed ways of teaching such as Herbartian Method or so."

Models of Teaching
(Report of Three Phase Study of CAM & IT?)
ACKNOWLEDGEMENT

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(Mujibul Hasan Siddiqui)

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CHAPTER I

INTRODUCTION
1.0. Introduction

Teaching is often thought of as something that comes rather naturally to people who know their subject. In general, it is thought that it is a simple process that produces simple outcomes. But teaching is an intriguing, important and complex process. It takes place in a complicated social institution, which is filled with diverse people. It is a fluid interplay of events. One can not just know the subject and teach it, because the subjects themselves are ever changing. The physics of 1989 is not the physics of 1979. The art of today is not the art of 1930. It is true that teaching is a process by which teacher and students create a shared environment including sets of values and beliefs which in tern colour their view of reality. The social movements now shaping the world were not imagined by the best minds of a generation ago. The teacher must learn to control five processes of teaching; firstly, making and using knowledge, secondly, shaping the school, thirdly, teaching with strategy, fourthly, creating interpersonal climates and fifth and lastly controlling a teaching personality. Bruner also emphasized four major features of theory of instruction in effective
teaching i) predisposition toward learning, ii) structured body of knowledge, iii) sequences of material to be learnt; and iv) the nature and pacing of reward and punishment. It means that a theory of instruction in teaching is concerned with how what one wishes to teach can best be learnt, with improving rather than describing learning.

1.1 Research on Teaching

The amount and the direction of research on teaching styles demonstrate vigorous changes during the past decade. As with any developing field all stages of the movement are visible simultaneously, but there appears to be a clearly discernible pattern to the development.

Phase I - Validation of theoretically derived teaching construct:

In the first phase during the 1960s and early 1970s, a flurry of studies attempted the validation of theoretically derived teaching construct, usually dichotomous variables that carried on implicit, if not explicit, value preference. Several instrumentation break through (Medley & Mitzel 1958, Flanders 1960) allowed the dominative versus integrative
construct of Anderson (1939)\(^7\) and the teacher centered versus learner centered notion of Withall (1949)\(^8\) to be examined in classrooms. The research for the most effective teaching style was pursued with much excitement during this period.

Phase II - **Specific Behaviour of Pupils**:

The next phase focused on specific behaviours that are related to learning outcomes of pupils rather than on global teaching styles. This phase continues actively today as specific teacher variables are tested in various settings to determine their utility.

Phase III - **Research - Based Teaching Pattern**:

A third critical, but rather rudimentary, phase has just begun to emerge from the research base. The development of research derived teaching patterns or styles has started to occur, at least for children of a particular age in particular settings. Only a few patterns have been identified, but the ones that have emerged are firmly rooted in empirical research rather than derived from theory. Within this phase, there is an attempt to develop generic patterns or styles that have broad utility as well as the possibility of synthesizing specific patterns effective for particular
Children in specific settings.

The research on teacher effectiveness has been consistently set in the framework developed by Mitze (1960) and elaborated by Dunkin and Biddle (1974). Mitze sketched four categories of variables: presage, context, process and product.

Presage variables include all the knowledge, attitudes, values and personality characteristics that teachers and students bring to the classroom.

Context variables include, but are not limited to, building facilities, programme materials, classroom aids and psychological climate.

Process variables are the actual behaviours and interactions that occur in the day to day instructional activities of the school.

Finally, product variables are the measures of the pupil changes on a dimension of interest, such as academic achievement or self-esteem.

1.2 Methods Based Teaching:

Teaching methods inevitably constitute significant aspects of the human effort to educate. These are the patterns of teacher behaviour that
recurrent, applicable to various subject matters, characteristics of more than one teacher and relevant to learning and may be considered a subcategory of educational methods which also include instructional devices such as teaching machines, conventional and programmed textbooks, simulations, films and others such as inductive and deductive method, heuristic method, lecture method, discussion method, discovery method, problem-solving method and project method, etc. \(^{12}\)

The origin of methodology in education can be traced to the ideas of Rousseau, who himself was influenced by Locke and others. Earlier writers like Comenius, rebelled against the formal education of their day and suggested better principles of teaching but without any tangible results because of the turmoil of the times. In the eighteenth century, Rousseau provided some of the ideas for reforms in teaching which others developed and put into practice. The most important of these reformers was Pestalozzi, who accomplished his great work in Switzerland between 1800 and 1825. Pestalozzi attempted to reduce the educational process to an organized routine, based on the natural development of the child. Although not
original or very efficient his work marks the introduction of modern pedagogy and the beginning of the modern methods in elementary training. Pestalozzian ideas spread rapidly throughout Europe and the United States but had little practical influence upon methods of teaching in the secondary schools.

Frobel - Herbart and others succeeded, Pestalozzi. Herbart emphasized educational development from experience and from the environment, as contrasted with the Pestalozzi's emphasis on mental development from within and according to organic law.

Thus, although Herbart recognized the need for adopting instruction to fit the capacities of the child, his chief concern was with method and with the work of the teacher. Herbart undertook to show that education consisted in the building up of an "apperceptive mass" of ideas rather than in the development of the mental faculties.

By 1910, Herbartianism as a system of education was quite generally criticised. The emphasis upon the teacher and upon formal procedure, especially, was
opposed. Modern educational theory and practice have been grown largely out of the work of Pestalozzi, Frobel and Herbart. The new philosophy, however, is based upon a new psychology and upon modern scientific procedure. It emphasizes the pupil, at least in theory, it regards learning as an active process, it considers the interests of the pupils individually and collectively and it lays stress on education as being constant process of reorganizing and reconstructing experience.  

1.3.0 Models - Based - Teaching :  

There are varying instructional goals for different classes and different subjects. We can refer Bloom's taxonomy of educational objectives which are categorised into three domains. These are cognitive, affective and psychomotor. To achieve these educational objectives or goals, different teaching strategies must be practised by the teacher. Model-approach to teaching was proposed by a number of educationists and psychologists. Flander put his interaction analysis as a model of teaching and for this approach he categorised the statements of students and teachers into ten categories. Glaser developed his stripped
down model of teaching which after some modification is well known as basic teaching model. He divided instructional material in his model into four components. These are instructional objectives, the entering behaviour of the students, instructional procedure, and the performance and assessment.  

1.3.1. Definition of Model of Teaching:

From the dictionary meaning the model is a pattern of something to be made or reproduced and means of transferring a relationship or process from its actual setting to one in which it can be more conveniently studied. In the point of view of teaching, a model of teaching is a plan or pattern that can be used to shape curricula, to design instructional materials and to guide instruction in the classroom and other settings. The most important aim of any model of teaching is to improve the instructional effectiveness in an interactive atmosphere and to improve or shape the curriculum.

1.3.2. Families of Models of Teaching:

Joyce and Weil organised the alternative models of teaching into four families, these are information processing, personal, social, and behavioural. They
stress that the different instructional goals would be realised by putting these models of teaching into action.

1.3.2.1. **Information Processing Family of Models of Teaching:**

The models of teaching of this family are concerned with the organization, presentation verbal and non-verbal symbols in a way that helps in the formation of concept and solution problem and development of social relationship and integrated personality. Thus these models are concerned with the productive thinking and development of general intellectual ability. The important models of this family are as follows:

I. **Inductive Thinking Model of Hilda Taba**
   It proposes to process the information through inductive process.

II. **Scientific Inquiry Model of J. Schwab**
   It is designed to teach the method employed by the subject for solving scientific and social problems.

III. **Concept Attainment Model of J. Bruner**
   It proposes to develop concept inductive reasoning i.e. developing a concept after presenting its examples and non-examples.
IV. **Advance Organizer Model of David Ausubel**
   It proposes to increase the capacity of learner to absorb and relate bodies of knowledge.

V. **Cognitive Growth Model of Jean Piaget**
   It has been designed to increase general intellectual ability specially logical reasoning.

VI. **Memory Model of Henry Lorayne**
   It is designed to increase the capacity to memorise concepts, facts etc.

1.3.2.2. **Personal Family of Models of Teaching:**

   The models of this family are intended to develop the unique personality of the learner. These models pay more attention to the emotional life of the person and also focus on helping individual to develop a productive relationship with their environment. Some of the important models of this family are as follows:

1. **Non-Directive Teaching Model of Karl Rogers**
   It aims at the development of the personal self in self awareness, autonomy and self-concept.
ii. **Synectics Model of William Gorden**

It is designed to develop creativity and creative problem solving in the learner.

iii. **Classroom Meeting Model of William Glasser**

It aims at the development of a sense of responsibility and self-confidence in one's social group.

1.3.2.3. **Social Family of Models of Teaching**

The models of this family are concerned with the social relationship of the individual with others in the society. These models aim at the development of social relationship, democratic processes and work productivity in the society. This is not to say however that these models restrict themselves to the development of social relationship. They are also concerned with the development of mind and the learning of academic subjects. Some of the important models of this family are as follows:

1. **Group Investigation Model of Herbert Thelen and Jon Dewey**

   - It aims at the development of skills for participation in democratic social processes through interaction skills and inquiry skills.
11. **Role Playing Model of Shaftel and Shaftel**:

It aims at motivating students to inquire into different personal and social values.

111. **Social Simulation Model of Seren Boocock and Harold Guitzkno**:  

It is designed to help students to experience various social processes and to examine their own reaction to them and also to acquire concept and decision making skills.

1.3.2.4. **Behavioural Family of Models of Teaching**:

The main thrust of these models is modification of the visible or overt behaviour of the learner rather than the underlying psychological structure and unobservable behaviour. The main psychological bases of these models are stimulus control and reinforcement as put forward in B.F. Skinner's theory of operant conditioning and Bandura's theory of social learning. The common characteristic of these models is that they break down the learning task into series of small sequences of behaviour. Each behaviour is so designed that success is ensured; the learner actively responds to the situation to the problematic situation and gets reinforcement and feedback. Some of the important models of this family are as follows:
1. **Contingency Management Model of B.F. Skinner**:  
It proposes to teach facts, concepts, and skills.

2. **Self-Control Model of B.F. Skinner**:  
It is designed to develop social behaviour and social skills.

3. **Stress Reduction Model of Rimm & Masters**:  
It aims at reduction of stress and anxiety in social situation and their substitution by relaxation.

4. **Desensitization Model of Walpe**:  
It is designed to reduce anxiety through pairing deep muscles relaxation with imaginative scenes that the student had said cause him or her to feel tense.

The above mentioned models under different families of models of teaching aim at the development of different aspects of human personality that the social, personal, informational and behavioural. Since education is meant for all round development of child's personality, no single model can be selected for his or her development. All of them
will have to be employed according to the requirements of the situation, that is, if some information is to be given, models of the first family would be required; if creativity is to be developed in the child, synectic model would be needed; if objective is to eliminate anxiety and stress, Desensitization model of Wolpe would be needed, and if the objective is the development of the social skill then model like Group Investigation Model of Herbert Thelen would be required.

The Selection of model also can be dependant on curriculum requirement, for example a biology teacher may need the Inductive Model of Hilda Taba and Concept Attainment Model of Brunner and social studies teacher who proposes to teach about values would need Role Playing Model of Fannie Shaftel and George Shaftel, which motivates to inquire into personal and social values. Some situation would require an application of a combination of model, that is, in social studies class, the teacher may have Inductive Thinking Model to help children master-map-skills and Group Investigation Model for criticising social issues.

1.3.3. Components of Models of Teaching:

The model of teaching consists of the following components:
(I) **Syntax**:
It describes the phases of the model. Each model has different strategies.

(II) **Social System**:
It describes the students and teachers roles and relationships and the kind of norms that are encouraged.

(III) **Principles of Reaction**:
It explains the procedure in which the teacher deals with the reactions of the students.

(IV) **Support System**:
It deals with the use of other teaching aids, human skills and capacities and technical facilities.

(V) **Instructional and Nurturant Effect**:
It describes the direct and implicit results of instructions.

(VI) **Application**:
It deals with the further applicability of the model for different curriculum and classes.

1.4 **The Selection of Models for the Survey of Research Studies**:

The investigator selected two models of teaching for his research work. These are concept Attainment Model of Jerome S. Brunner and Advanced Organizer Model of David P. Ausubel, they belong to
the same family i.e. the Information Processing Family. The description of these two models have been discussed in Chapter II.

1.5 The Need of the Survey of the Research Studies:

The present study is based on the critical review of the research studies. The review of the related research studies is not only important for its independent study of critical analysis of the research studies or literature but it is also very important for the point of view of the experimental studies of research. Therefore, it is only possible to review research studies that researcher would have a survey for collecting research studies for its objectives, used tools, samples, and findings from the different sources, so that the researcher can put himself or herself in a position to analyse collected research studies on the basis of categorising them into different aspects at different level as the case may be.

1.6 Statement of the Study:

The present study precisely aims at:
"A Survey of the Research Studies in the Areas of Concept Attainment Model and Advance Organizer Model".

1.7 Assumptions of the Study:

i) Proper research in any area is possible if the researcher is able to identify the areas in which work has been done in the areas in which there is a gap of knowledge.

ii) It has been assumed that the research work related directly or indirectly with the problem of the researcher has been in India and abroad.

iii) The studies collected during the survey provide the general awareness of the effectiveness of teaching at different levels for different age group subjects.

iv) If the models of teaching are selected for comparison from the same family, then meaningful comparison can be made.

1.8 Objectives of the Study:

The objectives of the present study are:

i) To collect the research studies in the areas of concept Attainment Model and Advance Organizer Model.
ii) To review the collected research studies under the area of Concept Attainment Model of teaching.

iii) To review the collected research studies under the area of Advance Organizer Model of teaching.

iv) To know the general effectiveness of teaching realised through these two models of teaching.

1.9 Delimitation of the Study:

i) The models of teaching is a very wide area in teacher education. It has its four families. The study was limited to only first family of models of teaching that information processing family.

ii) The study was further limited to only two models of teaching; Concept Attainment Model and Advance Organizer Model taken from the same family of models of teaching.

1.10 Source of Data:

The following sources have been used in collecting research studies:

Unpublished Ph.D. theses, M.Phil. Dissertations;
Different Educational Journals, Research Journals;
International Dissertation Abstract, Survey Reports,
1.11 **Sample** - The sample of the present study consisted of 18 research studies in India and 100 research studies outside India made on concept Attainment Model and Advanced Organizer Model at M.Phil and Ph.D. level.

1.12 **Method of Study**:

A critical interpretative and evaluative study of the available research studies on the Concept Attainment Model and Advance Organizer Model has been made.

The researcher has classified the research studies made on Concept Attainment Model and Advance Organizer Model in India and outside India into the following nine categories:

1) **Psychological Concepts and Strategies of Learning Process.**
2) **Problem Solving and Reasoning : Correlating and Integrating Past Experience.**
3) **Appraising Scholastic Achievements.**
4) **Measuring Intelligence and Aptitudes.**
5) **Appraising Social Relationship.**
6) **Language and thought.**
vi) Facilitating Motor Skills.

vii) Children With Special Needs.

viii) Teaching For Discrimination, Generalization and the Use of Symbols.

1.13 Definition of Operational Terms:

The researcher has used term in his research with certain meaning. They have been given below:

Achievement - Accomplishment or proficiency of performance in a given skill or a body of knowledge.

Aquisition of Concept - Concept attainment or concept assimilation (as the case may be) determined by knowledge, transfer, heuristic transfer, short term retention and long term retention of concept.

Advance Organizer - Advance Organizer, an important content, may be a concept or statement of relationship, generally based on the major concepts, propositions, generalizations, principles, and laws of discipline.

Apptitude - Educational - A combination of characteristic and abilities which considered together, can be used as a basis for prediction of a certain level of achievement that can be
attained through further development.

Ausubel's Strategy - Ausubel's Advance Organizer Model with syntax.

Bruner's Strategy - Bruner's Concept Attainment Model with syntax.

Concept - A form of mental construct.

Concept Knowledge - Recognition of concept learnt.

Concept transfer - Application and extrapolation of concepts learnt in situations similar to those presented during teaching.

Differential Effectiveness - Relative effectiveness for different student characteristics.

Discrimination - An ability to see slight difference between stimuli or objects.

Evaluation - Qualitative assessment by means of statistical significance.

