Chapter - II

REVIEW OF RELATED LITERATURE
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2.1 Introduction

Review of related literature is an integral part of any research activity, helps to have a clear vision and plan of action with reference to any specific aspect of the study. In present study, an extensive review of the related literature in relation to the impact of different models of teaching in general and that of the synectics model of teaching in particular have been made. According to J.B. Best (1997) a familiarity with the literature in an problem area helps the researcher to discover what is already known, what others have attempted to find out, which methods are promising and what problems remains to be solved.

The investigator has reviewed the reports of previous researches, dissertations, articles, surveys, reports, books and internet resources. The findings, opinions and statement of various researchers and authors which have a implications on the present study are presented in this chapter.

2.2 Related Studies on Development of Creativity of High School Pupils

Many studies have been done all over the world to answer the question on the development of creativity of pupils. Some comprehensive reviews have been conducted by Parnes (1967), Torrance (1972), Massfield, Busse and Karepelka (1978), Parnes (1978) and Torrance (1986). Parnes reviewed forty studies. Ninety percent of these studies reported increase in creativity by deliberately designed educational programmes.

Torrance (1972) conducted a survey of one hundred and forty two studies. He concluded that the percentage of success of these studies ranged from fifty percent to ninety percent which indicated
clear cut possibilities of the development of creativity by deliberately
designed procedures.

Massfields, Busse and Kerpelka (1978), surveyed sixty five
studies, most of the studies have shown effectiveness of these training
programmes in enhancing the creativity scores of the subjects. Rose
and Tallin (1984) conducted a “meta analysis of long term creativity
training programmes” the result of this analysis suggested that
training does affect creativity. Similarly Cohn (1984) conducted a
research Synthesis to evaluate one hundred and six published studies
for their effectiveness. The results suggested that creativity can be
enhanced.

In India Passi and Gayatri (1989) in their study “Developing
Educational Implication of research findings in the area of creativity in
Indian context” have analyzed one hundred and sixty six studies on
creativity and located only eleven studies on the developmental
aspects of creativity.

In the following paragraphs the types of research studies have
been discussed are:

a) Creative problem solving method, b) Programmes for developing
thinking skills, c) Complex programmes involving packages, (i)
Feuenstien instrumental enrichment programme, (ii) Purdue creative
thinking programme, (iii) Productive thinking programme, d) Training
in creative appreciation, creative perception and divergent thinking, e)
Methods of teaching, f) Methods for developing creativity,
(Brainstorming, Morphological analysis, Role-playing and Synectics) g)
Transcendental meditation, h) Other programmes.

a) Creative Problem Solving Method

The creative studies project (Buffalo 1969) Reger (1987) and
Results of the creative studies were extensive and highly positive.
Eager’s (1982) findings showed that any gain or difference in creative
productivity could not be directly attributed to the instruction in
problem solving. Roger’s (1987) findings showed positive effect on the
variables tested. Out of these studies only two studies showed positive results.

b) Programme for Developing Thinking Skills

Miller (1981), Johnson (1984), Buske (1985) and Milre (1986) studied the effect of progress like CORT lesson of De Bono, Lateral thinking techniques of De Bono etc. for developing creative thinking skills. Of these four studies, Johnson (1984) and Busku (1985) used CORT lessons and both of them got positive effect on all measures of thinking skills of creativity. Other two studies used De Bono's Lateral thinking techniques for training Meir (1986) got significantly effective result on Guilford's test of divergent thinking and Miller (1981) got nil effect in generating alternative solutions to figural problems. Among the four studies examined under this category three of these revealed a significant effect of the treatment.

c) Complex Programme Involving Packages

(i) Feuenstien Instrumental Enrichment Programme (FIE)

Ruiz and Castanda (1983), Ruiz (1985), Feuentien et.al. (1979) and Feurestein et.al. (1985) used FIE programme for their study to find out its effectiveness for developing thinking skills. These studies and several other studies using this programme in Israel, Venezuela, Canada and the United States failed to find clear FIE effects and must for one reason or another, (e.g. weakness of the experimental intervention, conflicting outcomes on different measures inadequate of experimental control, insufficiencies of the information provided were difficult to interpret).

