CHAPTER II

REVIEW OF RELATED LITERATURE AND STATEMENTS OF HYPOTHESES

2.00 Introduction

This chapter brings together in a convenient and comprehensive manner the related literature and research which has a direct bearing upon the problem identified in this study. Therefore, the focal point of the literature review is upon those studies which are directly applicable to the investigation at hand.

The investigations which follow are organized in such a manner as to follow the development of knowledge, comprehension, application and total achievement and their relationship with five variables of three different strategies.

Investigations related to the variables of the teaching Strategies taken for this study are Lecturing, Questioning and Answering, Discussion, Instructional Materials and Behavioural Objectives which are presented

under captions : 2.1.0, 2.2.0, 2.3.0, 2.4.0 and 2.5.0 respectively.

2.1.0 Lecturing

When comparing the effectiveness of lectures with that of another method there are three possible conclusions : they are more effective, less effective, or there is no significant difference.

Although few comparisons have been made in few of the developing and some of the developed countries, this issue has been the subject of more experimental observations in the United States than any other issue in the field of teaching methods. Indeed, McKeachie (1963) states that a host of comparisons remains unpublished as there are no significant differences to report.

Dubin and Taveggia (1968) reviewed ninety one studies, comparing two or more teaching methods on one or more measures of 'course content'. Most of the measures were 'objective tests' of the multiple-choice, true/false or sentence completion type used for course examinations. Most of these were tests of factual information but every report does not make it clear. Following are given some studies which are related to the present study.

Studies showing Effectiveness of Lecturing

Asch (1951) compares traditional lecture-discussion with free group discussion with both essay type examinations and multiple choice questions.

2.1.1 Use of 'Lecturing' showing Significant Results

A good many investigators compared either lecturing with discussion or lecture-discussion with student-centred free discussion to show that lecturing was comparatively more effective, using different tools for measuring different criteria.

Bloom's (1953) purpose of study was to measure stimulated recall of attention to simple comprehension. Burke (1955) used course work and examination measures. Gerberich and Warner's (1936) study showed that more able students had better results. Greene (1934) found the same in delayed test students. Guetzkow et al. (1954) found superiority of lecture when university result was considered. Jones (1923) showed that lecture system suited better with only upper 10 percent of the students. Ruja (1954) used tests of knowledge. Spence and Watson (1928) used objective type of tests. Ward (1956) found lecturing more effective in case of retention and understanding tests of less able students.

In further comparisons between lecturing and reading Corey (1934), Klausmeier and Ripple (1971) showed superiority of lecture in case of immediate recall and in immediate and delayed tests respectively.

Lecturing group has been compared with other groups by Beach (1960) to correlate between the kind of students and the kind of instructions. Lecturing versus no teaching

brought more significant results in tests of knowledge in Fodor's (1963) study.

2.1.2 Use of 'Lecturing' showing No Significant Results

The following studies show no significant difference regarding criterion variable when Lecturing is compared with the Discussion Method.

Becker et al., (1958), Carlson (1953), DiVesta (1954), Fodor (1963), Johnson and Smith (1953), Leton (1961), Lifson et al. (1956), Rickard (1946), Rohrer (1957), Ruja (1954), Smith (1954), Spence and Watson (1928), Ward (1956), all of them found no difference regarding recall of facts or knowledge of facts. The studies of Barnard (1936), Beach (1960), Bills (1952), Casey and Weaver (1956), Churchill and John (1958), Deignan (1956), Fitzgerald (1960), Gerberich and Warner (1936), Joyce and Weatherall (1957), Palmer and Verner (1959), Wieder (1954) show no significant difference when objective type of tests are administered (objectives not mentioned in these reports).

The studies of Bane (1925 and 1931), Gotke (1931), Robbins (1931) found no difference regarding immediate and delayed recall and Ward (1956) found no difference regarding retention of information by more able students.

Hill (1960), Rohrer (1957) found no difference between lecturing and discussion regarding concepts and principles.

2.1.3 Comparison of 'Lecturing' with other Methods showing No Significant Difference

Lanmer's (1974) study with fifth and sixth grade students was undertaken with the purpose to investigate and evaluate student performance on the work study skills in the Social Studies field. The experimental group utilised Taba-Teaching Strategies. There were slight differences in performance between boys and girls in either group. There was again no difference regarding the development of skills in (a) map Reading (b) reading graphs and (c) total work study skills.