Generalization - Tendency for a response, which was not learnt by direct association with a particular stimulus to accompany that stimulus. Educational technology term for
arranging and designing learning resources to ensure that behavioural changes occurring at the point of instruction are sustained at other appropriate times and places.

Heuristic Transfer - Application, analysis and synthesis of the concept learnt to discover new relationship in situations different from those presented during teaching.

Intelligence - The ability to make effective use of abstract concepts and symbols in thinking and in dealing with new situations.

Integration of Experiences - Learning experiences which are so related that they tend to unify knowledge.

Learning Experiences - A purposeful activity that has meaning to students at their development level, carried through to completion and evaluated.

Motor-Skills - Skills connected with the motor activity of muscles.
Previous Knowledge - Knowledge of related concepts acquired in previous two grades and expected to have been retained.

Reasoning - The development the meaning content of ideas through operating with symbols constituting propositions so that the propositions stands in serial order constituting argument or disclosure.

Scholastic Achievement - Knowledge attained or skills developed in the school subject usually designated by test scores or by marks assigned by teachers or by both.

Strategies of Learning - Patterns of behaviour, described in activity sequence.

As it is quite natural that teaching is not a simple process. It is a complex process. The models of teaching is a wide area. The researcher selected only two models of teaching for the survey of their research studies. This study, however, has no claims to cover all the research studies based on concept Attainment Model and Advance Organizer Model of teaching in India and in abroad. Even at its best, is only humble effort on the part of the author, at introducing to research workers
in Education in the Indian Universities, a field of study which holds great promises of research and investigation. It could provide some insight and stimulus to somebody (including the author himself, who is intending to do a full-fledged research work on this subject) to take this study further and delve deeper into the different questions posed by this work.
REFERENCES


22. Ibid.
23. Ibid.

24. Ibid.


CHAPTER II

SELECTION AND DESCRIPTION OF THE MODELS
FOR THE SURVEY OF RESEARCH STUDIES
2.1 **Selection of the Models**:

The investigator selected two models from the information processing family of models of teaching for the survey of research studies made on these two models which are as follows:

1) **Concept Attainment Model**

2) **Advance Organizer Model**

2.2.1 **Description of Concept Attainment Model**:

Concept Attainment Model of teaching has been presented by Bruner, Goodnow and Austin. This model has been developed from the 'Study of thinking'. The concept attainment strategy, as model of teaching, is concerned with two separate but related ideas: the nature of concepts themselves and the thinking processes used by individual to learn concepts.

2.2.2 **Nature of Concepts**:

Concepts are the key building blocks for the structure of knowledge of the various academic disciplines. The theoretical significance of cognitive concept in psychological theory parallels the seminal role of valence in Chemistry and give in biology or energy in Physics. Concepts are the distillate of
sensory experiences and the vital link between external inputs and overt behaviours. They are vehicles of thought. They are the critical components of an individual's cognitive structure.

According to Tennyson and Park, a concept is assumed to be a set of specific objects, symbols or events which share common characteristics (critical attributes) and can be referenced by a particular name or symbol. Concept learning is thus regarded as the identification of concept attributes which can be generalized to newly encountered examples and discriminate examples from non-examples. Concepts can be thought of as information about objects, events, and process that allows us to:

a) differentiate various things or classes
b) know relationship between objects, and
c) Generate ideas about events, things and processes.

Bruner analyses any concepts as having five elements:

i) Name - It is the term given to the category.
ii) Examples - They refer to instances of the concept.

There are some positive and negative examples. Positive examples are the instances of the concept.
iii) Attributes - These refer to the characteristics of a particular concept that help distinguish instances of the concept from non-instances. These characteristics or attributes, may be relevant, irrelevant, or criterion-related. Relevant attributes are common to all examples of concept which irrelevant attributes vary among examples of the concept. They are associated with certain examples of a concept but not with other examples of the same concept.

iv) Attribute Value - It refers to the acceptable range for any given relevant attribute. Criterion-related attributes are those relevant attributes that distinguish the concept from other superordinate or coordinate concepts.

v) The Rule - It is the definition or statement specifying the special attributes to a concept. To be most facilitative for concept attainment, concept definitions should contain references to both the relevant and criterion-related attributes of the concept.
2.2.3. **Thinking Strategies of Concept Attainment**

The elements of a concept, particularly its attributes and examples play important roles in students' thought process directed to concept attainment. Brunner, Goodnow and Austin identified regularities in students' decision-making processes that they labeled thinking strategies. Their research has implications for developing concept attainment teaching strategies, for understanding students' responses during concept attainment activities and for facilitating the most optimal thinking strategies.

2.2.4 **Factors Affecting In Selection of Strategies**

In their work on concept attainment, Bruner and his associates uncovered six distinct thinking strategies used to attain concepts and five sets of factors that affect selection of these strategies. The five factors that affect concept attainment behaviour are as follows:

1) **Definition of Task**

The prior set of the learner, that is whether the learner is seeking to learn a concept or just a collection of isolated facts, the learner's expectancies
about the concept, the subject's definition of what constitutes success in learning the concept, the learner's familiarity with and predilection for the relevant attributes of the concept, and the depth of understanding of the concept sought by the learner.

ii) Nature of the Instances Encountered:

The number and kinds of attributes of examples and nonexamples; the order and frequency of presentation of examples and nonexamples, the amount of information needed to ensure concept attainment and the subject's ability to control the order of and timing of examples and nonexamples.

iii) Nature of Validation:

The sources, frequency, immediacy, ambiguity, and directness or indirectness of validation.

iv) Anticipated Consequences of Categorizing:

The likelihood of anticipated consequences and the expected values of these consequences.

v) Nature of Imposed Restrictions:

The restrictions imposed on selection of strategies by the conditions under which the subject must work.
2.2.5 Division of Strategies:

The six concept attainment strategies are divided into selection and reception strategies based upon learning conditions.

2.2.5.1 Selection Strategies:

Selection strategies are used when the learner is free to choose concept instances (examples and nonexamples) in order to test hypotheses about concepts. In terms of instruction, this means that with these strategies the teacher presents unlabeled examples of the concept and the students inquire as to which of the presentations are examples and nonexamples and attempt to construct positive examples on their own.

2.2.5.2 Reception Strategies:

With these strategies, the learner's major area of freedom is in the hypotheses he chooses to adopt, not in the manner in which he can choose instances to test. The teacher presents examples of the concept that are labeled yes or no. Reception strategies are most often required for concept attainment — both within the classroom and in every day learning opportunities.
The concept attainment model developed by Bruner and his associates have three variations. These three models have the same conceptional base but each has slightly different set of activities. These three different models are:

i) Reception Model.
ii) Selection Model.
iii) Organized material Model.

In the present study the researcher has chosen the Reception Model Concept Attainment Model and thus the description of only Reception Oriented Model is given here.

2.2.6. Reception Model of Concept Attainment:

This model mainly focuses on the clarification of the events and activities. Clarification is mainly done by classifying the special attributes of the concept.

2.2.6.1 Syntax: Syntax of the model describes the main steps of teaching through the model. The three phases have been given for the development of the model.

Phase I: Presentation of Data and Identification of Attributes:

The teacher presents labelled 'yes' and 'no'
examples arranged from simple to more difficult. Students compare the attributes of example and non example in order to identify the common attributes of 'yes' example. They then state the rule according to the essential attributes. Thus in hypothesis a concept is formulated. This hypothesis a concept is formulated. This hypothesis is tested at phase II.

**Phase II : Testing Attainment of The Concept :**

The students are presented unlabelled examples and are asked to identify those examples that are the correct examples of the concept. The students are also required to generate their own example and thereby confirm or reject their hypothesis about the concept.

**Phase III : Analysis of Thinking Strategy :**

The students discuss their hypothesis among themselves and analyse the problem through which they attain the concept and their thinking process are analysed and discussed.

2.2.6.2 **Social System :**

Prior to teaching with this model, the teacher chooses the concept, selects and organizes the material into positive and negative examples and sequences the
the examples. In most cases teachers will have to prepare examples, extracting ideas and materials from texts and other sources, but designing them in such a way that the attributes are clear and that there are both positive and negative examples of the concept. The three major functions of the teacher during this model are to record, prompt (cue) and present additional data.

2.2.6.3. Principles of Reaction:

During the teaching learning process teacher supports the hypothesis formulated by the students. He or she helps the students to balance one hypothesis against another. There is a focus of specific feature of each example. Students discuss and evaluate their thinking strategies with proper assistance of the teacher.

2.2.6.4 Support System:

Concept attainment lessons require material that has been designed so that concepts are embedded in the material, with positive and negative exemplars that can be pointed out to the students. The student's job in concept attainment strategy is not to invent new concepts, but to attain the ones that have previously
been selected by the teacher. Hence, the data sources need to be known beforehand and the aspect of concept attainment activity made visible. When students are presented with an example, they describe its characteristics (attributes), which can then be recorded in a column on a blackboard or tagboard.

2.2.6.5 Application of the Model:

1. This model is applicable to all ages and grade levels.
2. The use of model shapes the particular learning activity.
3. The model can be used as a tool of evaluation of important ideas introduced earlier.
4. This is also used for opening a new conceptual area by initiating a sequence of individual or group inquiries.

2.2.6.6 Instructional and Nurturant Effect:

Concept Attainment model has been designed to enrich the students on specific concepts and by the nature of concepts. They also provide practice in inductive reasoning and opportunities for altering and improving students' concept-building strategies.
Specially with abstract concept, the model also nurtures an awareness of alternative perspectives, a sensitivity to logical reasoning in communication and a tolerance of ambiguity.

2.3 Advance Organizer Model:

An important resource in the classroom is written material. A perennial concern of educators is the preparation and use of materials that are organized in such a way as to maximize learning. David P. Ausubel, in his theory of meaningful verbal learning advocates the use of advance organizers to facilitate the learning of written materials.

2.3.1 Meaningful Verbal Learning:

David Ausubel is one of the few educational psychologists to address himself simultaneously to learning, teaching and curriculum. His theory of meaningful verbal learning deals with three concerns:

(a) how the mind works to process new information? (learning), and

(b) how teachers can apply these ideas about curriculum and learning when they present new material to students? (instruction), and

(c) how knowledge is organized? (Curriculum Content).
Logical meaningfulness is a property of the material to be learnt and is not sufficient to guarantee that it will be meaningful to the learner. In order, for it, to be meaningful to the learner, two additional conditions must be met.

In the first place the fact that the material is logically meaningful means only that it could be related to ideas that lie within the realm of human learning capability. In order for the material to be understandable by a particular individual, that individual must himself possess these necessary relevant items. If a particular learner does possess ideas in his cognitive structure to which the new learning material can be related in a substantive and non-arbitrary fashion, then we say that the material is potentially meaningful to him, or that it possesses potential meaningfulness.

The material possesses potential meaningfulness at this point because the learner could make it meaningful if he wanted to ie. the material itself can be related to some hypothetical cognitive structure and the particular individual possesses the necessary ideas to which to relate this material. All that is
lacking at this point is the intent of the learner to do so. If this intent is present or, in other words, if the learner has a meaningful learning set that is if he has the intent to relate this material in a nonarbitrary and substantive fashion to relevant items in his cognitive structure) then meaningful learning results.

2.3.2 **Advance Organizer**: 

The derivative of the theory of meaningful verbal learning is the Advance Organizer Model of teaching. According to Ausubel's theory of meaningful verbal learning, advance organizers are introduced in advance of new learning tasks and are formulated so that they take into account ideas and concepts already existing in the cognitive structure of the learner. They are presented at higher levels of abstractness, generality and inclusiveness than the material to be learnt, and they serve to provide specifically relevant anchoring ideas for the more differentiated and detailed material that is subsequently presented. Mayer maintains that advance organizers generally have **five characteristics** which are as follows
i. Short set of verbal or visual information,

ii. Presented prior to learning a larger body of to-be-learnt information,

iii. Containing no specific content from the to be-learnt information,

iv. Providing a means of generating logical relationships among elements in the to be-learnt information, and

v. Influencing the learner's encoding process.9

Besides Advance Organizer in general terms, Ausubel noted that one can not provide more detailed information without specific knowledge of the characteristics of both the learner and the material to be learnt.10 Ausubel (1977),11 Barner and Clawson (1975),12 Hartley and Davies (1976)13 and Mayer (1978)14 revealed that advance organizers have secondary functions in addition to providing ideational scaffolding or a meaningful context for new learning material. According to those authors an advance organizer provides an overview of the more detailed information to follow and may influence the learning set by increasing student motivation and/ or encouraging use of active encoding strategies on the part of the learner.

2.3.3 Types of Advance Organizer:

Ausubel labeled two types of advance organizers
depending on the learner's degree of familiarity with the material which is as follows:

a) **Expository Advance Organizers**:

They provide a general model of class relationship as a general subsumer for a new class, subclass, and species before more limited subsumer are provided for the particular subclass or species. These are used when the material to be learnt is complete.

b) **Comparative Advance Organizers**:

They are used most with relatively familiar material. They are designed to integrate new concepts with basically similar concepts existing the cognitive structure, yet they are also designed to discriminate between the old and new concepts in order to prevent confusion caused by their similarity.

It is important to point out that advance organizers are only part of Ausubel's theory of meaningful verbal learning. For Ausubel cognitive structure is the most important variable influencing learning, therefore, learning can be facilitated by manipulating concepts and ideas within the learner's
cognitive structure. Meaningful verbal learning is basically a subsumptive process whereby new and more highly differentiated learning material becomes assimilated into previously learnt superordinate ideas/concepts. Within this framework, it can be seen that the advance organizers are designed to manipulate the overall cognitive structure of the learner by creating a new part of cognitive structure\(^\text{16}\) that bridges the new learning material the larger, already existing in cognitive structure (assimilative context).

2.3.4 Illustration of Advance Organizer:

In the structure of a discipline is organized in hierarchical order. At the top of each discipline, there is a broad abstract concept. The more concrete concepts included in the broad concept are at a lower level of hierarchy. Here, the structure of a discipline of economics will be as follows:
2.2.5 Description of the Model:

The Advance Organizer Model of teaching is described into different steps which are as follows:

2.3.5.1 Syntax:

The Advance Organizer Model of teaching consists of three phases:

Phase I: Presentation of Advance Organizer:

During this phase, first of all the objectives are explained and clarified and after which the advance organizer is presented.

Phase II: Presentation of Learning Task or Material

At this stage, the learning material is presented. This is presented through lectures, films, scripts, discussion, experiences, extra reading material etc. The learning is organized in logical order. Attempts are made to maintain motivation and interest.

Phase III: Strengthening Cognitive Organization:

At this stage, the cognitive material is strengthened. The purpose of this stage is to anchor
new material with old. That is, integrative reconciliation is brought about. This is brought about by asking the students to prepare the summary of major attributes of new material, repeat definitions, and ask students to differentiate the closely related subject.

2.3.5.2 Social System:

In this model, the teacher retains control of the intellectual structure, as it is necessary continually to relate the learning material to the organizers and to help students differentiate new material from previously learnt material. In phase, three, however, the learning situation is ideally much more interactive, with students initiating many questions and comments.

2.3.5.3 Principles of Reaction:

The teacher's solicited or unsolicited responses to the learner's reactions are to be guided for the purpose of clarifying the meaning of the new learning material, differentiating it from and reconciling it with existing knowledge, making it personally relevant to the student, and helping to promote a critical approach to knowledge.
2.3.5.4 **Support System:**

Well-organized material is the critical support requirement of this model. The effectiveness of the advance organizer depends on an integral and appropriate relationship between the conceptual organizer and the content.

2.3.5.5 **Application:**

i) The Advance Organizer Model is specially useful to structure extended curriculum sequences or courses and to instruct students systematically in the key ideas of a field.

ii) It increases the learner's grasp of factual information linked to and explained by the key ideas.

iii) The model can also be shaped to teach the skills of effective reception learning.

iv) Whenever ideas or information needs to be presented, renewed, or clarified, the advance organizer is useful model.

v) Other models are also useful as means of evaluating or applying the material presented by the advance organizer. For example - the Advance-Organizer Model,
after introducing new material in a deductive, presentational way can be followed by inductive concept attainment activities that reinforce the material or that informally evaluative students' acquisition of the material.

vi) The activities designed to strengthen cognitive organization can be spontaneously applied to the clarification of ideas in whatever instructional context they appear, as can the technique of an organizer.