(ii) Purdue Creative Thinking Programme (PCT)

Feldhusen et.al. (1970), Feldhusen et.al. (1971), Hubez et.al. (1979) Feldhuson et.al. (1976) and Pitts (1975) tried to find the effect of PCTP. Although there were several conditions highly effective with fourth graders follow up study, the programme failed to show any
general long term effect on creative thinking abilities. Patel (1987) developed creativity in his sample.

iii) Productive Thinking Programme (PTP)

Treffinger et.al. (1974), Feldhusen, Shovel and Treffinger (1972) and Gold and Houtz (1984) studied the effect of PTP and of these of studies of Treffinger et.al. (1974) and Feldhusen et.al. (1972) were comparative studies between PTP and PCTS. All studies showed significantly effective results in enhancing creative thinking abilities and PTP produced more consistent gains.

d) Training in Creative Appreciation, Creative Reception and Divergent Thinking


e) Methods of Teaching

In this respect Haneock (1981) studied the effect of guided design, self instruction and group problem solving. Guided design did not improve the creative thinking ability. Mosher (1986) showed the effect of children’s literature and found increased ability to identify problems. Dividson (1981) used training in creativity and supervision related to childcare to the experimental and control groups and then reversed the treatment. The experimental group scored significantly higher to TTCT. Cebellos (1986) used inductive and deductive approach and got equally effective results in concept formation and higher order thinking. Foster (1981) stimulated creativity in small cooperative groups and got positive results. Nair (1978) used creative methods against traditional methods and got positive results. Shah
(1981) tested four different teaching strategies and found that strategy with the use of audio-visual aids was significantly effective. Pillay (1978) taught Geography through morphological analysis and brainstorming and could not find differential effect. Miyen (1982) tried three method, “Tell and do”, “Guided discovery” and “Pure discovery” and none of them were significantly effective. Prasad (1979) applied the discovery method of teaching against traditional methods of teaching and found the method significantly effective in developing fluency, flexibility and originality. Of the ten studies reviewed under teaching methods, six studies were significantly effective in developing creative thinking.

Beada (1979), Gupta (1977) and Deshmukh (1980) studied, techniques like brainstorming, role-playing, and synectics. Beada (1979) used synectics model and found that it had potent influence on ideational output. Gupta (1977) used brainstorming technique, but failed to see any significant effect except on fluency factor of seeing problem test. Deshmukh (1980) used brainstorming and role-playing technique and found significantly effective. Patel (1988) reported that brainstorming group did better on creativity and its components.

Roliso (1987) developed a systematic practice in generating alternative courses of action in decision making situations and found effective in real life situations. Davis et.al. (1979) developed a programme for thinking creativity which was a guide to training imagination and got 65 more creative ideas. Greffith (1988) tried deliberate and exaggerated use of imagination particularly connection making and synectics and got significant improvement. Lloyd (1982) compared behavioural creativity enhancement programme with a ‘stimulation creativity enhancement programme’ and found behavioural programme significantly superior to the other. Markwitz (1982) tried creativity intervention training and found that creative and flexible thinking can be enhanced Lerose (1987) tried systematic creative training and found if significantly effective in problem solving skills and higher order thinking skills. Schertz (1980) developed a
total creativity programme for individualizing and humanizing the learning process and got certain traits like imagination, complexity, etc., improved.

**Jarial (1981)** developed a programme for verbal and non-verbal creative thinking abilities and found the programme significantly effective. Bhaskar (1981) evolved a programme based on some exercises providing training and found significantly effective. Upadhya (1981) conducted some training activity sessions, and found that stimulating environment significantly increased creativity scores. Nerpharake (1977) applied integrated programme of creativity training and found it significantly effective. Vora (1984) reported that divergent thinking programme with and without feedback did increase creativity. Gupta (1984) found that the creativity training programme was successful in developing both verbal and non-verbal creative thinking in students. Singh’s (1985) specially designed teaching strategy had significant effect on creativity and its different dimensions. In almost all the studies under this category significant effect was reported.

g) **Transcendental Meditation**

**Ball (1979)** compared transcendental meditation, TM siddhis programmes and course in developmental psychology and found that TM and TM siddhis significantly more effective than the other. NCERT carried out a study in this respect and got positive results. Sansanwal et.al. (1980) investigated the effect of TM and found certain components of creativity improved.

h) **Other Programmes**

**George (1985)** investigated a programme “talents unlimited” and the treatment worked for developing planning skills. Garber (981) tried “Igniting creative potential programme” and could not find any improvement. Ouilling et.al. (1971) treated “Saturday subway ride” and supported the effectiveness of the programme. Rose (1985) tried
the "Peabody language development kits" (PLDK) and found the effectiveness. Shore (1987) studied the effect of "Longs programming experiences" and got positive results. Dongaphy (1988) tried "New Directions in Creativity Mark 1" and failed to get any improvement. Lowery (1980) tried various instructional methods like New Directions In Creativity Basic (NDCB), New Directions in Creativity Enhanced (NDCE) Music and Imagery (MI) and found that MI was more effective. Amin (1988) found the programme was utilized for twelve weeks. Michael (1988) reported that treatment for creative thinking was effective when certain personality variables were controlled.