In the study of Mattox (1972) the effectiveness of conventional versus experimental methods of instruction as administered to two randomly selected groups of preservice teachers were examined. Instructors were assigned to groups by random lottery. A pretest-posttest control group design was used.

Smith (1972) sought to examine the learning in cognitive area which took place in two different classroom communication situations, teacher-directed communication and student-centred communication. Subjects of the empirical study were two hundred seventh grade students. Students studying under small discussion group could not surpass the group under teacher direction regarding mean learning achievement,

comprehension and application and body of learning.

Findings of Wal Vander (1972) while comparing lecture laboratory method with audio-tutorial method regarding achievement were inconsistent and inconclusive.

2.2.0 'Questioning and Answering'

It is a truism for educators that questions play an important role in teaching. Aschner (1961) called the teacher a professional 'Question-maker' and claimed that the asking of questions is one of the basic ways by which the teacher stimulates student thinking and learning. Asking questions is also one of the major dimensions of studying teachers' behaviour in the widely used system for interaction analysis. Inspite of accepting the importance of questions in teaching, researchers still do not know much about them. Until researchers find answers regarding the various questions of the effectiveness of questioning, hopes for a viable behavioural technology of teaching will remain unsolved and unrealised.

Many researchers have attempted to describe the types of questions asked by teachers. At least 11 classification systems have been proposed in recent years. Some are of general categories while others consist of specific classification needed for the curriculum.

Most of the question classification systems are composed almost entirely of the type of cognitive process

required to answer the question. Prior to defining effective types of question, the researcher needs to identify valued educational objectives in a specific setting. Once objectives are identified, the task of constructing questions which enable the students to achieve the objectives can be stated. In this type of research, effective question types would be defined asto whether they enabled the student to achieve desired educational objectives. Another task for the researcher is to consider whether there are effective question sequences. This issue was taken up by Taba (1964, 1966) who attempted to identify 'Questioning Strategies' that stimulate students to reflect on curriculum materials on an increasingly abstract level. In Shaver's model (1964) another type of question sequence was proposed.

Probably the first serious study regarding questioning and development of higher mental process was done by Stevens (1912). She found that, for a sample of High School classes varying in grade level and subject area, two thirds of the teachers' questions required direct recall of text book information. Floyd (1960) found that even from a sample of 40 'best' teachers of elementary classes, 42 percent of questions sought for specific facts and only 20 percent required thoughtful responses. Guszak (1967) showed similar percentages. Gallagher (1965), Davis and Tinsley (1967) studied teachers of gifted students and student teachers. More than half of the questions posed by both the groups

were to test students' recall of facts. Rosenshine (1971), in his anthology of teacher questions and teacher student interchanges, classified, as usual, two types of questions for statistical analysis, but the distinctions differed from study to study. Therefore, it is impossible to determine with any certainty whether the higher level question identified by Kleinman (1964) differ from those identified by Spaulding (1965) or by Wright and Nuthall (1970). Even when two or more investigators stated that they coded 'divergent' questions they might have used different operational definitions.

2.2.1 Use of 'Questioning-Answering' showing Significant Results

Only two studies were found which used multiple classifications of teacher questions or types of teacher-student discourse. Significant results were obtained in both the studies, one conducted by Conners and Eisenberg (1966), and the other by Solomon et al., (1963). Ghee (1975) studied effects of high level cognitive questions of Sanders (1966) on student,on student's level of response and the skill of critical thinking. The levels of response were based on Bloom's taxonomy (1956) of educational objectives. The subjects comprised twelfth grade level of 'Social Problems' classes and the study being an experimental one, continued

for six weeks. The high level questions were found to significantly affect the levels of response of the students, however, there was no such significance found on the students' ability to think through situations presented to them.

The most important work in this area to date is the research by Hunkins (1967, 1968). The purpose of his research was to determine whether the variable of question type bears any relationship to student achievement. Two experimental groups of sixth grade students worked daily for a month, one on sets of questions stressed knowledge, in the other, analysis and evaluation questions were stressed. Question types were defined in terms of Bloom's Taxonomy (1956). Hunkins found that the analysis-evaluation group earned a significantly higher score on a specially constructed post-training test than did students who answered those that stressed knowledge. The classification of all questions into only two forms has not yielded consistent significant results or any discrenible trend.