2.3.5.6 Instructional And Nurturant Effects:

The instructional effects of this model are conceptual structures, meaningful assimilation of information and ideas. The model nurturs an interest in a inquiry and precise habits of thinking.
REFERENCES


CHAPTER III

RESEARCH STUDIES IN CONCEPT ATTAINMENT

MODEL AND ADVANCE ORGANIZER MODEL IN INDIA
3.0 Models of teaching is a new area introduced in India. It is under experiment to know the effectiveness of its different models at various levels of teaching. There were few research studies which have been experimented in this field at M.Phil and Ph.D. levels in India, as well as at the national level.

These research studies made on concept Attainment Model and Advance Organizer Model of Teaching have been classified under the following different categories.

3.1 Category No. 1

**Psychological Concepts And Strategies of Learning Process:**

Under this category the following research studies have been made on CAM and AOM.

3.1.1. Concept Attainment Model of Teaching

The following research studies have been made on CAM.

- Pandey (1981) evolved teaching styles on the basis of verbal interaction taking place in the classroom;
determined the effect of teaching style on science concept attainment at various levels; to identify the teaching behaviours commonly exhibited by science teachers and determined the effect of individual teaching behaviour on concept attainment at various levels. The sample comprised 24-postgraduate trained male science teachers having at least five years of teaching experience in secondary and higher secondary schools and 300 secondary schools students studying in class XI from five schools of Varanasi. Concept Attainment test and Instrument for analysing verbal teaching behaviour developed by investigator, Group Test of General Mental Ability (Joshi), Calculation of percentages, Different Interaction Analysis Ratios, Analysis of Variance and t-test were used. He found that all teaching behaviours were not frequently observed in the science teachers. Extended lecturing was negatively related with different levels of concept attainment and the segment of formal level, excepting for segment of problems and definitions with which it was positively correlated. The teacher's questioning had significant positive effect on both the levels, classificatory and formal of concept attainment. Teaching styles had varying affects
on both the levels of concept attainment as well as total concept attainment. Empathic and democratic teaching styles were on par as regards their effect on concept attainment even though the empathic style was slightly superior to the democratic style. Oratorial and traditional styles were inferior to empathic and democratic teaching styles. Giving background information encouraging students — participation and student response and giving ample opportunity for students to think in the course of teaching behaviours were conducive to better concept learning.

Pani (1988) compared concept attainment scores (CAS) of groups through Reception and Selection Strategies of concept attainment; and studied the effect of personality factors A, B, C, D, E, F, G, H, I, J, O, Q_1, Q_2, Q_3 and Q_4 on concept attainment scores of two groups. The sample consisted of 30 students of Class VIII in Gramin Jiwan Jayoti School at Rao. Concept Attainment test and Jr and Sr. High School Personality Questionaire, Mann-Whitney U-Test were utilized. He found that the reception strategy and selection strategy were equally effective in terms of attainment of science concept.
Passi, Singh & Sansanwal (1985) studied the effectiveness of training in concept attainment Model in terms of understanding of, and reaction towards to model; the effectiveness of training in Inquiry Training Model in terms of understanding and reaction towards the model; the resultant willingness of teacher educators to implement the models in teacher education programme. They also developed and finalised the measurement tools namely, theory check up and reaction scale separately for Concept Attainment Model and Inquiry Training Model and a Scale measuring Willingness to implement the models; and developed a strategy of training in Models of Teaching. They used Theory check up for Concept Attainment Model (Bruce Joyce); Indore Theory Check up for the Concept Attainment Model, Reaction Scale, On Concept Attainment Model Theory check up for the Inquiry Training Model (Bruce Joyce), Indore theory check up for Inquiry Training Model, Reaction Scale on Inquiry Training Model, Willingness Scale for Implementation of Models. Mean, SD, Frequency Distribution, Coefficient of Variation, Rank Correlation t-test, coefficient of correlation, Percentage and Chi-squam test were utilised to analyse the data. They found that training is concept Attainment Model in the form of lecture,
demonstration, discussion, and peer practice feedback did enhance the understanding of teacher educator's theoretical aspect of CAM; the training in CAM did bring significant favourable change in teacher educators' reactions towards CAM. The level of understanding of CAM did not influence teacher educator's reactions towards CAM; Training in Inquiry Training Model in the form of lecture, demonstration, discussion and peer practice feedback did change the understanding of teacher educators' theoretical aspects of ITM; Training in ITM did bring favourable reactions of teacher educators towards ITM. The understanding of ITM did not influence teacher educators' reactions towards ITM. The teacher educators were willing to implement models of teaching in teacher education programme if the support system is available. The training strategy comprising of theoretical discussion, demonstration, and peer practice feedback in quadro was in effective terms of developing understanding favourable reactions, and willingness to implement models of teaching in teacher training programme.

Antimadas (1986) developed the model competency of pre-service teacher trainees by adopting CAM with three different training strategies. He studied the
effectiveness of three different training strategies for CAM in terms of model competency of pre-service teacher trainies; the effectiveness of three different training strategies in terms of model competency acquired by pre-service teacher trainies; the effectiveness of three different training strategies in terms of model competency acquired by pre-service teacher trainies at the end of coaching stage; the effects of personality factors A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃ and Q₄ separately on model competency acquired by three training strategies in CAM at the end of training stage; the effect personality factors A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃ and Q₄ separately on model competency acquired by three training strategies in concept attainment model at the end of coaching and the effect of interaction between types of training strategies and personality factors A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃ and Q₄ separately on model competency acquired through three training strategies in concept attainment model at the training as well as at the coaching stage. The sample consisted of 55 B.Ed. students of Education Department of Devi Ahilya Vishwavidalaya, Indore 16 P.F. Cattell, Teaching Analysis Guide (TAG) by Bruice Joyce; Factorial Analysis of Variance with unequal Cell Size and one way
Analysis of variance were utilized. He found that the three different training strategies were equally effective in terms of model competency of teacher-trainees at the end of training and coaching stage. The personality factors A B C E F G H I L M N O Q₁ Q₂ Q₃ and Q₄ did not influence the model competency of teacher-trainees at the end of coaching stage, the personality factor influences significantly the model competency of teacher trainies at the end of coaching stage. There was no significant affect of interaction between treatment and Personality factors A B C E F G H I L M N O Q₁ Q₂ Q₃ and Q₄ separately on model competency of teacher trainies at the end of training and coaching stage.

Bihari (1986) studied the effectiveness of three training strategies in learning CAM in terms of teaching competency of student-teachers; in terms of understanding of the model; in terms of coaching through the model; in terms of reaction towards the model and in terms of willingness to implement the model. The sample consisted of 55 student-teachers studying in B.Ed. 'B' section of the Department of Education, D.A.V. Indore. Theory check up by Bruce Joyce and Modified Theory check up (Indore), Teaching Analysis Guide (TAG), Reaction Scale, Willingness
Scale, Analysis of variance, Analysis of covariance and t-test were utilised. The researcher found that the three training strategies namely peer feedback and practice in quardo, peer feedback, and practice in pairs and demonstration followed by practice in quardo were equally effective for developing teaching competence.

3.1.2. Advance Organizer Model of Teaching:

The following research study has been made on A.O.M.

Satapathy (1987), compared the relative effectiveness of Wholist (SMT₁), partist (MMT₁) and partist-first demonstration (MMT₁) approaches in terms of theoretical understanding of the model, competency in model, reaction towards the model and willingness for implementation of the model by taking abstract reasoning as covariate, the change in competency in the model from simulated condition to real condition of student—teachers trained through wholist approach partist approach and partist-first demonstration approach separately; the change in reaction towards the model from simulated condition to real condition of student—teachers trained through wholist approach, partist approach and partist first demonstration approach
Separately; the change in willingness for implementation of model from simulated condition to real condition of student-teachers trained through,wholist approach, partist approach and partist-first demonstration approach separately, and the competency in the model attained by student-teachers trained through different training approaches by taking theoretical understanding of covariate. The sample comprised of 36 B.Ed. student-teachers studying in the Department of Education, D.A.V. Indore. Abstract Reasoning Test (ART), Indore Theory check-up (ITC), Teaching Analysis Guide (TAG), General Reaction Scale (RS) Willingness Scale for Implementation WS), Correlated t-test, and Analysis of Covariance were utilised. He found that (1) the partist and partist first demonstration approaches were significantly more effective than wholist approach in terms of theoretical understanding of the model when abstract reasoning was taken as covariate whereas partist approach and partist-first demonstration approach were equally effective in terms of theoretical understanding of the model when abstract reasoning was considered as covariate. (2) The wholist, partist and partist-first demonstration approaches were equally effective in terms of competency in model of student-teachers both in simulated and real conditions when abstract reasoning was considered as covariate.
(3) The wholist, partist, and partist-first demonstration approaches were equally effective in terms of reaction towards the model as expressed by student-teachers in simulated condition when abstract reasoning was considered as covariate. The wholist and partist approaches were equally effective in terms of reaction towards the model while the partist-first demonstration approach was significantly more effective than both wholist and partist approaches in terms of reaction towards the model in real condition when abstract reasoning was considered as covariate. (4) The wholist approach was significantly effective than partist approach in terms of willingness for implementation of the model while the wholist and partist-first demonstration approaches were equally effective in terms of willingness for implementation of the model. But the partist-first demonstration approach was significantly effective than partist approach in terms of willingness for implementation of the model when abstract reasoning was taken as covariate. (5) The wholist, partist and partist first demonstration approaches were equally effective in terms of willingness for implementation of model in real condition when abstract reasoning was taken as covariate. (6) There was a significant positive change in competency in
model of student-teachers trained through wholist-approach and those trained through partist-first demonstration approach while there was no significant change in competency in the model of student-teachers trained through partist approach from simulated condition to real condition. (7) There was no significant change in reaction towards the model of student-teachers trained through wholist approach partist approach and partist-first demonstration approach from simulated to real conditions. (8) The practice conditions significantly influenced on the willingness for implementation of model as expressed by student-teachers. The practice in real conditions influenced willingness for implementation higher than the practice in simulated conditions. (9) The wholist approach and partist approach and the wholist approach and partist-first demonstration approach were to be equally effective in terms of willingness for implementation of model while the partist first demonstration approach was significantly more effective than partist approach in terms of willingness for implementation of model of student-teachers. (10) The interaction between practice condition and training approach significantly influenced on the willingness for implementation of model of student teachers. Partist-first demonstration approach was the
best approach of training in simulated and real condition as compared to wholist and partist approaches in terms of willingness for implementation of model. In real condition; both wholist and partist approaches produced same impact on willingness for implementation of the model. (11) There was a positive significant change in willingness for implementation of model of student-teachers from simulated to real conditions trained through wholist approach while there was no significant change in willingness for implementation of model of student-teachers trained through partist-first demonstration approach from simulated condition to real conditions. (12) The wholist, partist, and partist-first demonstration approaches were equally effective in terms of competency in model of student-teachers both in simulated and real conditions when theoretical understanding was considered as covariate.

3.2 Category No. 2:

Problem Solving and Reasoning: Correlating And Integrating Past Experience:

Under this category the following research study has been made on Concept Attainment Model of teaching.
Passi, Singh and Sansanwal (1986) compared the understanding of student teachers belonging to standard Model Treatment Group (E₁), group having variation in PPF (E₂), group doing PPF in Pairs (E₃); the competency in the beginning of PPF of student-teachers belonging to E₁, E₂ and E₃ groups; the competency at the end of PPF of student teachers belonging to E₁ E₂ and E₃ groups; the reactions towards Concept Attainment Model of student-teachers (as trainee learner) belonging to E₁ E₂ and E₃ groups; understanding of students teachers belonging to standard Model Treatment Group (E₁) with the group having variation in PPF (E₂); the competency in the beginning of PPF of student teachers belonging to E₁ and E₂ groups; the competency at the end of PPF of student teachers belonging to E₁ and E₂ groups and the reactions towards Inquiry Training Model of student teachers (as trainee-learner) belonging to E₁ and E₂ groups. 321 student-teachers for CAM and 72 for ITM constituted the sample. Theory check up (Bruice), Theory check up (Indore); Reaction Scale for CAM (RS₁ for Trainee learner). Teaching Analysis Guide (TAG) and Pre-test-posttest parallel group design were utilized. They found that (i) Mean
achievement scores on Theory check up (Indore) of E_1, E_2 and E_3 groups differed significantly when scores on Theory check up (Brui) were used as covariate student teachers belonging to E_2 groups had significantly higher understanding of theoretical aspect of CAM as compared to student-teachers of E_1 and E_3 groups. E_1 and E_3 groups understood the theoretical aspects of CAM to the same extent. (ii) Mean TAG scores of E_1, E_2 and E_3 groups differed significantly by adjusting Theory Check up (Indore) scores as covariate. The student teachers of E_2 group attained significantly higher competency in the beginning of PPF. It is important to note that same group had significantly higher level of understanding of theoretical aspects of CAM. E_1 and E_3 groups had equal level of understanding of the theoretical aspect for CAM. In decreasing order of competency, the groups are E_2, E_1 and E_3. (iii) Groups had differential competency at the end of PPF. Mean competency score of E_2 group was significantly higher than that of E_1 and E_3 groups, so student teachers of E_2 group attained higher competency at the end of PPF in comparison to E_1 and E_2 groups. E_1 and E_3 groups attained competency to the same extent at the end of PPF. E_1 group attained higher competency as compared to E_3 group in the beginning of PPF. (iv) E_1, E_2 and E_3
groups had differential reactions at the end of theoretical presentations and in the beginning of PPF. Mean reaction score of E₁ group is significantly lower than that of E₁ and E₂ groups. The reaction of all the three groups were favourable as evident from the mean reaction scores. Reactions of E₁ and E₂ groups were same. (v) The mean achievement scores of E₁ and E₂ groups did not differ significantly.
(vi) Student-teachers of E₁ and E₂ groups attained competency in ITM to the same degree after viewing demonstrations and having understood the theory.
(vii) The mean adjusted competency scores of E₁ group was significantly higher than that of E₂ group. The treatment given to E₁ group was superior to the treatment given to E₂ group in terms of competency attained at the end of PPF. (viii) The mean scores of reaction towards ITM E₁ and E₂ groups did not differ significantly. Student-teachers of both E₁ and E₂ groups had equally favourable reactions towards ITM.

3.3 Category No. 3:

Appraising Scholastic Achievements

Under this category the following research studies have been made on CAM and ADM.
3.3.1. **Concept Attainment Model:**

The following research studies have been made on CAM.

Chitriv (1983) assertained comparative effectiveness of Ausubel strategy with traditional strategy on the various criteria of concept acquisition in mathematics; comparative effectiveness of Bruner strategy with traditional strategy on the various criteria of concept acquisition in mathematics; relative effectiveness of Ausubel And Bruner Strategies on the various criteria of Concept acquisition in mathematics. Sample consisted of 127 eleventh grade students of science stream. Raven's standard Progressive Matrices, cognitive Style Test, previous knowledge test, concept knowledge test, concept transfer test, Heuristic Transfer Test, Concept Retention Test I, Concept Retention Test II, Observer's Rating Scale, Observer Raters, Pre-and post testing and Analysis of Covariance were utilized. He concluded that Ausubel's strategy was superior to traditional strategy for teaching mathematical concept to eleventh grade students, so far as knowledge, transfer and heuristic transfer of the concepts were concerned; Bruner's strategy was superior to traditional strategy for teaching mathematical concepts eleventh grade students, so far as knowledge,
heuristic transfer, short term retention and long term retention of the concepts were concerned. The strategies of Ausubel and Bruner were equally effective for teaching mathematical concepts to eleventh grade students, so far as students' ability to acquire knowledge of the concepts was concerned; Ausubel's strategy was superior to Bruner's strategy for teaching mathematical concepts to eleventh grade students, so far as enhancing concept transfer was concerned; Bruner's strategy was superior to Ausubel's strategy for teaching mathematical concepts to eleventh grade students, so far as students' abilities to transfer heuristics were concerned; conceptual style preference of the students seemed to have differential effect on their acquisition of mathematical concept, when taught by Ausubel strategy. This strategy appeared to be more suitable for teaching mathematical concepts to categorical style students of eleventh grade, conceptual style preferences of the students did not seem to have differential effect on their acquisition of mathematical concepts, when taught by Bruner strategy. This strategy appeared to be suitable for teaching mathematical concepts to eleventh grade students of all conceptual style preferences.
Das (1986) studied the effectiveness of CAM in terms of teaching competencies of preservice student-teachers; the effectiveness of CAM in terms of understanding the model; the effectiveness of CAM in terms of training the model, the effectiveness of CAM in terms of reaction towards the model at various stage of training; the effectiveness of CAM in terms of coaching the model, and the effectiveness of CAM in relation to previous achievement. Sample consisted of 16 students teachers studying in B.Ed. 'B' section of the Department of Education, DAV, Indore. T.C. Bruice, MTC Indore, Reaction Scale, TAG by Bruice Joyce. He found that CAM is effective in developing the teaching competencies of pre-service student-teachers. Training given to student teachers in theoretical aspects of CAM. Training in CAM had affected the teaching behaviour of student-teachers of the coaching stage. There was a significant relation of the student teachers towards the CAM at post theory demonstration and post practice stage. There was effective transfer of training and CAM had affected the teaching behaviour of student teachers of coaching stage. There was no significant relationship between previous academic achievement of student teachers and their performance on CAM theory and coaching stage but it seemed that previous academic achievement was
related with training of CAM.