Jnana Proboddini of Poona, has been conducting regular classes through which attempts are made to foster the creative thinking abilities of the students. The concept of development of the creativity of students was started in 1978. At present, this institution is imparting training in creative thinking to the students from grade V to IX.

It may be observed from the above review that attempts have been made to develop creativity. A number of procedures have been tried so far. Hence in the existing state of affairs, it is not possible to form a final opinion regarding the adaptability or usability of a particular creativity developing procedure specially in the Indian culture. Like other cultures, in Indian culture also, it is very much possible to develop student's creative thinking abilities through deliberately designed creativity developing procedures.

Torrance (1986) in his review of researches has quoted "there seemed to be listed or no tendency in experimental studies to embrace such disciplined procedures as Synectics". Jarial (1981) suggested "Synectics method though found effective, more experimental research was needed in this area".

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2.3 Related Studies on the Effect of Techniques and Methods of Nurturing Creativity

Baron, T. (1969) studied the effect of process like CORT lessons of De Buno, Lateral Thinking Techniques of De Buno etc. for developing creative thinking skills. The studies showed a positive effect on all measures of thinking skills of creativity.

Taylor, C. W. (1972) made a study on developing teaching strategies to encourage students to solve problems in science creativity.

Haughty (1984) used productive thinking programme for developing creativity. It comprised of self instructional material having sixteen programmed instructional booklets in which children were taught to become better problem solvers through the presentation of a number of detective problems and by utilizing several guide posts for effective thinking. The findings showed the significant effect of these programmes on figural fluency and originality of Torrance test of creative thinking.

Gupta (1985) studied the development and evaluation of Creativity Training Programme (CTP) for sixth grade children and found that the programme was successful in developing creative thinking abilities both verbal and non verbal among students.

Singh (1985) made a study of the effect of a specially designed teaching strategy and socio-psychological factors on creativity among middle school children. The result showed that the specially designed teaching strategy had significant effect on creativity and its different dimensions.

Sharma (1986) used different types of media, modules, silent films for the development of creativity and found that successful employment of stimuli did not depend upon their inherent quality but upon the teaching climate within which they were presented and upon the teacher who carried the atmosphere for imaginative responses.

Nadanpawar (1986) developed a creative method to develop linguistic creativity in Marathi among students. The study found that
the method had a significant effect on language proficiency overall creativity and all the abilities involved in linguistic creativity.

Patel (1987) used Purdue Thinking Programme to foster divergent thinking ability of verbal and figural, fluency, flexibility, originality and elaboration among primary school children. The findings show a significant effect of these programmes on creative ability of IV, V and VI grade students.

Albana (1987) used an experimental training programme which included invention activity, relaxation, visual stimulation and was successful in developing creativity.

Lerose (1987) tried systematic creative training and found it significantly effective in problem solving skills and higher order thinking skills.

Shore (1987) studied the effect of "Logs programming experiences" in creative thinking and got positive results.

Patel and Rao (1988) tried to show the effectiveness of brain storming in improving the creative thinking ability in Indian setup. The findings proved that brainstorming proved powerful for developing fluency and flexibility component of creativity.

Amin (1988) studied the effectiveness of creative thinking programmes on the creativity level of the school children in relation to the programme correlates and found that (i) The main effect of the training on creativity by the programme was significant for creativity and its component (i) measures fluency and originality (ii) when the programmes I were utilized for as long a period of twelve weeks, enhancement I of creativity seem to be superior irrespective of discussion and programme instructors.

Mohammad (1989) conducted a study to find out the effect of discovery method of taming on creative thinking abilities of students. The findings showed that the discovery I method of teaching proved significantly effective in developing fluency, flexibility and originality dimensions of creativity.
Gurpas Agnela (1990) presented a paper in which four steps were mentioned which helped to improve creative thinking they were (i) preparation, (ii) incubation, (iii) illumination (iv) verification.