Kleinman (1964) classified questions into 'Low level' and 'High level' with three subcategories within each type. Low-level questions were classified as 'neutral', 'rhetorical' or 'factual'. 'High-level' questions were classified as 'clarifying', 'associative', and 'critical thinking. Difference between high level questions and low level questions were significant. In Thompson and Bower's study (1968) the highest

achieving teachers were those who mixed convergent and divergent questions.

2.2.2 Use of 'Questioning-Answering' showing No Significant Results

Cohen (1972) in a twenty-week observational study examined the classroom questions of tenth and eleventh grade Science, English and Social Studies and tried to find out whether the frequency and type of questions were related to changes in pupil thinking. It was found that no significant difference existed between the number of high level questioning science and non-science teachers. Finally, it was found that the high level questioning behaviour of teachers, as determined from this study had negligible effects on pupils' critical thinking ability.

Among the investigations in which questions were classified into two types, significant results were not found in the studies of Harris and Serwer (1966), Harris et al., (1968), Perkins, (1965), Wright and Nuthall (1970). Reid's (1973) study was designed to investigate the effect of four treatments consisting of high and low inference questions arranged in several sequence patterns to help stimulate the twelfth grade Social Studies students' desire for more information and sustained reflection. Each student remained in his treatment group for three tasks. In each task all students eventually responded to the same inference questions

In each case no significant difference was found. Spaulding (1965) conducted a study with fourth and sixth graders in 'Reading' and 'Mathematics'. Study continued for two semesters with 21 teachers. He defined the eliciting of a specific answer as containing both 'Recall' and 'Open-ended' questions giving 'Mental Arithmetic' problems. 'Open-ended' questions were those which elicited 'judgment, opinion, interpretation, hypothesis, or prediction'. In his study high-achieving teachers asked fewer 'open-ended' questions.

2.2.3 Use of 'Questioning-Answering' as Dependent Variables

There are some studies where questioning behaviour has been treated as dependent variable. Downs (1972) in his study tried to find out whether it was possible to teach preservice elementary educator through either classroom or independent study to ask questions requiring higher levels of cognitive thinking. Data were collected from pre and posttests given to 73 Elementary Education Majors. The experimental groups differed significantly in increased number of high level of questions asked and decreased number of memory questions between the pre and post tests. The independent study group transferred improved questioning techniques to the elementary class room while the classroom instruction group did not. The five fifty minute-periods devoted to instruction on question asking, one period per week revealed in a significant increase in the number of

above memory questions and a decrease in the number of memory questions asked by the experimental groups. The control group went in the opposite direction.

But Radtke's study (1973) shows a different picture. The study began with a strong concern felt by the researcher with the predominantly lower cognitive level of questions used by elementary student teachers while leading Social Studies discussions. The results of the statistical analysis led to the conclusion that the experimental treatment had little effect in changing the total number of questions asked. There were no statistically significant differences between experimental and control groups in their use of a variety of questions.

Centre of Advanced study in Education (CASE, Baroda) has concentrated on many experimental studies taking teaching behaviours both as dependent and independent variables. The following r studies directly related to the present study, have considered Questioning and Answering as independent variables for the study.

In an experimental study Sharma (1972) tried to find out the relative effectiveness of four patterns of teacher classroom behaviour-narration, open questions, narrow questions, and narrow questions with feedback upon pupils attainment in terms of knowledge, comprehension and application objectives. The study was conducted on pupils of standard VII

Social Studies. It was found that pattern involving narrow questions was more effective in achieving the knowledge and comprehension objectives. No pattern was found to have any differential effect in achieving the application objective.

The study by Beseda (1973) indicates that pupils taught by teachers who were trained to use more divergent questions, did not show significant gain in Social Studies achievement or critical thinking ability. In fact, increase in divergent questions by the teachers produced a decrease in critical thinking of their pupils.

Padma (1975) evolved her study on the basis of Johns (1968), Sharma (1972) and Beseda (1973). The objectives of her study were to find out the effectiveness of four patterns - Lecturing - Problem Solving Approach pattern, Questioning-Answering-Problem Solving Approach pattern, Questioning-Answering-Feedback-Problem Solving Approach pattern and Lecturing-No Problem Solving Approach Pattern - on the development of applicational ability and retention of applicational ability in Science of Standard VII pupils of Baroda city (India). Two designs were used for the study, the first one was 4 X 4 Graeco-Latin Square Design and the second one was completely a randomised design. The first experiment continued for one month, i.e. each class receiving same treatment for four days while in the second experiment each class received treatment for six days.