Sharma (1986) studied the effectiveness of CAM in terms of achievement of students on attainment test based on the concepts taught in Chemistry, and the effectiveness of CAM in terms of reactions of students towards the new method of teaching. Sample consisted of 67 students of class IX from Kamla Nehru Girls Higher Secondary School, Indore. Achievement test for Chemistry concepts, Reaction Scale, Chi-square test and t-test were utilized. He found that the mean performance of the experimental and control groups on achievement test is not significantly different from each other. Students of experimental group have responded favourably towards majority of the statements.

Gangrade (1987) compared the achievement of science of class VIII students taught through combination of CAM and Lecture Method (LM) with those taught through Traditional Method (TM) by taking separately intelligence, attitude towards science and previous year achievement in science as covariates; the achievement of science of class VIII students taught through combination of CAM and LM with those taught through TM by taking separately intelligence, attitude towards science and previous year achievement in science as covariate; studied the contribution of intelligence, attitude towards science,
achievement-value-anxiety and previous year achievement in science to achievement in science of class VII students taught through combination of CAM and LM, and the contribution of intelligence, attitude towards science, achievement-value-anxiety, and previous year achievement in science to achievement in science of class VIII students taught through combination of CAM and LM. The sample consisted of 10^4 VIIth and VIIIth classes students of science. Intelligence test by Prayag Mehta, Science Attitude Scale by Avinash Grewal, Achievement-value-Anxiety Inventory by Prayag Mehta, Criterion test Previous year achievement in science, Analysis of covariance, regression, equation, and Multiple correlation-Coefficient were utilized. He found that the combination of CAM with LM was significantly superior to TM in teaching chemistry to class VII students when the groups were matched in respect of intelligence, attitude towards science and previous year achievement in science. The combination of CAM with LM was significantly superior to TM in teaching physics to class VIII students when the groups were matched in respect of intelligence, attitude towards science and previous year achievement in science. For predicting the achievement in science of class VII students taught chemistry through combination of CAM with LM regression
equation was established. The intelligence was found to be contributing to the extent of 53 percent to the achievement in science. For predicting the achievement in science of class VIII students taught physics through combination of CAM with LM regression equation was established. The total contribution of intelligence, attitude towards science, achievement-value-anxiety and previous year achievement in science was 74 percent. Out of which intelligence contributed to the extent of 42 percent and attitude towards science to the extent of 25.8 percent.

Sushma (1987) studied the effect of CAM based teaching on pupil achievement, the effect of Biological Science Inquiry Model (BSIM) based teaching on pupil achievement; the effectiveness of CAM, BSIM and TM to teaching on pupil achievement, the effect of CAM based teaching on pupils attitude towards Biological Science, the effect of BSIM based teaching on pupils attitude towards Biological Science, and the difference in change in attitude towards Biological science when taught through different models of teaching (CAM and BSIM). The sample consisted of 102 girls of class VIII of Central Hindu Girls School at Banaras. Samanya Mansik Yogyata Parikshan, Socio-Economic Status Index Scale, Uplabdi
Parikshan, Jeev Vigyan Ke Prati Chhatra Abhivriti
Mapan Suchi, Analysis of Variance, F-Ratio and t-test
were utilized. He found that CAM was effective for
Teaching Biological Sciences to VIII-class students.
BSIM was effective for teaching Biological Sciences to
VIII-class students. The three different teaching
strategies had different effects on pupil achievement
in Biological Science. CAM was more effective than
BSIM when students achievement in Biological Science
was taken.

3.3.2 Advance Organizer Model:

The following research studies have been made
on AOM.

Panda (1986) determined the effect of AO on learning
from text material of ninth grade pupils; the effect
of set induction on learning of ninth grade pupils,
the effect of AO and traditional method of teaching on
the achievement of ninth grade pupils; and the
influence interaction between methods of instruction
sex and criterion test. The sample consisted of 60
students of St. Marry High School of Indore, General
Mental Ability Test by Jalota (1963) Criterion test
prepared by investigator, and 3 X 2 X 2 factorial
design were utilized. He found that the difference between the mean achievement of pupils studying through AO, set induction and TM were significant.

Senapati (1986) compared programmed learning material, Advance Organizer Material and Traditional Methods in terms of achievement of students studying through them; and studied the effect of personality factors A B C E F G H I L M N O Q₁ Q₂ Q₃ and Q₄ and their interaction with the treatment on achievement of students. Sample consisted of 139 student-teachers in the Department of Education in DAV at Indore. 16 P.F. Cattell, Criterion test, and 3 x 2 Factorial Analysis of Variance with unequal cell size were utilized. He found that the PLM Method and TM were equally effective in terms of achievement of students on criterion test. The AOM was effective than both the PLM and TM in terms of achievement of students on criterion test. The personality factors A B C D E F G H I L M N O Q₁ Q₂ Q₃ and Q₄ did not influence the achievement of students on criterion test.

Budhisagar (1986) studied the effect of treatment, intelligence, attitude towards coaching profession and their interactions on overall achievement of students;
the effect of treatment, intelligence, creativity and their interaction on overall achievement of students; the effect of treatment, personality, creativity and their interaction on overall achievement of students; the effect of treatment, attitude towards teaching profession, personality and their interaction on overall achievement of students; the effect of treatment, attitude towards teaching profession, creativity and their interaction on overall achievement of students; the change in reaction of students towards instructional material, and the students reaction towards instructional materials with respect to their level of intelligence, creativity, personality and attitude towards teaching profession. The sample consisted of 139 student-teachers in the Department of Education in DAV at Indore. Standardized tests, Achievement test developed by Investigator, Culture Fair (or Free) Intelligence Test by R.B. Cattell, Non Language Test of Verbal Intelligence by S. Chatterji and Manjula Mukerjee, Allahabad Intelligence Test by Sohan Lal, Verbal Intelligence Test by R.K. Ojha and K. Ray Chaudhary. A Group Intelligence Test by Prayag Mehta, Standard Progressive Matrices by J.C. Raven, and Advance Progressive Matrices by J.C. Raven; Attitude Towards Teaching Professional Scale by Shalinee Bhogle, Attitude Towards Teaching Professional
Profession by V.V. Katti and C.S. Banur and P. Ponnambalam and H. Visvesaran, Non Verbal Test of Creative thinking by Baqer Mehdi, Verbal Test of Creative Thinking by Baqer Mehdi, Passi Tests of Creativity by B.K. Passi, Torrance Tests of Creative Thinking by E.P. Torrance, Extroversion - Introversion Inventory by Shanthamani and A. Hafeez; Maudsley Personality Inventory by P.A. Abraham and E.T. Jorge, Gita Das, B. De, N.K. Dutta, T.E. Shamagam, S.S. Jalota and S.D. Kapoor; Mean, Standard Deviation, percentils, Analysis of Covariance, 3 x 2 x 2 Factorial Analysis of variance with unequal cell size; and Chi-square were utilized. She found that the instructional material based on operant conditioning model is, PLM and that based on AOM, were effective in terms of achievement of students on different criterion tests and reaction of students. The instructional material based on operant conditioning model as well as AOM was significant superior to the TM and the instructional material based on OCM and that based on AOM were equally effective when students' mean achievement scores were adjusted with respect to intelligence. On the other hand, when the overall mean achievement scores of students were not adjusted with respect to intelligence then instructional
material based on AOM was found to be significantly superior to instructional material based on OCM. But instructional material based on AOM as well as OCM were significantly superior to the Traditional Method. Intelligence was found to be effective significantly the overall achievement of students.

3.4 Category No. 4:

Measuring Intelligence And Aptitudes:

Under this category the following research study has been made on Advance Organizer Model:

Rajoria (1987) studied the effect of method of teaching, residential background and their interaction on achievement in science of class VIII students by taking, separately, intelligence, and previous year achievement in science; the contribution of intelligence, attitude towards science, Achievement value–Anxiety and previous year achievement in science to achievement in science of class VIII students of different residential background taught through AOM; and the Traditional Method. The sample consisted of 114 students of class VIII in Govt. Middle School No. 24, at Indore. Intelligence test by Prayag Mehta, Science Attitude Scale by
Avinash Grewal, Achievement-value-Anxiety - Inventory by Prayag Kehta, Criterion test constructed by investigator, 2 x 2 Factorial Design Analysis of covariance, 2 x 2 x 2 Factorial Design Analysis of variance with unequal all size, Regression equation and Multiple correlation Coefficient were utilized. She found that the AOM was significantly superior to TM in terms of achievement in science of class VIII students when the groups were matched separately in respect of intelligence and previous year achievement in science. AOM was effective and suitable for teaching science to class VIII students belonging to rural as well as urban area. The total contribution of intelligence, attitude towards science, Achievement-value-Anxiety and previous year achievement in science to the achievement in science for rural students was 87 percent. Whereas for urban students it was 44 percent. For predicting the performance in science of students taught through AOM belonging to urban and rural areas, the regression equation was established separately for students having rural or urban background.

3.5 Category Nos. 5, 6, 7 and 8:

As far as these categories are concerned the researcher could not find any research study inspite
of his best efforts.

3.6 **Category No. 9:**

**Teaching For Discrimination, Generalization And the Use of Symbols:**

Under this category the following research study has been made on Concept Attainment Model.

Fassi, Singh and Sansanwal (1986) compared the competency in the beginning of coaching in school of student-teachers belonging to $E_1$, $E_2$ and $E_3$ groups; the competency at the end of coaching in school of student teachers belonging to $E_1$, $E_2$ and $E_3$ groups; the reaction towards Concept Attainment Model of student teachers (as practicing teachers) belonging to $E_1$, $E_2$ and $E_3$ groups, the willingness to implement the Model of student teachers belonging to $E_1$, $E_2$ and $E_3$ groups; the reactions towards the selected model school students taught by student teachers belonging to $E_1$, $E_2$ and $E_3$ groups; the competency at the end of coaching in school of student-teachers belonging to $E_1$ and $E_2$ groups; the reactions towards Inquiry Training Model of student-teachers (Practicing teachers) belonging to $E_1$ and $E_2$ groups; the willingness to implement the
Model of student-teachers belonging to $E_1$ and $E_2$ groups, and the reactions towards the selected Model by school students taught by student-teacher belonging to $E_1$ and $E_2$ groups. The sample consisted of 321 student-teachers and 2500 pupils having subjects from different age groups, socio-economic background, medium of instruction and nature of the school. Teachers Analysis Guide (TAG), Reaction scale for CAM (RS 2 for practicing teachers), Willingness for implementation of Model (WS 2 for student-teachers), Reaction Scale for CAM (RS 3 for pupil learner). Similar tools as given for CAM were developed specifically for ITM study. Analysis of covariance, t-test and Analysis of Variance were utilized. They found that mean competency scores of $E_1$, $E_2$ and $E_3$ groups differ significantly when competency at the end of PPF was considered as covariate. The mean competency score of $E_2$ group is significantly higher than that of $E_1$ and $E_3$ groups had competency in the beginning of coaching stage to the same degree. When competency scores on TAG in the beginning of coaching was considered as covariate, it reflects that competency at coaching stage of student teachers belonging to $E_1$, $E_2$ and $E_3$ groups differed significantly from one another. The mean competency score on TAG of
E₃ group was significantly lower than that of E₁ and E₂. E₁ and E₂ groups attained competency to the same degree. Mean reaction scores of E₁, E₂ and E₃ group did not differ significantly but the student-teachers of E₁, E₂ and E₃ groups had variable reactions towards CAM. Mean score of willingness to implement models of student-teachers belonging to E₁, E₂ and E₃ groups differed significantly. The mean willingness score of E₃ group was significantly higher as compared to E₁ and E₂ groups. The mean willingness score of E₁ and E₂ groups indicated low degree of willingness to implement the model. The mean reaction scores of school students taught by student-teachers of E₁ and E₂ groups did not differ significantly.

Student teachers of both E₁ and E₂ groups taught through ITM with equal competency. Mean scores of reaction towards ITM of student teachers (as practicing teachers) of E₁ group did not differ significantly from that of E₂ group. Student teachers of E₁ and E₂ groups had favourable reactions. The Mean willingness scores of E₁ and E₂ groups did not differ significantly. Mean scores of both E₁ and E₂ groups indicated that they had unfavourable willingness to implement the model. Mean reaction scores of school students taught by student-
teachers of E₁ group did not differ significantly than that of E₂ group. The mean scores indicated unfavourable reactions.
CHAPTER IV

RESEARCH STUDIES IN CONCEPT ATTAINMENT MODELS AND ADVANCE ORGANIZER MODEL OUTSIDE INDIA
The researcher categorised the research studies made on Concept Attainment Model and Advanced Organizer Model, experimented in instructional process, into different psychological aspects/concepts.

4.1A.0. **Category No. 1 (A):**

**Psychological Concepts And Strategies of Learning Process:**

Under this category the following research studies have been made on CAM and AOM.

4.1A.1. **Concept Attainment Model:**

The following research studies have been made on CAM.

Byers (1961) experimented his study to know the relationship of strategies to efficiency of performance; having a sample of 30 men and 30 women randomly selected from educational psychology classes at the university of Wisconsin and utilized a random replicated 6 x 6 Latin Square design. He found that strategies influenced efficiency of performance. The most efficient performance was associated with the low risk strategies, conservative focussing while the least efficient performance was associated with high risk strategies.
Lemke (1965) identified the relationships between concept attainment and information processing tasks. Sample consisted of 94 females from two classes in educational psychology during the second semester 1963-64 at the University of Wisconsin. A Battery of Sixteen Tests, Incomplete Image Analysis and Alpha Factor Analysis were used. He found that the span and rote memory factors, representing the memory domain, were isolated and found to be clearly unrelated to the task factors. The results generally supported studies using similar stimulus materials and presentation modes.

The factors of the reasoning domain were all related in degree to the task factors; however, Deduction and Spatial Scanning, factors thought to be related the domain, were only marginally related to the concept attainment and information processing factors.

The verbal comprehension factor was found to be related to the task factors, which suggests that inclusion of additional factors from its domain might account for additional variance in the study of abilities and their relationships to Concept attainment and information processing.
Nicholson (1966) concerned with the logical structure of a concept and the efficiency with which early adolescents attain conjunctive and disjunctive concepts, when varied stimuli are used, had a sample of 80 young adolescents from the ninth grade of a military school. He used analysis of variance involving two-way classifications - Factorial Design, and Lindquist Type-I (Treatment X Subject) Design. He found that a) regardless of the type of concept used in the study, the attainment of disjunctive concepts was significantly more difficult than attainment of conjunctive concepts was significantly more difficult than attainment of conjunctive concepts of comparable difficulty, b) regardless of the type of concept used in the study, the attainment of concepts in the thematic materials was significantly more difficult than the attainment of concepts of comparable difficulty in the abstract materials, c) the thematic materials did not discriminate significantly between subjects grouped accordingly to ability, d) the concrete materials did not discriminate significantly between subjects grouped according to ability.