Shaughnessy Michael (1991) in his paper on the curricular of students “Creative Poetential” gave suggestions for enhancing creativity in the classroom setting. The suggestions for enhancing creativity in the classroom setting were given. The suggestions were finding something positive in all ideas, systematically rewarding creativity, demanding activity of students giving credit for creativity in grading and modeling creative behaviour.

Lawal (1991) in his study on the relationship between social studies classroom environment and the development of creativity, recommended means of promoting creative skills.

Renzelie-Josephs (1992) presented a general theory for developing creative productivity in young learners by examining interaction among teachers (abilities, interest, learning styles) and the curriculum.

Paul (1993) contented that the creativity dimensions of thinking is fostered the best by joining it with critical dimensions.

Soriano-de-Alencar (1993) suggests the use of brainstorming and attribute listing to produce new idea combinations.

Bampole, Ellen and others (1994) studied the “Use of Imagery” for creative writing for academically gifted students and found groups receiving guided imagery practice generated more original writing which contained more sensory description than comparison groups.

Gaekwad, Nautial, Pai and Paremu (1994) made a study to examine the effect of brainstorming on the creativity scores of institutionalized and non-institutionalized girls within the age range of 10-15 years. The sample consisted of 26 institutionalized and non-institutionalized girls each. A significant elevation in the creativity scores following brainstorming session were seen in the experimental groups, particularly the institutionalized subjects.
Indu Bansal and Shika Agarwal (1997) conducted a study to find the difference in creative ability of young children of rural and urban community before and after exposure to computers over a period of time. The sample consisted of twenty four students of 4th and 5th class evenly distributed between rural and urban groups. These children were given Bacquer Mehdi’s test of creative ability and were then randomly divided into two groups. A treatment group worked through computer using software Akanksha and received coaching. The results showed a great improvement between the pre-test and post-test scores for the treatment group than for the control group. No significant difference was found between rural and urban children.

2.4 Studies Related to Synectics and Creativity

One such method of teaching is synectics which can be used to teach sciences, social sciences or language in the classroom. Researchers did tests effectively in the classroom for teaching various subjects.

Khatena (1973) attempted a study to ascertain whether college men and women identified as high and low creative would produce more original verbal images when taught to use creative imagery and analogy than they had previous to such training. For this, through a special training programme, the experimental group was taught to use simile, metaphor, personification and allusion as comparison form within the four types i.e., personal analogy, symbolic and fantasy analogy, as suggested by Gordon (1961). Experimenters were trained for 200 minutes (four sessions of 50 minutes each) over a period of 10 days. All the subjects were administered onomatopoeia and images (Khatena and Torrance, 1973) as a post-test and it was found that the training programme significantly increased the mean originality scores of the students.

Korth (1973) conducted a study to find out the effect of training in the synectics method of group problem solving and achieved limited
success to college students. He further revealed that synectics training significantly enhanced associational fluency but had no effect on several personality measures or on rating of inventiveness and usefulness for two real life problems. Similar results were also supported by Perkins and his associates (1979). They used synectics model of teaching in order to teach general class sessions of two hours each to the method and found that although analogy is important in explanation and argument, it rarely contributes to discovery.

Bates (1975) made an attempt to investigate the comparative effect of two methods of helping ten and eleven year old students to solve three problems in elementary school science. One method consisted of providing a verbal principal with each problem. The second method involved the use of analogy, that is, the connecting of seemingly unrelated qualities, states or objects, using the format of problem solving approach called synectics, seven problems were designed for testing. To analyze the data, pre-test and post-test control group design was employed. The analysis of scores indicated that the students receiving analogues were not significantly superior in hypothesizing than those in the other groups. Further, they showed that male students receiving analogues were comparatively successful with this type of aid while females were not. The subjects in the analogues and principle groups scored significantly higher than the control group in forming new analogues indicating a possible training effect.

Khatena (1976, 1978) also made two attempts to find out the effect of synectics model of teaching and gave a number of suggestions for parents as well as teachers. He found that the students, who had learned not only to think in analogies but also to deliberately use analogies as needed, stand an excellent chance of being creative and inventive as well as good problem solvers.