Data were analysed using analysis of variance in experiment I and analysis of covariance in Experiment II. Findings as reported in the study were (i) the four teaching patterns had equal effects on the development of applicational ability when measured under surprise testing condition, (ii) the four teaching patterns had equal effects on the development of applicational ability when measured under planned testing condition and (iii) in the first experiment it was found that four teaching patterns had an effect on the retention of applicational ability. On further analysis it was found that the mean for Pattern (P_3) i.e. Questioning-Answering-Feedback-Problem Solving Approach, was significantly smaller than other three patterns.

Shaida's study (1975) was more or less in the line of Sharma (1972). His objective of study was to find out the effects of four teaching patterns - Narrow questions with Feedback (P_1), Narrow Questions without Feedback (P_2), Broad Questions with Feedback (P_3) Broad Questions with no Feedback upon the attainment and retention of Eighth class boys in Social Studies in terms of knowledge, comprehension, application and total scores. The design followed was Graeco-Latin Square (4 X 4) for four weeks i.e. each class had each treatment for four successive days. Findings were- (i) difference between mean for knowledge scores under treatment P_1 and P_2 was found significant and was in favour of P_1, (ii) difference between means for knowledge scores

under treatments P_3 and P_4 was not significant, (iii) difference between means for knowledge scores under treatments P_1 and P_3 was significant and was in favour of P_1, (iv) difference between means for knowledge scores under treatment P_2 and P_4 was not significant, (v) Patterns P_1 and P_3 produced similar effects upon attainment of pupils in terms of comprehension and total scores, (vi) patterns of Narrow Questions with Feedback and Narrow Questions with no Feedback produce similar effects upon application scores, (vii) the pattern of Broad Questions with Feedback resulted into higher scores for application than the other patterns.

2.3.0 Discussion

Discussion is one of the very significant teaching variables frequently compared with different methods of teaching. The proponents of discussion method have claimed characteristic advantages in problem solving, application of knowledge and other higher level objectives. It would be seen appropriate to evaluate the method primarily in terms of success in these areas.

2.3.1 Use of 'Discussion' showing Significant Results

The following studies show the effectiveness of the discussion method when compared with that of lecturing.

In Bane's studies (1925, 1931) discussion groups shpwed higher scores in delayed recall.

In the study of Beach (1960) less sociable students scored higher on multiple choice questions and in another study more sociable students scored higher on multiple choice questions. Gerberich and Warner (1936) found less able students showed higher scores on multiple choice questions, matching,true/false and other examinations. Rickard (1946) showed better results in delayed recall test. Ward (1956) while measuring understanding of information by more able students found discussion to be more effective.

Kohut's (1975) purpose of study was to compare the student achievement on different types of examinations, changes in student attitudes toward the Social Studies as a result of particular instructional patterns by using Pretest-Posttest Control Group Design with 950 pupils in grades Nine through Twelve for six weeks. Pupils taught by a pupil-centric instructional pattern showed significantly higher score on a subjective examination, subjective retention examination and expressed significantly greater approving attitude toward performance and capability of the teachers' instruction compared to pupils taught by a teacher-centric instructional pattern. Ward (1956) found greater expression of individual differences in the case of academically superior students.

In the study of Yost (1972) with tenth grade students treatment was significantly effective regarding achievement

and use of critical thinking and study habits. Crocker and others (1974) studied two modes of discussion-structured and unstructured which were operationally distinguished by the degree of teacher control over the conduct of pupil investigations. Subjects were from grade six pupils of Elementary Science. It was found that subjects achieved better when taught in the structured mode and exhibited a significant preference for the same and that preference was significantly related to the class and IQ.

2.3.2. Use of 'Discussion' showing No Significant Results

Following are some studies, though the findings are not significant but need a careful examination. Here the nature of studies moves as if along a continuum of directive-nondirective scale.

Miller (1966) attempted to determine the relative effectiveness of highly directive teaching (Method A) and the teaching roles more responsive to learner cues (Method B). Pupil thinking,pupil attitudes toward the learning experience and the particular subject matter studied and growth in pupils' achievement in a defined content area were used as criteria. The general design for the study involved teaching 100 Seventh and Eighth grade pupils, with lessons on Economics. The pupil population was randomly divided into two main treatment groups each of which studied the same 30 minute lessons. Half of the groups of the pupils were

instructed under teaching which was more directive and the other half, under teaching which was more responsive. Each of four teachers taught one group of pupils by Method A and one by Method B. The classroom teaching was recorded and pupils comments were classified at four levels of understanding recognition or recall, three levels of inference, error and comments which were procedural. Pupil attitude, pupil mastery of content facts, and pupil achievement of content meaning were also studied through use of pencil-and-paper instruments. There were no difference with significance in the mastery of facts and in higher understanding.