Mascolo (1967) determined whether a) a body knowledge had greater effective meaning for individuals when it had been organized around Key Conceptual Schemes, than
when not so organized. b) The effective meaningfulness of a body of knowledge was related to performance in conceptualizing new material. c) The organization of subject matter around key conceptual schemes was related to performance in conceptualizing new material and d) Formal inquiry training increased performance in conceptualizing new material. The sample consisted of 96 high school biology students. A Two Way Classification Design, A Transparency Test, Chi-Squares, The Analysis of Variance Techniques, and t-Test Technique were used. He found that significantly greater performance was demonstrated by groups having a course organized around the key conceptual schemes as compared to groups having a course not so organized. Hypothesis dealing with differences in performance due to formal inquiry training were rejected as not significant. No significant differences were obtained that could be attributable to formal inquiry training.

Meinke (1966) investigated the effects of several methodological variables upon the efficiency of attaining concepts. The sample consisted of 198 subjects - males and Females. Analysis of Variance, A 2 x 3 x 4 Factorial Design, and A 2 x 2 x 6 x 4 Factorial Design were used/adopted. In the first experiment, the ANOVA revealed
significant main effects for the three independent variables when using anyone of the three dependent variables as the measure. In the second experiment the ANOVA revealed no significant main effects. Significant second and third order interactions were found.

Carol (1968) investigated the effects of concrete and formal cognitive behaviour and methods of instructional feedback (minimum and maximum on the generalization of concept attainment over varying intervals of time (0, 10, 20 days) between an initial learning and test task. The sample consisted of 24 sixth grade elementary school children. He found that there was a significant relationship between cognitive level and performance, the formal group performed more efficiently than the concrete group. There were no other statistically significant results. However, data trends indicated that 1) Minimum feedback was more effective in facilitating performance for the formal group than for concrete group; 2) maximum feedback for the concrete group resulted in more efficient performance than minimum feedback.
other of the conditions; and investigated possible relationships between achievement and the other dimensions of the study. The Sample consisted of 117 Juniors and Seniors who were the members of seminar groups in humanities, business law, and management or sociology. He found that students learnt no less in the cooperative condition and preferred the cooperative condition. Participation did not appear to be a factor in the level of understanding and did not seem to be affected by either condition. Level of achievement anxiety seemed to affect concept understanding and condition preference but the relationships were not clear.

Selden (1971) made the development of support for generic strategy type differentiation and an empirical study of concept attainment behaviour. Sample consisted of 32 sixth graders subjects. Variance lasting (partist/ scanning), and Maintenance testing (wholist/ focussing were used. It was found that the effect of mode of presentation was significant while the effects of organization of materials and complexity of informational field were not found to be significant.
Cason (1972) developed and tested an information processing model of concept learning incorporating a hypothesis generation mechanism. The sample consisted of 124 undergraduate students. A Hypothesis Generation Ability Test, A Concept Learning Test, Monte Carlo Techniques, Chi-square Test were used. Monte Carlo, simulations of the concept learning process indicated that the violation of anyone of these assumptions resulted in the model learning more slowly.

Gordon (1972) identified the strategies used in concept attainment. The sample consisted of 60 nursing clinicians given the task of diagnosing the current state of a patient from among 32 possible states. Strategies were altered in response to task conditions. When meaningful materials permitted prediction of the most likely hypothesis, subjects took advantage of this early in the task. Similarly, when opportunities to test attributes were limited, more information was extracted by multiple hypothesis testing. Both of these procedures increased inferential strain but decreased the risk of not having sufficient information to attain the concept.

David (1973) studied the effects of presenting new
concepts embedded in 230-words-prose passages. The sample consisted of 66 tenth grade students enrolled in a high school. A 3 x 2 x 2 x 3 Randomized Factorial Design with Repeated Measures, Immediate Test of Concept Understanding and Delayed Test of Concept Understanding. He found that there were significant two factor interactions on both the Immediate Test of Concept Understanding and Delayed Test of Concept Understanding. The factors involved were: (1) measured intelligence and (2) number of examples of concepts provided. It was concluded that ease of learning concepts from prose materials involves complex combinations of factors.

Mills (1973) studied the effect of a proposed model for motivation on the concept attainment of selected high school and college students. The sample consisted of High School and College populations at Fountain Central High School, Keedersburg, Indiana, and Indiana State University, Terre Haute, Indiana. A 25-item multiple-choice, true-false test, A Randomized Black Design for Two way Analysis of Variance, Kuder-Richardson 20-formula were used. It was found that 1) for the high school population, the instructional use of the proposed model for motivation was effective
in increasing concept attainment; for the undergraduate college population, the instructional use of the proposed model for motivation made no difference in concept attainment; 3) for the graduate college population, the proposed model for motivation had a positive effect on the concept attainment of the students.

Peters (1973) determined whether the Frayer Model of Concept Attainment which encompasses a systematic procedure for defining concepts and structures material in a manner designed to facilitate comprehension for both good and poor readers was superior to a method employed by many social studies text-books in defining concepts. The sample consisted of 360 ninth grade subjects. Gates-MacGinitie Reading Test, A Comprehension was developed, and Multivariate Analysis of Variance were used. He found that there was a significant difference between the good and poor readers who utilized the Frayer Model and good and poor readers who used the Text-book Approach.

Simpson (1975) made the objective of his study "... to what extent can variables identified in studying concept attainment in a highly controlled laboratory
situation have similar effects on concept attainment of social studies concept?" The sample consisted of 90 children at fourth grade level. He found that 1) there was a higher score for subjects who had two levels of critical properties identified than subjects who had only one level of critical properties identified. This was found to have statistically significant difference. 2) There was a proportionally higher score for subjects as instance presentation forms went from an example, to a description, to a definition. The scores were found to have statistically significant differences in support of the hypothesis. 3) there was an interaction between the two main effects variables for increasing correct response scores, however, no interaction was found.

Bachman (1979) studied the relationship between Cognitive Style and Concept attainment efficiency. The sample consisted of 160 male and female undergraduates. Cue preference test developed by the author, The Hidden Figure Test, and Scholastic Aptitude Test were utilized. He found that verbal ability, Cue relevance/saliency and task complexity are important mediators in the relationship between F1 and CA efficiency and success. The measures of CA
strategy was found to be unrelated to F1 difference.

Shineman (1980) investigated the effect on the information processing behaviour of student teachers having similar or different conceptual interaction of student teachers' conceptual levels and their cooperating teachers' conceptual levels on the student-teachers' initial and final information processing behaviour. The sample consisted of 32-student-teachers and their cooperating teachers. Paragraph completion test, A Median-split, and 2 x 2 Factorial Design were utilized. Theoretically predictable by conceptual level theory highly significant differences were found between high and low conceptual student-teachers on information processing. Significant differences were found between initial and final information processing behaviour.

Fulton (1981) determined whether selected teaching strategies used to teach science concepts while integrating the improvement of reading language skills would significantly reduce the reading difficulties of Seventh Grade Students. The sample consisted of 186 seventh grade students. A) Science Concept Test developed by the investigator, B) Gate-MacGiniti
Vocabulary, C) Comprehension sub tests and D) t-test were used. Data analysis revealed (1) significant means score differences between the control group and Method A the Science Concept test. Differences also existed between method B, and Method C and between Method C and Control group (Method D); (2) there was no significant differences on the vocabulary sub test; (3) there was significant difference between Method A and Method B means Scores and between Method B and Method C on the comprehension sub test.

Nuzum (1983) developed an instructional package for teaching arithmetic story problem solving skills and examined the efficiency of that Method on the story problem solving performance of four learning disabled students. Sample consisted of a single subject. The single Design with three Replications was used. He found that a method which included instruction to mastery in analysis, task specific and procedural knowledge was responsive to the needs of the learning disabled in this study. Each subject's problem solving performance improved substantially.

Galabaki (1983) ascertained and established the difference for sixth-graders, in measures of cognitive
achievement growth in economic understanding and lasting effects of the Lecture and Visual discussion methods of teaching economics education as a separate subject. The sample consisted of sixth-graders. Analysis of Covariance, Dunn Test for Multiple Comparisons and Item Analysis, were used. He found that although the experimental groups performed significantly better than the central groups the results seemed to be of little comfort when it was recognized that statistical significance was slight. Students exposed to a program of planned instruction in economic by means of the Lecture Method retained as much economic understanding as the students exposed to a similar program by means of visual discussion method.

Lee (1983) investigated the interactive effects of the personal traits of conceptual development and the different presentation forms of concept attainment. The sample consisted of 511 male and female 10th grade students. A 2 x 2 Factorial Design was used. It was found that there was a statistically significance difference between instruction based on the definitions and examples, and based on the examples only form.
Gilmore (1985) made the objectives of his study as to determine the effects of question strategy training for students and teacher modeling of questions on students questioning behaviour; to determine the effects of teacher questions and student questions on concept acquisition, and to determine if teacher questions and student questions affect high, medium and low ability students differently. The sample consisted of 125 fifth and sixth grade students. A prior t-test was used; and he analysed that there were no significant differences among the four groups. An interaction t-test indicated that there were no significant interactions of ability with treatment.

Hanclosky (1985) made a comparison of Task Analysis, Advance Organizer and Concept Elaboration Methods in teaching concepts and principles. The sample consisted of 92 students enrolled in undergraduate teacher education care courses. He found that the task analysis group performed significantly higher than the advance organizer and concept elaboration groups in both concept and principle learning.

McDonald (1986) investigated the relationship between locus of control and concept attainment strategies.
The sample consisted of public middle school children. The Chi-square statistical test and Two Way ANOVA procedure were used. He found that there were statistically significant differences between locus of control, strategy utilization and number of traits to solution. There was no statistical support for a significant interaction between locus of control and utilized strategy on the number of trials solution.

Dalton (1986) made the objectives of his study were to learn about teachers thinking processes as they attempted to implement in their classrooms two recently acquired models of teaching (Concept Attainment and Synectics) and to investigate the relationship of those processes to their success in transferring the new models of teaching into their active teaching repertoire. The sample consisted of ten teachers with no previous experience with either the Concept Attainment teaching strategy or the synectics strategy, two teachers with three years of experience in using both strategies. A Semi-structured Simulated Recall Interview and Transcripts of the simulated Recall Interview were used. He found that teachers using these two strategies report nearly twice as many thoughts related to both goals/objectives and instructional procedures.
Bodolus (1986) examined the use of concept mapping, after Novak, as a strategy to facilitate meaningful learning based on a theoretical structure. The sample consisted of 429 ninth grade science students. Pre-test/Post-test true Experimental design was used. It was found that the experimental and traditional groups did significantly better on the context post-test than the control group while the experimental group using the mapping process did only slightly better than the traditional group.

Geballos (1986) made the objective of his study to know the effects of Concept Teaching Methods on Cognitive Thinking ability. The sample consisted of 36 students from two intact fourth grade classrooms. New Jersey Test of Reasoning Skills, Analysis of Covariance and A 2 x 2 Factorial Design were used. He found that there was no significant differences between or within groups. Similar results were obtained on the other two measurement instruments. For the age group under study, inductive and deductive approaches are equally effective in promoting concept formation/attainment and in fastening the metacognitive strategies that are crucial to higher-order thinking.
Ponick (1986) investigated instructional design that facilitates Concept learning, and made focus on manipulating visual cognitive processes affecting concept attainment by the learner. The sample consisted of 71 university undergraduate students. There was no significant difference existed among the treatment groups. A significant difference was found in favour of the animation treatment.

4.1.1.2 **Advance Organizer Model**

The following studies have been made on Advance organizer Model.

Townsend (1969) made the objective of his study as, a study of the effect on advance organizer may have on learning to graphically analyze straight line Kinematics was carried out within the two instructional modes of an autotutorial printed program and classroom presentation by an instructor. The sample consisted of 137 undergraduate college students in physics course. Florida Twelfth Grade Test was used. No significant difference was found between the scores of those subjects who received the advance organizer and those who received the traditional introduction. However, a significant interaction effect was found between the
introductions and the mode of instruction showing a positive significant effect of the advance organizer under programmed instruction and no significant effect of the advance organizer under teacher instruction.

Weisberg (1969) examined the value of several modes of information organization used to teach concepts of ocean floor topography to right-grade students, and determined whether other advance organizers in the form of visual aids might serve the same the function as Ausubel's verbal advance organizers. The sample consisted of 96 right-grade students. A $4 \times 3 \times 2$ ANOVA Factorial was utilized. The findings showed that there was a significant difference between map as graph organizers and verbal advance organizer.

Ethirveerasingam (1971) compared the effect of organizers on that of overview and summary in learning and retaining complex verbal material, provided evidence and generalized the results to vocational students, to the hypothesis of David P. Ausubel (1960). The sample consisted of 182 eleventh grade students. Analysis of variance was used. He found that there were no significant differences between treatments. There were also no significant interactions between retention and treatment.
Munford (1971) tested the effectiveness of Advance organizers in facilitating learning and retention. The sample consisted of 51 college students. Analysis of covariance was used. It was found that there were no significant differences among the groups in the amount of initial learning or retention.

Barrow (1973) determined whether the use of an advance organizer or historical introduction significantly influenced learning and/or retention in a discovery learning unit in science at the seventh grade level, and determined whether the variables of I.Q., reading comprehension, work study, skills, and sex had only effect upon learning and/or retention with regard to the advance organizer or historical introduction. The sample consisted of seventh grade students. National Assessment in science test, Kuder-Richardson 20-Formula and A Unit Examination prepared by the investigator. The findings of the study did not demonstrate Joyce and Weil's assumption that advance organizer would effect active learning situations positively.

Graber (1975) examined the use of advance organizers and low level teacher questions in a mathematics
classroom. The sample consisted of undergraduate students. Pretest-posttest experimental design was used. The findings of the study showed that no organizer was significantly superior to the other, and there was no significant advantage for one rate of questioning over another.

Murchison (1975) explored the usefulness of advance organizers for the teaching of science to ninth grade students. The sample consisted of four groups of students. A Multivariate Analysis of Variance was used. The findings showed that I.Q and Motivation were each significant and treatment differences were significant. Interaction was found among I.Q., sex and treatment. When abstract material was to be learnt a pre-test was the organizer of choice for high I.Q. boys and for high motivation students, although an abstract organizer did best with high motivation boys.

Kersten (1976) examined the effects of an advance organizer on the learning and retention of material on matrices by college students, and examined whether for this topic an advance organizer had an additive or interactive effect with instructional material and if an advance organizer interacts with the ability level of
the student. The sample consisted of 70 students in college algebra course. It was found that there was no significant difference between advance organizer and control introduction means for either test in either experiment; and a significant difference between matric and control instructional material means was found for both test in both experiments.

Tavares (1976) evaluated the effects of using advance organizers in a laboratory inquiry oriented physical science course for nonscience majors. The sample consisted of college students. Wisconsin Inventory of Science Processes. A course Achievement test by author, and a student Attitude Inventory by author. The course independent of the use of advance organizers, did not increase the performance of the students in those outcomes that are evaluated through the instruments used.

Goodman (1977) investigated the effects of treatments on the learning of a unit on descriptive statistics. The sample consisted of 196 ninth and tenth grade geometry students. Stanford Achievement Test, A Two-way Fixed Effects Analysis of Variance, Design, were used. The result of this study showed no significant effect due to treatment and no significant interactions. There
was a significant effect due to ability.

Salman (1977) evaluated the utility of the advance organizer preinstructional strategy using an oral mode of presentation. The sample consisted of 96 college students. An Analysis of Variance was used. It was concluded that oral advance organizers or learning passages in conjunction with either written or oral learning passages provide no differentiation in learning or retention with verbally sophisticated subjects.