Mitchell (1972) investigated the effects of three instructional strategies (i) an open learning environment, (ii) a formal lecture - discussion approach and (iii) the classroom teacher situation on the children's interest in Science, children's Science skills and Knowledge.

A sample size of thirty undergraduate education students was randomly selected, who would be doing their student teaching during the fall semester and the grade levels involved were limited to One, Four, Five and Six. The results of the data analysed showed that no statistically significant difference occurred among the groups of the prospective teachers. The data gathered from the instruments responded to by the children on the other hand, did show

statistically significant differences.

Walker (1973) attempted to study the effect on SQ3R (Survey, Question, Read, Recite, Review) study method of instruction upon the achievement of students in fifth grade Social Studies. Two classes were selected to serve as the experimental group and the other two classes as the control group. The investigator spent equal time with the control and the experimental group (19 times 30 minutes' period). The analysis of covariance was applied and the experimental group showed no significant difference in mean gain in Social Studies on the basis of sex, I.Q. when compared with traditional method.

Wispé's study (1951) seems to bear directly on the intellectual advance, at the very frontiers of knowledge. On the basis of an extremely detailed first hand study of lecturers in action she discovered a meaningful descriptive dimension to be directive/non-directive teaching style. There were no significant differences as far as bright students were concerned. But directive teaching was superior in enabling the duller students to do well in their examinations. Most students preferred the directive method.

Yaoff (1973) examined the differential effects of involvement and inquiry activity on the Elementary School children taught with three open teaching styles : teacher-guided, small-group, and individual-oriented. Each of the

three groups of students were taught by one of these methods. Three teachers were trained to use all the styles and they chose one for the study. There were thirty children, ten in each group. The inquiry took place over a period of five weeks, one and half hour each afternoon. All three open styles appeared to be viable.

The following study, though not directly related to the present one under investigation, the variables used therein are however, indirectly related to the present one as the investigator assigned some activity to the group taught by Strategy (S_3), Discussion by using Instructional Materials.

The purpose of Coatney's (1974) study was to determine the effect of activity and responsible assignments on learning from Written Materials. There were three treatments - (i) responsible assignment (R), (ii) active treatment (A), and (iii) inactive treatment (I).

The results were that (1) $I < A$, at the .01 level of significance on the test of application and at .01 level on the test of knowledge (2) $A < R$ on both tests and A in fact slightly superior to R.

2.4.0 Use of Instructional Materials

Very few studies so far have been found showing the use of Instructional Materials.

Baker (1973) while dealing with the technology of instructional development, and Lumsdaine (1963) dealing with instruments and media of instruction, hardly mention of software instructional material and its effectiveness for developing learning outcomes, specially in the cognitive domain. The following is one of the very few studies conducted with this variable.

2.4.1 Use of Instructional Materials showing Significant Results

Mathias (1975) intended to conduct and report on a controlled study relating to the instruction of Eighth Grade students in selected critical thinking skills.

The study group included Eighth Grade students (737) in twenty five Social Study classes in two junior high schools ; one school was the treatment group, the other the control group. Existing instructional materials were used with the controlled group while the treatment group used the same materials supplemented by the special materials selected for the study. Following the eight week instructional period the Watson-Glaser Critical Thinking Appraisal was readministered. Specific conclusions indicated that (i) planned instruction in selected critical thinking skills made a statistically significant difference in a student's ability to think critically, (ii) a relationship exists between a student's ability to read and his

ability to learn to think critically. The three treatment group classifications scored higher on the post-test than any classification in the control group. The general conclusions are (i) effective instruction in critical thinking skills requires prepared materials and teaching procedures and techniques,(ii) teachers can use special instructional materials with limited training in specific critical thinking skills.

2.5.0 Behavioural Objectives

Since the publication of Mager's (1962) 'Preparing Instructional Objectives', many curriculum leaders, curriculum developers and classroom teachers have prepared and used behavioural objectives and have written profusely promoting the use of behavioural objectives. Most articles are, however, merely logical arguments. Dalis (1970) and Eisner (1967a) pointed out that the contributions of behavioural objectives to curriculum construction, teaching and learning, is an empirical problem. In recent years there has been heated debate over the usefulness of objectives. Empirical research has yielded inconclusive results. Findings are about equally divided between reports of significant difference and no significant difference in achievement where instructional objectives have been used.

2.5.1 Use of Behavioural Objectives showing Significant Results

Dalis (1970) designed the study (1) to provide data on whether student achievement can be influenced significantly by providing students, in advance of instruction, information on what is expected of them, as an outcome of instruction and (2) to investigate various ways of communicating to students, in writing, that which is to be learned in class. For the study 143 Tenth Grade students were randomly assigned to one of the three treatment groups. In conducting the study at the posttest, only the control group design was employed. A comparison of student achievement was conducted among those (i) S_s provided with precise instructional objectives (Group one), (ii) those provided with a set of vague instructional objectives (Group two) and (iii) those provided with a placebo (Group three) in advance of instruction. During the 3-weeks' study students were given messages from time to time and at the end of the experiment a sixty-eight item criterion test was developed to assess student achievement. Also an opinionnaire was designed to secure certain reactions by participants during the study. Throughout the experiment the teacher remained unaware of the specific character of the information being given to the S_s. Precise instructional group showed significantly higher mean score, in criterion test as well as selection of relevant activities than group two and three.

In Jenkin and Neisworth's study (1973) fiftyfive male and female students of Psychology were provided with objectives for each unit of instruction throughout a semester. They were randomly given one or two sets of objectives and later quizzed both with items which corresponded and which did not correspond to their objectives. Overall S_s perfomed significantly better on items which corresponded to the objectives they had been provided.

The study of McEwen (1972) was designed to examine the effects of communicated instructional objectives and of choice of study methods in reading the objectives as a means of changing the behaviour of disruptive students. Three Eighth Grade subjects whose behaviour either disturbed other students and disturbed the teacher or showed lack of interest in the subject matter and class activities, were selected for the study. Inspection and evaluation of the results showed that when given instructional objectives all students increased their appropriate classroom behaviour, raised their grades and completed more work. The data also showed that when instructional objectives were coupled with a choice of study methods, all students increased in appropriate behaviour, in grades and in rate of performance to a level above what was attained by instructional objectives alone.

Martin (1974) attempted to relate attitude, critical operation, terminal achievement and residual performance to the use of behavioural objectives while teaching the Basic Science Classes to the vocational students of Ninth grade who were the subjects of this study. Treatment for the experimental one differed only in one respect. During the lecture that initiated each daily module, each student in this group was givena a copy of the behavioural objectives to be used as a study guide. Following the completion of eight modules, a two-day test, requiring manipulative demonstrations of the skills taught was given.

McNeil (1967) has reported three studies which were designed to collect evidence as to whether supervision by objective produced predicted consequences. All the three studies showed significant results.

The study of Morse (1972) was designed with three questions. Can students benefit from training in the use of behavioural objectives prior to using them in an instructional setting, do behavioural objectives facilitate learning, when students have behavioural objectives, do they learn more material related to those objectives than material which is not related but contained within the learning tests ? Subjects were 34 female undergraduate students enrolled in a course in Human Development and the educative process was taught by the experimenter.

Subjects who received training in the use of objectives had more positive attitudes toward objectives than did subjects who received no training but exhibited only slightly more positive attitudes than did subjects who were trained in knowledge about objectives. Subjects trained in the use of objectives and who possessed objectives achieved higher scores on criterion test items related to the objectives when compared to all other groups but achieved only slightly higher scores than the other subjects who also possessed objectives.

Mitchell's (1975) study was designed to examine the application of behavioural objectives model of teaching in a beginning Clinical Methods course in a graduate school of Social Work. Two instruments were developed for use in this study. An instructional instrument was developed for use as an instructional guide for learning and given to the experimental groups. The criterion instrument was developed as a performance posttest to measure the mastery of the learning objectives for the course of study. Following a semester of study both the experimental and control groups were given the criterion test as a final examination.

In Russell's study (1975) an intact college class (288 subjects) was randomly divided into three treatment groups, (1) a group which received behavioural objectives (2) a group which received non-behavioural objectives and

(3) another group which received no objectives. During six week period, treatment effects were assessed on seven criterion measures. Sheldor's study (1973) with English and Algebra courses in Community Colleges the experiment group provided with detailed behavioural objectives scored significantly higher than did the control group without the objectives.