Geiger (1978) investigated the relation between learner personality traits and verbal forms of advance organizers and determined whether learning and retention are facilitated by the advance organizer and if the advance organizers are differentially effective among learners who demonstrate varying degree of the selected personality traits. The sample consisted of 81 eight grade students. A posttest only design and Junior/Senior High School Personality Questionnaire (HSPQ) was used. It was found that Advance Organizer Format did not have a significant effect on learning; and there was a trend for the visual advance organizer group to achieve higher scores on learning and retention posttest.
Darrow (1980) investigated the relative effectiveness of two pre-instructional treatments on the learning and retention of material-processing concepts by eight and ninth grade industrial arts students on treatment involved. The sample consisted of 178 students. Analysis of Variance was used. The findings showed that no significant difference was found between treatment groups for either the initial learning or the retention measure. The advance organizer and the conventional overview treatments were equally effective for both measures.

Dena (1980) tested the effects using a graphic advance organizer before, during and after reading on the comprehension of written text. The sample consisted of 197 sixth grade students. Iowa Standardized Achievement test was used. The findings indicated that although the graphic advance organizer did not facilitate comprehension of single theme text, it did facilitate comprehension of multi-thematic text. The graphic advance organizer strengthened retention of context, and below level, at level, and above level readers benefited similarly from the use of the graphic advance organizer.
Mahajan (1983) made the objective of his study to see whether the effect of Ausubellian Advance organizers on the learning of formal operational students was any different from their effect on concrete operational students. The sample consisted of 305 physics-students. A 2 x 2 Factorial Design, and Analysis of Covariance, were used. It was found that there was a significant interaction between the cognitive level and the absence or presence of organizers, at least as far as the immediate posttest was concerned. For the two delayed posttest, there was no significant interaction as far as the composite scores or scores on the recall portion of the test were concerned.

Borine (1982) investigated three instructional method based on Ausubel’s concept of meaningful learning specially the effectiveness of 200 words advance organizers, 20 word advance organizers and no advance organizers were investigated using expository passage. The sample consisted of 121 seventh graders. Stanford Achievement Test was used. The findings indicated that the 20 word advance organizer at level readers were superior to the 200 word and no advance organizer on delayed retention. For the above level readers on delayed retention, there were no facilitative effects
among the 200 word, 20 word and no advance organizers readers.

Livingston (1984) investigated the effects of advance organizer and direct instruction passages for high and low ability eight grade students in the learning and retention of meaningful verbal material. The sample consisted of 210 eighth grade students. A criterion test, Retention test, A 2 x 2 x 3 Repeated Measures ANOVA Pearson Product Moment Correlation, Multiple Regression Analysis, were used/utilised the findings showed that there was no statistical difference between the treatment means. High ability subjects in the advance organizer group achieved significantly higher scores than low ability students in this group on all three occasions.

Carnes (1985) investigated concerned how the use of advance organizers and various sizes of groups of subjects would effect students' achievement scores, retention scores and rates of learning. The sample consisted of 100 high school physics students. Achievement test, Retention test, and Tukey test, were utilised. It was found that students working in groups
of three and four on computer tutorials had significantly better rates of learning than, students working alone, while no significant differences in achievement or retention were observed.

Category 1-B

TRANSFER OF LEARNING:

+f.1.B.0 Under this sub-category the following research studies have been made on concept Attainment Model and Advance Organizer Model.

+f.1.B.1 Concept Attainment Model:

The following research studies have been made on CAM.

Alvord (1968) made the objective of his study to know the changing relationships between performance scores and ability measures, and to know differential transfer. Intellectual processes related to learning differences are also expected to increase in complexity as the subject moves from a "stimulus" to "rule" to a "family" level of problem solving. The sample consisted of 181 sixth grade subjects prior to the learning exercises. Early and late performance test, ANOVA were utilised.
It was concluded that the study successfully demonstrated a research model simultaneously treating experimental and individual difference variables. Positive 'learn to learn (LTL) effects obtained could not be related to major changes in intellectual processes with increased learning opportunities, components of learning variance predictable from ability and "task specific" measures reflect the high specificity of learning performance on concept attainment problem for subjects at this age and level of development.

Mascolo (1967) determined whether, a body of knowledge has greater effective meaning for individuals when it has been organised around key conceptual schemes, than when not so organized, the effective meaningfulness of body of knowledge is related to performance in conceptualizing new material; the organization of subject matter around key conceptual schemes is related to performance in conceptualizing new material; and formal inquiry training increases performance in conceptualizing new material. The sample consisted of 96 high school biology students. Two-Way classification Design, Transparency test, Chi-Squares, The Analysis of Variance, t-test, were utilised. The findings showed
that the effective meaning of the body of knowledge was positively related to performance in conceptualizing new material; organization of subject matter around the key conceptual schemes seemed to increase performance in conceptualizing new material, whereas formal inquiry training had no significant effect.

Shyers (1975) made the objective of his study to understand the concept of proportionality through a training sequence based upon the structure which underlines the formal level. The sample consisted of college freshman enrolled in a remedial Mathematics course. A Test of Piaget's Balance Beam Task was utilised. The findings showed that there was no evidence of transfer of structure except in the presence of identical elements. However, training showed transfer to the overall concept of proportionality with both experimental groups making a significant gain from Pretest to Posttest.

Piper (1986) explored the more obvious opportunities for teaching biological science for transfer at the junior high school level of education within one school system. The sample consisted of 38 science teachers including those in seventh grade life science, eight
grade earth science, ninth grade physical science, and high school biology. It was found that there was the possibility of the learning of the concepts being transferred on a horizontal orientation (seventh grade life science and seventh grade unified studies) and on a vertical orientation (from one level of science to another, higher grade level of science).

4.1.B.2 Advance Organizer Model:

The following research studies have been made under the same category on AOM.

Nixt (1972) investigated the relative effects of frequent use of advance organizer and structures reviews in a college mathematics course for students who are not physical science, engineering, or mathematics majors. The sample consisted of students enrolled in a freshman mathematics course tenor — Richardson Formula, A 2 x 5 Fixed Effects Design and Analysis of Covariance, were utilized. He found that there were no significant differences for treatment effects recitation instructor effects, nor interaction.

Aman (1981) investigated the effects of the use of an advance organizer on transfer in programmed
instruction situation. The sample consisted of 91 ninth grade industrial art students. The pretest - posttest developed by Clemson University South Carolina, Department of Education and PICA Foundation and Analysis of Covariance were utilised. It was found that an advance organizer in combination with the LAP was more effective in decreasing magnitude of error on posttest scores than was the LAP alone; and the advance organizer was probably not direct teaching material as indicated by the correlated t-test performed on the pretest and posttest scores of treatment group.

Noel (1983) investigated the influence of advance organizers in a systematically designed lesson to teach rule-using behaviour on transfer of rule-learning to problem solving situations. The sample consisted of 72 fifth and sixth grade elementary students. Two way ANOVA achievement test developed by the author. 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.
4.2.0 Category No. 2:

**Problem Solving And Reasoning : Correlating And Integrating Past Experience**

The following research studies have been made under this category on CAM and AOM.

4.2.1 **Concept Attainment Model**:

The following research studies have been conducted on CAM.

Carol (1968) investigated the effects of concrete and formal cognitive behaviour and methods of instructional feedback (minimum and maximum) on the generalization of concept attainment over varying intervals of time between an initial learning and test task. The sample consisted of 24 sixth grade elementary school children. Lodwick Test and Analysis of Variance were utilised. It was found that there was a significant relationship between cognitive level and performance, and the formal group performed more efficiently than the concrete group.

Kyle (1971) determined whether competitive and cooperative conditions have a differential effect on the amount of student participation and learning;
examined whether students reacted more positively to one or the other of the conditions, and investigated possible relationships between achievement and the other dimensions of the study. The sample consisted of 117 Juniors and Seniors Achievement Anxiety Test, Chi-square test and t-test; were utilised. It was found that students learnt no less in the cooperative than in the competitive condition. Participation did not appear to be a factor in the level of understanding and did not seem to be affected by either condition. Level of achievement anxiety seemed to affect concept understanding and condition preference but the relationships were not clear.

Lawrason (1972) examined the effect on acquisition and transfer of systematic variations in direction of learner behaviour as defined by the sequence of instructional events. The sample consisted of 131 Junior or senior education majors. Tools were not mentioned in Dissertation Abstract Internationa. He found that there were significant differences between the five treatment groups receiving both concept definition and practice and the control group and was no significant difference, however, between the treatment given practice above, and the control group.
Clissold (1972) described the process of structuring learning sets and writing a programmed course of study for the attainment of three identified concepts. The sample consisted of 21 nursing students. Gagne's Format For Compiling Subordinate Learning Sets, and Achievement Test, were utilised. The findings showed that subjects with a High Grade Point Average may complete the programmed materials in the least amount of time and with the least number of errors and that when a subject took a long time to complete the programmed materials, her achievement of learning sets decreased.

Gau (1972) examined the effect of instruction utilizing Dienes' perceptual variability principle on the development of the ability to operate with symbols in a meaningful way. Accordingly the following question was posed: Will an increase in the number of enactive and/or iconic embodiments of a concept utilized in an instructional episode produce a corresponding increase in the proportion of students that reach criterion on transfer test involving the symbolic embodiment of the concept? The sample consisted of 202 fifth and sixth grader students. Pretest-Posttest was utilised. The findings showed that instruction utilizing one, two or
three enactive and/or iconic embodiments of a concept had essentially the same effect on the ability of average to above average fifth and sixth grade students to operate with a symbolic embodiment of the concept.

Wager (1972) investigated the effect of different sequencing strategies on Concept Attainment. The sample consisted of 169 second and third grade students. A $2 \times 4 \times 4$ Factorial Design was used. The findings showed that the three programmed instructional treatments had similar effects on the posttest performances of the students in terms of effectiveness.

Leorn (1974) evaluated the contribution made to the attainment of certain relational concepts of Physical Science by computation and numerical problem solving in comparison to the contribution made by non-computational problem solving techniques. The sample consisted of 111 college students. A One Way Analysis of Variance, Two Factorial Design were utilized. The findings showed that SAT-Math, SAT-Verbal, SAT-total, High School percentile and college quality point average scores each had a significant positive effect upon concept attainment, but that only mathematical aptitude as
measured by the subjects SAT-Math score had a greater effect upon success by one method of problem solving than by another. The significance of the interaction was found.

Ngoi (1974) validated a model of levels of concept attainment to be used in the assessment of elementary school children's attainment of fifteen theoretical concepts within the conceptual scheme of the particle nature of matter. The sample consisted of a group of sixth graders. t-test, Variance, Standard Deviation, The Kuder-Richardson Reliability Estimates, Stanford Achievement Test were utilized. The findings showed that there was an existence of a cumulative hierarchy to the levels of study, and the scaling of these levels appear to be different from the order suggested in the model. The order proceeds from Recall to Application to Generalization.

Trundnak (1974) investigated the relative effectiveness of four cannonical teaching procedure for attainment and generalization of mathematical concepts. The sample consisted of 124 students in College Algebra I. The findings showed that there was no significant differences in the treatment groups for concept attainment. However,
significant differences were found with respect to generalization but for only one concept.

In this the complete sequence was found to be more effective than the sequence without exemplification moves for primitive generalization, and the procedure without non-exemplification moves was significantly more effective than those without initial characterization moves or without exemplification moves for mathematical generalization.

Bailey (1974) examined the various effects of the SMSG Canonical teaching procedure for permitting attainment of the set of instructional objectives, and the generalizability of the attainment of these instructional objectives over both the dimensional variable and the likelihood variable of the experimental model. The sample consisted of 158 students enrolled in Finite Mathematics. Binomial test and Fisher Exact Probability test were utilized. The findings showed that the SMSG Canonical teaching procedure was adequate for permitting attainment of the specified instructional objectives. That is, at least 80% of those students who failed to reach criterion on a particular instructional objectives on a pretest and satisfied all other
antecedent conditions then reached criterion on the particular objective on a posttest.

Shyers (1975) understood the concept of proportionality through a training sequence based upon the structure which underlines the formal level. The sample consisted of college freshman enrolled in a remedial mathematics. On a test of Piaget's Balance Beam Task, the findings showed that there was no evidence of transfer of structure except in the presence of identical element.

Nuzum (1983) developed an instructional package for teaching arithmetical story problem solving skills and examined the efficiency of that method on the story problem solving performance of four learning disabled students. A single subject Design with three replications was used. The findings of the study showed that a method which included instruction to mastery in analysis, task specific and procedural knowledge was responsive to the needs of the learning disabled in this study. Each subject's problem solving performance improved substantially.

4.2.2. **Advance Organizer Model**

The following research studies have been
Folker (1973) investigated the effects of adjunct post-questions and expository advance organizers on problem-solving from prose text. The sample consisted of 88 introductory psychology students. A post-only Control Group Design and a 2 x 2 analysis of Variance, were utilized. The findings showed that adjunct post-questions resulted in significantly superior problem-solving behaviour compared to no adjunct questions, there were no significant performance differences between having and not having advance organizers, and there were no significant interaction effects.

Stallan (1978) assessed the effects of method of organization of individualized learning materials using two types of preinstructional strategies with high and low readers. The sample consisted of 75 high-school students Senior High Assessment of Reading Performance (SHARP) test, a 3 x 2 ANOVA, and a 3 x 2 Chi-square, were utilized. The findings showed that on the basis of the main effect for method of instruction and reading level, there was no significant difference between mean gain scores of the three groups.
4.3.0 Category No. 3:

Appraising Scholastic Achievements

The following research studies have been conducted under this category on CAM and ADM.

4.3.1 Concept Attainment Model:

The following research studies have been conducted on CAM.

Kyle (1971) determined whether competitive and cooperative conditions have a differential effect on the amount of student participation and learning; and examined whether students react more positively to one or the other of the conditions; and investigated possible relationships between achievement and the other dimensions of the study. The sample consisted of 117 juniors and seniors who were the members of seminar groups in humanities, business law and management or sociology. Achievement Anxiety Test, Chi-square test, and t-test were utilized. The findings showed that students learnt no less in the cooperative than in the competitive conditions and performed the cooperative conditions. Participation did not appear to be a factor in the level of understanding and did not seem to be affected by
either condition. Level of achievement anxiety seemed to affect concept understanding and condition preference but the relationships were not clear.

David (1973) studied the effects of presenting new concepts embedded in 230-word prose passages. The sample consisted of 66 tenth grade students. A 3 x 2 x 2 x 3 Randomized Factorial Design, Immediate test of concept Understanding and Delayed test of Concept Understanding. The findings showed that there were significant two factor interactions on both "the immediate test of Concept Understanding" and "the Delayed test concept understanding. It was concluded that case of learning concepts from prose materials involves complex combinations of factors.

Henkin (1977) investigated the correlation of the Boehm test of basic Concept with reading achievement; selected factors relating to reading achievement included vocabulary, comprehension and composit score, investigated the comparison between normal disadvantaged high risk first grade children on concept attainment and reading achievement; and the role of sex upon concept attainment and reading achievement. The sample consisted of 50 first grade children, Boehm test
of basic concept Form A, Gate's MacGinitie Reading test, student t-test, were utilized. The findings showed that significant differences were found between normal and disadvantaged and high risk children in that latter two groups are deficient in concept attainment and reading achievement.

Rottavina (1977) investigated some cognitive skill and reading achievement correlates of social maladjustment across three chronological age groups. The sample consisted of low socio-economic status youngsters from 2nd grade 38, 5th grade 40, and a state operated institution for delinquents 40. ANDVA and t-test were utilized. The findings showed that there was a greater importance of information processing at the adolescent level than at the elementary grade levels. Reading achievement was more powerful than prediction of behaviour.

4.3.2 **Advance Organizer Model:**

The following research studies have been conducted on AOM.

Brovey (1969) examined the effects of varying types of introductory information (advance organizer or
historical introduction) on the acquisition and retention of knowledge about differentiated geological phenomena found in the field environment. 5 to 7 subjects were taken by trained observers to seven field doctors in Central Park, New York City. Achievement test developed by author. The findings showed that subject receiving advance organizing information did not show significantly greater acquisition and retention than subjects receiving on historical introduction prior to a field experience.

Hershman (1971) investigated the utility of advance organizers and behavioural objectives for improving achievement in physics at the College level. The sample consisted of College students of physics. A Covariance Analysis and the Scholastic Aptitude test were utilized. The findings showed that there were no significant differences that could be attributed to treatment effect with assurance; the behavioural objectives were more able to help the lower ability students in most of the cases; and the motivation and level of aspiration of the students were the decisive variables that marked the treatment effects.