Zeigter's study (1974) evaluated the effect of general college students' knowledge and utilisation of behavioural objectives in cognitive domain on achievement and attitude in a music appreciation course.

2.5.2 Use of 'Behavioural Objectives' showing No Significant Results

Baker (1969) conducted an experiment in the field of Social Science where one of three lists of objectives - one list non-behavioural, the other two behavioural ones, was randomly assigned to participating high school Social Studies teachers who were instructed to teach objectives in their classes.

Teachers were instructed to teach five objectives within two class periods. The tests were administered immediately following instruction. Analysis of variance was applied. Results of the analysis yileded no significant differences.

The purpose of Coleman's (1972) study was to compare the relative effectiveness of using or not using performance objectives prior to instruction on cognitive learning outcomes in Physical Science Course for twelve weeks.

The purpose of David's study (1972) was to examine any relationship between Project Physics students' use of a list of behavioural objectives and achievement and appropriateness of confidence, retention and classroom learning environment. No significant differences between the experimental and control groups were found in achievement or retention scores.

Gibson's study (1974) was made to examine the relationship between a student's acceptance of the instructional objectives of the course and the amount of his learning as measured by tests on the objectives.

Hawk (1976) took the study to investigate the effect of the use of the behaviourally stated objectives upon the achievement of high school students in Social Studies. Control group teachers had no experience of behaviourally stated objectives. Study was conducted for three weeks showing no significant difference between the control and experimental groups.

Moody (1974) undertook the study to assess the relative effectiveness of behavioural objectives in independent study materials on the initial learning and retention of Social Studies content by high school juniors in contrast to independent study without stated behavioural objectives. Bloom's taxonomy of educational objectives - cognitive domain was used in the study.

Payne's (1972) hypothesis was that students and teachers knowing and using behaviourally stated objectives gain in achievement test in high school Chemistry than those using non-behaviourally stated objectives. The hypothesis was rejected.

In Rablais's study (1972) with freshmen and sophomore students of General Psychology, the controlled group was not given a list of objectives but was given the same learning experience as that of the experimental group.

In Suckley's study (1972) the Eighth grade students with three treatments as (1) no objectives, (2) unit objectives, (3) unit and specific objectives, revealed that there was no increase in factors relating to cognitive development due to providing behavioural objectives.

An investigation was undertaken by Theodore (1975) to determine the effects of behavioural objectives on achievements in a Biology class which utilised a self-instructional multi-media approach. Experimental group I was provided with a list of behavioural objectives prior to instruction of each of the thirteen weekly units. Experimental group II received the behavioural objectives beginning with unit 8 and containing through unit 13. The control group did not receive any behavioural objectives or placeb . Instruction was presented by means of tape-presentation, student study guides, displayed, experiments, and charts. Analysis of data revealed that there was no significant difference of mean scores in unit task, standardised achievement test for three groups.

2.5.3 Use of 'Behavioural Objectives' showing Mixed Results

Few more findings have been reported, studying behavioural objectives as independent variable and showing mixed results.

Ferre (1972) studied the effects of providing behavioural objectives with three groups - (A) who were given no perfomance objectives (B) who were given the performance objectives once at the beginning of each unit, and (C) who were given the perfomance objectives daily. Significant differences were found between group mean scores

on learning and retention, (C) gaining more than (B) which gained more than (A). There were no significant differences on the attitude measure and the attitude was unrelated to achievement.

Lawson (1972) attempted a study to determine (1) asto which of the two types of specificity objectives promoted the greatest cognitive development, (2) to ascertain the effect of placement of objectives on cognitive achievement within two specificity treatments, (3) to determine the influence of the above stated variables on both intentional and incidental retention as measured by delayed achievement test and (4) to determine the effects of specificity and placement of objectives as measured by the students' perceptions of instructional objectives scale. The materials were presented to introductory Engineering students. Eighty four of these students on which total data were available were utilised in all reported analyses.

Analysis on immediate achievement disclosed that all objective treatments combined were superior to the Conventional Learning Directive group. However, neither level of specificity of objectives nor their respective placement yielded significant differences among themselves on retention, the groups which received objectives were superior to those utilising general objectives. Moreover,

all experimental treatments combined yielded superior results on retention as compared to CLD group. Further analysis on immediate achievement indicated that there was no significant difference produced by the placement variation under which objectives were presented to S_s. This finding was applied to delayed achievement. Additional analysis disclosed that on immediate achievement, neither intentional nor incidental learning was influenced by either specificity of instructional objectives or their placement.

The purpose of True's study (1974) was to explore the effects of overtly revealing performance objectives prior to instruction on achievement of vocational students in Industrial Communications; the population selected was composed of Automobile Machine and Food-Processing Technology students. Teaching methods were identical with both the groups. A non-equivalent control group design was used. The data were collected for 10 weeks during the presentation of eight units of work. Achievement was measured by the difference between pretest scores and post/test scores. An analysis of covariance was used in the study. Analysis of results showed that (1) the control group achievement was greater for four units of work and (2) the experimental group achievement was higher for two units of work. Achievement for both groups was not significant on two units of work. In this study it was

determined that by overtly revealing perfomance objectives there was little or no effect on achievement.

2.6.0 Significance of the Related Studies and the Present Study

Regarding the use of behavioural objectives twenty three studies have been reported ; amongst them ten showing significant results and ten showing no significant results and three showing mixed type of results. These type of findings put one really in a very challenging situation especially when one is strongly convinced of the sound theoretical foundation of the use of behavioural objectives.

Regarding the use of lecturing, questioning-answering and discussion, findings reveal that almost equal number of studies are showing more significant and less significant results and number of studies are much more which indicate no significant difference between two methods of studies specially when lecturing is compared with discussion. As a summary of all studies related to these variable it may be said lecturing is equally effective as questioning-answering or discussion regarding informative aspects of learning. Lecturing and narrow questions are more effective than broad questions regarding immediate recall. Broad questions are more effective than narrow questions regarededing comprehension and retention. Discussion is more effective than lecturing regarding comprehension and retention.

By analysing allt these available researches in the methods and techniques of teaching, the investigator is satisfactorily convinced that one single teaching variable cannot achieve all the objectives of a particular unit. While each unit contains more than one objectives, it is to be explored an effective synthesis or sequencing of different methods for different parts of the unit.

It has been repeatedly emphasized by different Education Commissions, experts in the fields of research, curriculum planners and educational reformers that the most important aspect of education is that there is a wide gap between teaching and learning outcomes. In order to meet the gap, a conscious effort for finding out a proper synthesis of methods, which the investigator terms as strategy, is to be made by every conscientious researcher.

On the basis of previous researches with these independent variables and investigator's experience in the field of teaching the following strategies were formulated.

1. Strategy S_1 - Lecturing and Questioning-Answering
2. Strategy S_2 - Lecturing and Questioning-Answering by using Behavioural Objectives.
3. Strategy S_3 - Discussion by using Instructional Materials.

2.7.0 Following null hypotheses have been formulated by the investigator on the basis of review of researches and own experience in the field of teaching.

Hypotheses Related to Post-achievement :

H_1 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives and Strategy (S_3) Discussion by using Instructional Materials in terms of pupils' attainment of Instructional Objectives at knowledge level in Geography for students of Standard IX.

H_2 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives, Strategy (S_3) Discussion by using Instructional Materials in terms of pupils' attainment of Instructional Objectives at comprehension level.

H_3 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives. Strategy (S_3) Discussion by using Instructional Materials in terms of pupils' attainment of Instructional Objectives at application level.

H_4 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives, Strategy (S_3) Discussion by using Instructional Materials in terms of pupils' total achievement (knowledge, comprehension, application taken together).

Hypotheses Related to Retention Test :

H_5 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives and Strategy (S_3) Discussion by using Instructional Materials on retention of pupils' attainment of Instructional Objectives at knowledge level.

H_6 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives and Strategy (S_3) Discussion by using Instructional Materials on retention of pupils' attainment of Instructional Objective at comprehension level.

H_7 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives and Strategy (S_3) Discussion by using Instructional Materials on retention of pupils' attainment at application level.

H_8 - There will be no significant difference in the mean scores of the groups taught by using Strategy (S_1) Lecturing and Questioning-Answering, Strategy (S_2) Lecturing and Questioning-Answering by using Behavioural Objectives, Strategy (S_2) Discussion by using Instructional Materials on retention of pupils' total attainment (knowledge, comprehension, and application taken together).

2.8.0 Assumptions

1. There is no carry-over effect in the teacher behaviour from strategy to strategy as teacher is programmed.

2. Knowledge, comprehension and applicational abilities are measurable with different types of tests.

3. Knowledge, comprehension and applicational abilities are common scores various units of geography teaching.

4. Different types of objectives are attainable by making synthesis of different types of methods.