Caponechi (1973) examined the effects of an advance
organizer as compared to an introductory overview and a control set of historical materials on the acquisition and retention of the topic of Matrices within a normal classroom situation. The sample consisted of 91 undergraduate students. Kuder-Richardson Formula-14, A 3 x 3 fixed effect design, and ANOVA, were utilized. The findings showed that there were a significant interaction between the treatment and ability levels on the achievement test; and there was no statistical difference between the organizer and introductory overview means, although the difference in the means favoured the advance organizer.

Oppong (1978) investigated the facilitative effects on achievement of organizers learnt to mastery using geography materials at the ninth grade level. The sample consisted of 60 ninth grade social studies students. Iowa Test of Basic Skills, Form 5, Level 14, A two way 2 x 6 ANOVA, - A two way 2 x 2 ANOVA unequal Cell n's ANDVA, were utilized. The findings showed that the use of advance organizer before each text chapter, showed significant superiority in achievement when compared with the non-organizer group using text material only.

Tamthai (1982) determined the facilitating effects of a pictorial-diagramatic advance organizer on science
learning achievement of eight-grade. The sample consisted of 188 eighth grade students. Three way ANCOVA, A 2 x 2 x 3 Factorial Design, Standard Deviation, and t-test and two-tailed t-test were utilized. The findings showed that the advance organizer did have a facilitating effect on female students who were field independent; while it inhibited the science learning of field dependent female students.

Dennis (1984) investigated the effectiveness of advance organizers and repetition on achievement in a high school biology class. The sample consisted of four groups of 10th grade students. California Achievement test, A Lindquist Type I Research Design and A Multivariate Analysis of Variance were utilized. The findings showed that there was no significant interaction between treatment on the two dependent variables. However, there was a significant gains in achievement by students in all groups from pretest to posttests.

Margan (1985) assessed the effects of two types of prelaboratory exercises when used as advance organizers in an introductory biology laboratory course on student achievement and attitude toward biology. The sample consisted of 40 students. A Likert type scale was
utilized. The findings showed that there was a statistically significant facilitating effects of advance organizer on both student achievement and student attitudes.

Little (1986) determined whether significant differences existed in the self-concept and social studies achievement of third grade students in a control class receiving conventional instruction. The sample consisted of 125 third grade students from an elementary school. Aroson's Jigsaw Small Group Approach, A two way of Analysis of Variance, and Tukey's HSD Test, were utilized. The findings showed that the use of summaries, outlines key-terms, and questions (with Jigsaw) and the use of conventional social studies instruction were effective in improving the social studies achievement of students.

4.4.0 Category No. 4:

Measuring Intelligence And Aptitudes Ability

The following research studies have been done, under this category on CAM and AOM.

4.4.1 Concept Attainment Model:

The following research studies have been done
Bordelon (1978) assessed the relationships among concept attainment, reading comprehension and listening comprehension; and examined the factor of I.Q. and Sex as they related to the other variables. The sample consisted of 40 sixth grade students. The Pearson Product Moment coefficient of correlation, Concept Attainment test, The Durrell Listening Comprehension test and the Cattell Culture Fair Intelligence test, were utilized. The findings showed that there were no significant relationships between comprehension and concept attainment; and the lack of relationships might be due to the different types of intellectual operations.

Lee (1983) investigated the interactive effects of the personal traits of conceptual development and the different presentation forms of concept attainment. The sample consisted of 511 male and female 10th grade students. A 2 x 2 Factorial Design was utilized. The findings showed that there was a statistically significant performance difference between instruction based on the definitions and examples and based on the examples only form; there was a significant interaction between treatment and conceptual level.
Advance Organizer Model:

The following research studies have been located:

Lucas (1972) studied the effects that three types of advance organizers had upon the learning of a biological concept; and determined whether the student variables of I.Q., abstract reasoning and sex had any effect upon learning a biological concept. The sample consisted of 196 seventh grade students. Academic Promise Test, and California Short-Form Mental Maturity Test were utilized. The findings showed that the use of three types of advance organizers did not significantly affect the learning of a biological concept in seventh grade science, and that no interactive effects of I.Q., abstract reasoning; sex were found.

Johnes (1974) determined if advance organizers generally described as more abstract, general and inclusive than the learning materials they precede, are also level, that is, selectively beneficial only to subjects at a particular level of demonstrated scholastic ability. A 3 x 2 Factorial ANOVA, and Scheffe-tests were utilized. The findings showed that abstract- subjects receiving the abstract organizer scored significantly higher
than abstract subjects receiving either the concrete organizer or the non-organizer. It was concluded that advance organizers could be prepared that are selectively beneficial only for subjects of a particular level of demonstrated scholastic ability. Advance organizers prepared for this experiment provided significant facilitation only in terms of short-term retention.

Saretsky (1975) investigated the effect of the use of an advance organizer on learning, with learners at different reading ability levels - for topically different prose passages. The sample consisted of 288 8th graders. A 3 x 3 x 2 mixed effect design, Analysis of Variance, and a Reading Comprehension test, were utilized. The findings showed that there was no significant difference for use or non-use of advance-organizers. Main effects for reading ability level and for different prose passages were found significant. No interaction effects were significant.

4.5.0 Category No. 5:

Appraising Social Relationships

The following research studies have been categorized under this category made on CAM and AOM.
4.5.1. Concept Attainment Model:

The following research studies have been located on CAM by the researcher.

Billeh (1969) identified those concepts from within the conceptual scheme the Biological Cell appropriate for study by Jordanian children in grade 3 through 6, and compared the achievement of Jordanian and American Children in grade 3 through 6 as indicated by scores on tests designed to measure knowledge, comprehension, and application of each of the selected concepts when both receive comparable instruction related to the conceptual scheme the Biological Cell. The sample consisted of pupils in Grade 3 through 6 and grade 2 through 6 in elementary school. A Multivariate ANOVA technique and t-test were utilized. Analysis of the data revealed the following:

A. Jordanian population:

1. The achievement criteria were met by pupils:
   a) in grade 3 on 66% of the tests;
   b) in grade 4 through 6 on about 90% of the tests;
   c) of high ability in grades 4 through 6 on all tests; and
   d) of high ability in grade 3 and average ability in grade 4 through 6 on 50% of the tests, at three levels of achievement.
2. Because of the erratic nature of the functional relationship that exists among the mean scores earned by pupils in grade 3 through 6,

3. Significant differences existed between high and average ability groups;

4. Ability effect seemed to be the same for all grades.

B. **Comparison between American and Jordan Pupils**

1. Neither of the populations of pupils was consistently superior in achievement on the concepts when compared to the other population indicating that culture did not seem to be a factor in learning the concepts.

2. The ability effect was the same in the two national schools at the three levels of achievement for all concepts.

3. The trends in the mean scores, at the three levels of achievement, of the different grades in the two national schools were similar for most of the concepts.
Colton (1970) made the two-fold objectives of his study: The first was an issue which probed the appropriateness and effectiveness of using the medium of television to achieve some basic cognitive goals in Kindergarten and the second stemmed from the general problem of the continuing polarization of black and white people in the Wayne State. The sample consisted of an all-white kindergarten class. An instrument developed by the author to measure attainment of concepts and the 'preferred companion choices of the subjects. The data indicated that although gains were made in attaining some of the concepts, there was no pre-post change in the choices of "preferred companions" by the integrated or all-white kindergarten children as a result of viewing either unknown same, or opposite colour children portraying "teachers" in videotaped sequences. Why some of the questions used as cues for selecting pictures of "preferred companions" elicited opposite colour choices more than others also discussed.

Adams (1970) assumed that population differences were to a large extent explained by differences in how much the two groups have learnt about how to go about learning to learn in the laboratory supplements or speeds up the acquisition of the relevant development
experiences needed by the low socio-economic-status subjects for the task; and to equalize performance in low and middle socio-economic groups. The sample consisted of 7, 9 and 11 years old students. Learning Curves and Blacks of Items were utilized. The findings failed to confirm the predicted changes in the shapes of the learning curves (increasing to decreasing gains) from problems 1 to 6 for the 11- and 9-year old, low socio-economic groups (SES). The learning curves for the low SES, 7-year-old group and middle SES, 7-9 and 11-year old groups were curves of decreasing gains on all problems. It was concluded that the learning curves on Problem 1 through 6 were curves of decreasing gains for both low and middle SES children at the three ages studied.

Schaeffer (1971) determined if children in fourth grade were able to acquire concepts in social studies as effectively by reading as by a sensory activity approach or if a third factor, e.g. the ability to attend, influenced achievement more in one mode than in the other. The sample consisted of 110 pupils of fourth grade. Metropolitan Achievement test was utilized. The findings showed that there were not statistically significant differences. However, positive trends were shown for the non-reading approach.
4.5.2 **Advance Organizer Model**:

The following research study has been made on AOM.

Allen (1969) made the objective of his study to know the effects on the learning and retention of written social studies material of the use of advance organizers with memory level or higher order questions. The sample consisted of 212 ninth grade students. A one way ANOVA and Lorge Thorndik Verbal Intelligence test Form I. The findings showed that the effects of advance organizer was not apparent on the first test but on the second test they enhanced the effects of treatment questions for average and below average students and resulted in general rather than question specific facilitation of learning for above average students.

4.6.0 **Category No. 6**:

**Language and Thought**

The following research studies have been categorized under this category made on CAM and AOM.

4.6.1 **Concept Attainment Model**: The following research studies have been made on CAM.
Tamppari (1969) specified biological concepts related to an important theme which was taught in existing biological curricula; made in order to identify concept according to the learning theory of Robert M. Gagne, and studied the attainment of the identified concepts by students in grade five, seven, and nine. The sample consisted of 463 fifth, seventh and ninth grade students. Standardized test was developed by the author. The findings showed that each succeeding grade level achieved significantly higher mean scores; ninth grade male students achieved a significantly higher mean score than did female ninth grade students; and the grade level and chronological age respectively, were the most important factors in determining the level of concept attainment while I.Q was the least important factors.

Schaeffer (1971) determined if children in fourth grade were able to acquire concepts in social studies as effectively by reading as by a sensory activity approach or if a third factor e.g. the ability to attend, influenced achievement more in one mode than in the other. The sample consisted of 110 fourth grade pupils. Metropolitan Achievement Test was utilized. The findings showed that there were no statistically differences between reading and non reading approach. However, positive trends were shown for the non reading
approach.

Clissold (1972) described the process of structuring learning sets and writing a programmed course of study for the attainment of three identified concepts. The sample consisted of 21 nursing students. Gagne's Format For Formulating Subordinate Learning Sets, and Achievement test, were utilized. The findings showed that subject with high grade point average may complete the programmed materials in the least amount of time and with the least number of errors and that when a subject took a long time to complete the programmed materials, her achievement of learning set decreased.

Peters (1973) determined whether the Frayer Model of concept attainment which encompasses a systematic procedure for defining concepts and structured materials in a manner designed to facilitate comprehension for both good and poor readers was superior to a method employed by many social studies textbooks in defining concepts. The sample consisted of 360 ninth grade students. Gates-MacGinitie Reading Test. A comprehension test developed by author, and Multivariate ANOVA, were utilized. The findings showed that there was a significant difference between the good and poor readers who utilized the Frayer Model and good and poor readers who used the textbook approach; and good and poor
readers who employed the Frayer Model achieved a significantly higher score on the concept comprehension test.

Marliave (1976) investigated the effects on concept attainment of training for hypothesizing and evaluating defining attributes. The sample consisted of a group of children. Oral and written tests were utilized. The findings of the study did not show the training for hypothesizing and evaluating to be sufficient for formal level concept attainment among subjects able to classify examples and non-examples; and to discriminate and name attributes.

Bordelon (1978) assessed relationships among concept attainment, reading comprehension and listening comprehension. The sample consisted of 40 sixth grade students. Pearson's Product Moment Coefficient of Correlation, Concept attainment test based on a study by Jerome Bruner, The Durrel Listening Comprehension test, close reading test, and the Cattel Culture Fair Intelligence test; were utilized. The findings showed that no significant relationships were found between reading comprehension and concept attainment; no significant relationships were found between listening comprehension and concept attainment; a significant
relationship was found between reading comprehension and listening comprehension; and significant differences were not found between scores of boys and girls.

Rallins (1980) determined the degree to which Texas high school seniors attained five selected earth science concept. The sample consisted of random selection of 5 seniors from 100 Texas high schools. Frayer Concept Analysis Scheme and The Klausmeier Model, a 12-item test constructed by the author, were utilized. The findings showed that seniors from schools in the second largest size range, male students, and students with more than two years of science background attained significantly higher scores.

Fulton (1981) determined whether selected teaching strategies used to teach science concepts while integrating the improvement of reading language skills would significantly reduce the reading difficulties of seventh grade students. The sample consisted of 136 seventh grade students in five science classes. Science Concept test developed by the investigator, Gate MacGinie Vocabulary and comprehension subtest (Form 1 & 3), t-test were utilized. The findings showed that there were significant means score differences between the control group and Method A the science concept
test; there were no significant differences on the vocabulary subtest.

4.6.2. **Advance Organizer Model**

The following research studies have been made on AOM.

Maher (1975) analyzed the effects of instructional objectives as advance organizer prior to a reading assigned and interpretive questions aimed at these objectives following the assignment, on the interpretive comprehension of fourth and sixth grade students; and analyzed whether an advance organizer was more effectively presented with two learning modalities than with one modality whether vocabulary or readability variables were predictors of interpretive comprehension, and whether there were interaction between the I.Q., or pretest variables and treatment groups in performance on the criterion variable. The sample consisted of 84 students. Stanley and Campbell's Experimental Design Fair; Multiple Regression Analysis, and California Reading Test were utilized. The findings showed that advance organizers in the form of interpretive objectives and questions aimed at these objectives following the reading assignment; provided for significant improvement
on the interpretive section of the California Reading Test; the vocabulary and readability scores were significant predictors of interpretive comprehension; there was a significant interaction between pretest scores and treatment groups.

Saretsky (1975) maximised learning by reading, and investigated the effect of the use of an advance organizer on learning, with learners at different reading ability levels, for topically different prose passages. The sample consisted of 288 eight grade students. A 3 x 3 x 2 mixed effect design, ANOVA, and comprehension test, were utilized. The findings showed that there was no significant difference for use or non-use of advance organizers. Main effects for reading ability level and for different prose passages were found significant. No interaction effects were significant.

Kneen (1979) compared the effects of two types of advance organizers, guide material and the structured overview, on a comprehension of a reading task. The sample consisted of 96 seventh graders. A three way completely Crossed ANOVA, Stanford Diagnostic Reading Test and Brown Level Form A, were utilized. The findings showed that the structured overview resulted in a
significantly greater comprehension of the reading task than did guide material as evidenced by comprehension test performance; the structured overview was more effective in facilitating comprehension of the reading task than guide material for all reading ability groups; and there was no interaction among sex, treatment, and reading ability.

Brune (1982) examined the effects of advance organizers on listening comprehension among learning disabled and non-learning disabled adolescents in grades seven and eight. The sample consisted of 30 learning disabled and 30 non-learning disabled adolescents. Free and Probed Recall Criterion were utilized. The findings showed that advance organizers facilitated listening comprehension for both learning disabled and non-learning disabled groups in both narrative and expository modes. The non-learning disabled group scored significantly higher than the learning disabled group when advance organizers were used.

Meurer (1985) drawing from linguistics, cognitive psychology and educational psychology, assessed L₁ and L₂ reading comprehension performance of Brazilian University students in relation to expository texts and hierarchical levels of information distribution within the content.
structure of texts, and the effects of advance organizers in the form of brief introductions. The sample consisted of 40 students. A Three Way ANOVA and A 2 x 2 Factorial Design were utilized. The findings supported the use of advance organizers as seen within Ausubel's (1965) "assimilation theory and the retrieval plan" hypothesis as proposed in schema theory (Anderson and Pearson 1984). Support was also lent to a theory of "Macro structures (Van Dijk 1980). However, no significant difference was found in the subjects' performance with regard to language in terms of overall percentage of recall and summaries, not in the pattern of recall per hierarchical level of idea units.

4.7.0. Category No. 7:

Facilitating Motor Skills

The following research studies have been categorized under this category made on CAM and AOM.

4.7.1. Concept Attainment Model:

The following research studies have been made on CAM.

- Rottavina (1977) investigated some cognitive skills and reading achievement correlates of social maladjust-
ment across three chronological age groups. The sample consisted of t-test were utilized. The findings showed that there was a greater importance of information processing at the adolescent level, than at the elementary grade levels.

Woodward (1985) investigated the effectiveness of a computer simulation in enhancing students learning in a unit of health. The sample consisted of 30 mildly handicapped students. Posttest Experimental design was utilized. The findings indicated significant differences on basic facts and concepts that were reinforced by the simulation. These differences were retained on a maintenance test given two weeks after the posttest. The most significant differences were on the test that measured problem solving skills.

4.7.2. Advance Organizer Model:

The following research studies have been made on ADM.

Moore (1981) determined if three groups differing prerequisite skills and knowledge were given in advance organizer. The sample consisted of 154 middle school students. Unannounced Criterian test, t-test, and A 2 x 3 Factorial ANOVA, were utilized. The findings
showed that high prerequisite skills and knowledge, advance organizer, students did not score significantly higher than high prerequisite skills and knowledge non-organizer students. Middle prerequisite skills and knowledge, advance organizer students did not score significantly higher than middle prerequisite skills and knowledge, non-organizer students. Low prerequisite skills and knowledge, advance organizer students did not score significantly higher than low prerequisite skills knowledge non-organizer students. The only significant result was for level effects. The result of this research did not add support to Ausubel's theory.

Watkins (1982) assessed the effect of advance organizers and advance organizers with listening examples on the cognition, performance and aural discrimination of musical concepts and skills by non-music majors. The sample consisted of undergraduate non-music majors from two intact fundamentals of music. t-test was utilized. The findings for AOs and AOMs did not indicate scores higher than baseline averages. AOMs when compared with AOs indicated increased written test scores as well as phase mean score for each of the two treatment interventions.
4.8.0. **Category No. 8:**

**Children With Special Needs**

The following research studies have been categorized under this category made on CAM and AOM.

4.8.1. **Concept Attainment Model:**

The following research studies have been made on CAM.

Schutz (1969) assessed the value of teaching young disadvantaged children two components of concepts; the relevant attributes or stimulus features and the conceptual rule by which the attributes were organized. The sample consisted of 60-Four years-old disadvantaged children. A test of Concept Utilization and A test of Concept Identification, were utilized. The findings showed that each experimental group performed significantly better than control if and only if the children had learnt both components before or during the experiment, so that findings were as predicted. These four-year-old children who learnt concepts when these were combined for the first time.

Henkin 1977) investigated the correlation of the Boehm
test of basic concept with reading achievement; studied selected factors relating to reading achievement included vocabulary, comprehension and a composite score; investigated the comparison between normal, disadvantaged and high risk first grade children on concept attainment and reading achievement; and investigated the role of sex upon concept attainment and reading achievement in normal and disadvantaged first grade children. The sample consisted of 50 first grade disadvantaged children. Boehm Test of Basic Concept Form A, Gates MacGinitie Reading Test, Primary A Form I, and student t-test, were utilized. The findings showed that significant differences were found between normal and disadvantaged and high risk children in that latter two groups were deficient in concept attainment and reading achievement; a significant relationship between normal male and normal female concept attainment and reading achievement was supported. No sex differences were found between disadvantaged males and females.

Nuzum (1983) developed an instructional package for teaching arithmetic story problem-solving skills and examined the efficiency of that method on the story-problem solving performance. The sample consisted of
learning disabled students. A single subject design with three replications was utilized. The findings showed that a method which included instruction to mastery in analysis, task specific and procedural knowledge was responsive to the needs of the learning disabled in this study. Each subject's problem solving performance improved substantially.

Rattavino (1977) investigated some cognitive skill and reading achievement correlates of social maladjustment across three chronological age groups. The sample consisted of low socio-economic status (SES) youngsters from 2nd grade 80, 5th grade 40, and a state operated institution for delinquents 40. ANOVA and t-test were utilized. The findings showed that there was a greater importance of information processing at the adolescent level, than at the elementary grade levels. ANOVA and t-test comparisons of poorly and well adjusted youngsters at all three level revealed comparable hypothesis testing performance between peers. When delinquents were grouped as either good or poor hypotheses testers, however, the later group shared significantly poorer adjustment ratings. Reading achievement was more powerful than hypotheses testing performance for prediction of behaviour.
The following research studies have been made on AOM.

Steinbrink (1970) determined whether or not advance organizers facilitate increased cognitive achievement among disadvantaged black elementary students. The sample consisted of 77 fifth grade and 79 sixth grade disadvantaged black elementary students. A Univariate Analysis of Multiple Covariance with two Covariates; was utilized. The findings showed that the differences among the treatment classes who were taught by different teachers were not significant. The interaction of teachers by treatments was not significant.

Brune (1982) examined the effects of advance organizers on listening comprehension among learning disabled and non-learning disabled adolescents in grades seven and eight. The subjects consisted of 30 learning disabled and 30 non-learning disabled adolescents matched for sex, grade placement. Free and Probed Recall Criterion were utilized. The findings showed that advance organizers facilitated listening comprehension for both learning disabled and non-learning disabled groups in both narrative and expository modes. The non-learning
disabled group scored significantly higher than the learning disabled group when advance organizer used.

Chang (1982) examined the effect of that filmic advance organizer had on the learning and retention of facts and concepts from a sound film by the regular and the mainstreamed educable mentally retarded learners (EMRS). All subjects were selected from sixth, seventh and eighth graders. A 2 x 3 Factorial Design, A Two-Way ANOVA, Duncan's Multiple Range Test, Kundert-Richardson Hoyt Formula; were utilized. The findings showed that Filmic Advance organizers prepared for this study appeared to provide facilitative effect for the regular subjects in acquisition and retention of facts and concept presented in a consumer education film and ability levels did not differentially affect the learning outcomes.

4.9.0. Category No. 9 :

Teaching For Discrimination, Generalization And the Use of Symbols

The following research studies have been put under this category made on CAM and ACM.
4.9.1. **Concept Attainment Model**:

The following research studies have been made on CAM.

Cason (1972) developed and tested an information processing Model of Concept learning incorporating a hypothesis generation mechanism. The sample consisted of 124 undergraduate students. A hypothesis Generation Ability Test, A Concept Learning Test, Monte Carlo Technique, and Chi-square test were utilized. The findings showed that a predicted error-distribution was obtained on each problem for each subject: (a) group GC₁ performed better than GC₂ on each of the problems, (b) group GC₁ performed better at each level of preference for the relevant dimension than group GC₂ and (c) within each treatment groups subjects tended to perform better on problems in which the relevant dimension was more preferred.

Meinke (1966) investigated the effects of several methodological variables upon the efficiency of attaining concepts. The sample consisted of 198 students ANOVA, A 2 x 3 x 4 Factorial Design, A 2 x 2 x 6 x 4 Factorial Design were utilized. The findings showed that there were significant main effects for the three independent
variables when using anyone of the three dependent variables as the measure; and there were significant second and third order interactions.

Trundnak (1974) investigated the relative effectiveness of four canonical teaching procedure for attainment and generalization of Mathematical concepts. The sample consisted of 124 students in college Algebra I. Fisher Exact Probability Test and Chi-square test, were utilized. The findings showed that there was no significant differences in the treatment, groups for concept attainment. However, significant differences were found with respect to generalization but for only one concept.

Bailey (1974) examined the various effects of SMSG Canonical teaching procedure for permitting attainment of the set of instructional objectives and examined the generalizability of the attainment of these instructional objectives over both the dimensional variable and the likelihood variable of the experimental model. The sample consisted of 158 students. Binomial test or Fisher Exact Probability test, were developed. The findings showed that the SMSG canonical teaching procedure was adequate for permitting attainment of the specified instructional objectives; generalization from two dimensional experiments to three dimensional
experiments were interpreted to occur for those concepts which did not require combinatorial analysis but did not occur for those concepts which required combinatorial analysis.

Simpson (1975) made the objective of his study that "... to what extent can variables identified in studying concept attainment in a highly controlled laboratory situation have similar effects on concept attainment of social studies concept?" The sample consisted of 90 children at fourth grade level. The findings showed that there was a proportionally higher score for subjects as instance presentation forms went from an example, to description, to a definition.

Bachman (1979) investigated the relationship between cognitive style and concept attainment efficiency, success and strategy in college undergraduates. The sample consisted of 160 undergraduates students. Cue preference test developed by the author, the Hidden Figure test, and Scholastic Aptitude test, were utilized. The findings showed that the conditions of high task complexity and salient irrelevant cues produced a significant but low relationship between FI and CA efficiency and success.
Hanclosky (1985) made a comparison of task analysis, advance organizer and concept elaboration methods in teaching concepts and principles. The sample consisted of 92 undergraduates in teacher education care courses. Achievement test was developed by the author. The findings showed that the task analysis group performed significantly higher than the advance organizer and concept elaboration group, in both concept and principle learning.

**Advance Organizer Model**

The following research studies have been made on AOM.

Nixt (1972) investigated the relative effects of frequent use of advance organizers and structures reviews in a college mathematics course for students who were not physical science, engineering or mathematics majors. The sample consisted of a group of students in a freshman mathematics course. Kuder-Richardson Formula, A 2 x 5 fixed Effect Design, and ANCOVA, were utilized. The findings showed that there were no significant differences for treatment effects, recitation instructor effects, nor interactions.
Borine (1982) investigated three instructional methods based on Ausubel's concept of meaningful learning. The sample consisted of 121 seventh graders. Stanford Achievement test was utilized. The findings indicated that the 20 word advance organizer at level readers were superior to the 200 word and no advance organizer on delayed retention. For the above level readers on delayed retention, there were no facilitative effects among the 200 word, 20 word and no advance organizer readers.

Makhdum (1983) evaluated the effect of advance organizer in facilitating the learning of English by foreign students. A two-way analysis of variance was utilized. The sample consisted of 40 American, Venezuelan and Saudi Arabian students. The findings showed no significances between nationalities by treatment interaction and no significant differences between experimental and control groups across nationalities, however, there were significant differences across nationalities for each treatment. While both the Venezuelan and Saudi Arabian students also had a non-western cultural background.

Lewis (1986) compared the effectiveness of an Ausubelian Advance organizer and simplified readability of science
content when used together or separately in the biology laboratory. The sample consisted of 239 grade students. California Achievement test was utilized. The findings showed that either the advance organizer or simplified reading material is significantly better than no treatment but the two together are significantly better than either alone.
CHAPTER V

CONCLUSION

RESEARCH STUDIES IN INDIA AND OUTSIDE INDIA ON CONCEPT ATTAINMENT MODEL AND ADVANCE ORGANIZER MODEL
5.0 Conclusion:

5.1 Research Studies in India:

After the study of the different research studies in India classified under different categories which have been conducted on Concept Attainment Model and Advance Organizer Model in teaching-learning process, the researcher arrived at the following conclusions.

Before adopting any model of teaching, one should first know the understanding level and reaction towards the model. Passi (1985), Passi, and Singh and Sansanwal (1986), Bihari (1987), and Satpathy (1987) in their research studies found the significant favourable change among teacher-educators as well as student-teachers towards the understanding of reaction towards the theoretical aspect of Concept Attainment Model and Advance Organizer Model.

In the research study of Satpathy (1987) Advance Organizer Model was found more effective to implement whereas the research study of Passi, Singh and Sansanwal (1986) showed significant difference in the implementation of the model.
The research studies had been conducted in India on both the models in the classes of VII, VIII, IX, X and XI with the subject of science and mathematics with both the sexes.

The research studies of Pandey (1981) and Satnathy (1987) showed that teaching behaviours were conducive to better concept learning and Das (1986) investigated that CAI was effective in developing teaching effectiveness. Bihari (1987) and Pandey (1987) observed the importance of giving background information and feedback to the students which has favourable effect on participation level.

Personality factors did not influence the model competency of CAM as well as the achievement of students in AOI which were supported by Antimadas (1986) and Senapati (1986) respectively. However, the research study of Pani (1985) found very little effect of personality factors on achievement of students in CAM.

the models in terms of achievement of students.

The Intelligence plays an important role in the achievement of science. It has been supported by the research studies of Budhilsagar (1986), Gangrade (1987) and Rajoria (1987). However in the study of Gangrade (1987) besides intelligence, the second major factor which had effect on achievement of science was attitude towards science. The minor contribution was of achievement-value-anxiety and the previous year achievement in science. In the study of Rajoria (1984) the comparison was made in the Rural and Urban students in respect of intelligence, attitude towards science teaching, achievement-value-anxiety and previous year achievement on science and it was found more favourable in rural students than urban students.

5.2. Research Studies Outside India:

After the study of the different research studies outside India classified under different categories which have been conducted on Concept Attainment Model and Advance Organizer Model in teaching-learning-process, the researcher arrived at the following conclusions.

5.2.1 Concept Attainment Model:

Under this model, the researcher arrived at the
the following conclusions.

The research studies had been conducted outside India on Concept Attainment Model in the classes I to XII and at Graduate level in the subjects of Sociology, Biology, Mathematics, Educational Psychology, Science, Teacher Education care Course, Business Law, Humanities and Management, etc. These studies have been conducted on the boys as well as girls.

The selected factors like abilities, span of attention, rote memory, task, reasoning domain, deduction and spatial scanning and cooperative conditions showed effect on concept attainment process and it had been supported by the studies of Lamke (1965), Billeh (1969), Kyle (1971), David (1973), Simpson (1975), Bachman (1979), and Ceballos (1986). However, Rattavina (1977) found that there was a greater importance of information processing at the adolescent level, than at the elementary grade level.

Effective meaning of body of knowledge and instructional feedback had been found more effective for facilitating performance of the learners in the research studies of Mascolo (1967), Carol (1968), and Overstreet (1970).

Carol (1968) and Lawron (1972) found that there was significant relationship between cognitive behaviour/level and performance.

The significant interaction/participation effect had been found in the research studies of Carol (1963), David (1973), Loarn (1974), and Lee (1983) while Kyle (1971), and Gilmore (1965) found insignificant interaction/participation effect in concept attainment process.
Kyle (1971) also found that the level of achievement-anxiety had effect on concept understanding, and Cason (1972) found that the violation of assumption resulted into slow learning.

Schaeffer (1971) and Peters (1973) found significant relationship between vocabulary/comprehension and concept attainment while Bordelon (1978) and Fulton (1981) found insignificant difference between comprehension and concept attainment; however, Bordelon (1978) found a significant relationship between reading comprehension and listening comprehension.

It had been found by Schutz (1969), Henkin (1977), Rottavina (1977), Nuzum (1983) and Woodworth (1985) that the Concept Attainment Model was also responsive to the needs of the learning disabled/mentally retarded learners in problem solving situation and in attainment of several concepts in teaching-learning process.

Tampper (1969) and Tissold (1972) found that subjects with the high grade point average had effect on concept learning.

5.2.2 Advance Organizer Model:

As far as the Advance Organizer Model is concerned, the researcher arrived at the following conclusions.
The research studies had been conducted outside India on Advance Organizer Model in the classes of III to XII, undergraduate level and graduate level in the subjects of Social Studies, Physics, Mathematics, Industrial Course, and Psychology. These studies had been conducted both on boys and girls.


Borine (1982) and Kahajan (1983) found in their research studies that there were significant differences between cognitive level and advance organizer.
The effect of advance organizer due to ability level had been found in the research studies of Hershman (1971), Saretsky (1975), Goodman (1977) and Livingston (1984).

The research studies of Brune (1982) and Change (1982) showed that advance organizer facilitated comprehension for learning by disabled students both in narrative and expository modes, while the research study of Steinbrink (1970) did not indicate significant effect of advance organizer on achievement of disabled learners.

The significant interaction/participation level had been found in the research studies of Caponechi (1973), Murchison (1975), Saretsky (1975), Mahajan (1983), but on the other hand Ethirveerasingam (1971), Mixt (1972), Felker (1973), Maher (1975), Goodman (1977), Kneen (1979), Makhdoom (1983), and Dennis (1984) found insignificant interaction/participation level in conducting the advance organizer model in their research studies.
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