Another study was carried by Brown (1980) to see the effect of training in connection with making on students' vocabulary, reading skill and self-concept. For this, three groups of the students were
taken as a sample. The first group i.e., experimental group, was trained in synectics education system's connection-making using material. The second group i.e., control I group had sessions using materials adapted from those used by the experimental group. The third group (control group II) had no sessions. The results showed no significant difference after training. However, it is indicated improvement in reading of sixth graders during the training period.

**Passi (1985)** also conducted a study to see the effect of synectics model of teaching on creative writing and showed a significant change in creative writing after the students were exposed to synectics model.

The findings of all these studies are inconclusive and conflicting. The reason may be that they used synectics model of teaching with different cultural samples and subjects. Another reason may be that they used different structural design of the model. Keeping these reasons in view, a need is felt effectively of synectics model is tested according to the structure of the model given by Gordon (1961). Further, as proposed by Joyce and Weil (1982) the model has its instructional and nurturing effects. The studies reviewed have not studied the effectiveness from the proposed point. There is a need to conduct studies to test the instructional and nurturing effects. The present study is a venture in this direction.

### 2.5 Studies Related to Factors of Creativity

While studying the effect of different teaching methods or programmes, researchers have mainly stressed on the study of factors of creativity like fluency, flexibility, originality and elaboration. These factors have been identified by Torrance (1962) as factors of general creativity. However, these may be different factors for specific creativity (Guilford) in sciences, languages or social sciences. In languages, like the general creativity factors, may be a specific factor of elaboration. Most of the researchers have not gone for the study of such specific factors. There is a need to study such specific factors.
which are specific to a particular creativity as an effective method of teaching.

The studies reviewed here point out that the synectics model of teaching needs to be studied for its effectiveness in the instrumental and nurturing effects as proposed by Joyce and Weil (1985) need to be studied. Language specific creativity factors have to be studied while studying the effectiveness of the model longer duration of the treatment for establishing the instrumental or nurturing effects of the teaching model, etc. It was with a view to filling these research gaps that the present study was undertaken.

The findings of the studies reviewed above are conflicting as well as inconclusive. Therefore, the directional hypotheses could not be conceived from the review. In this perspective, it was decided to have bi-directional hypotheses while comparing the effects of the synectics models of teaching with the conventional teaching method for all the dependent variables.

2.6 Studies Related to Development of Creativity

Many studies have been conducted all over the world to try out different methods for developing creativity. These include teaching programmes, teaching methods and instructional material.


Similarly, Renzuli (1973a, b) and Callahan (1973) designed a series of publication named as "New direction in creativity" which
consisted of a number of exercises to foster the divergent thinking. Callahan and Ranzuli (1977) reported evidence supporting the programme's effectiveness, based on a study of more than 600 sixth grade students from 22 rural, suburban and urban schools.

Almost all the researchers found that teaching programmes or learning material developed by them was effective in developing creative ability among their subjects. Apart from the reasons given by these researchers, one most prominent reason that seems to be affecting creativity was the specific teaching learning environment that was created by their teaching.

There are many other researchers who worked in different types of media, modules, silent films, etc., for the development of creativity and found the effectiveness of these on divergent thinking. They were Cunnigton and Torrance (1965), Sharpies (1967), Furness 91968), Feldhusen et.al. (1969), Luthe (1976), Rodge (1976), Badhure (1978), Ponnuswani (1980), Shah (1981) and Sharma 91986). On the basis of his study, Sharpies (1967) and Furness (1968) concluded that successful employment of stimuli did not depend upon their inherent quality but upon the teaching climate within which they were presented and upon the teacher who carried the atmosphere for imaginative responses.

Many researchers tried creative solving approach developed by Parnes and his associates to find out the improvement in creativity. The most pertinent are Paren (1959), Parnes and Meadows (1959), Parnes and Meadows (1960), Reese and Parnes (1970), Renners and Renners (1971), Noller and Parnes (1972), Parnes and Noller (1972, 1973), Biles (1976), Reese et.al. (1976), Kealey (1977), Noller and Biondi (1977) and Shean (1977). They found that creative problem solving helped in fact, finding, problem finding, solution finding and acceptance. These researchers found the significant effect of training on all measures of creativity i.e. fluency, flexibility, originality, elaboration and sensitivity.
Another most widely used technique had been Brain Storming. Meadow (1959), Parnes and Meadow (1959), Parnes and Meadow (1959) and Turner and Reins (1965) found brain storming technique as the most effective for improving the creative thinking of the individual in Parnes programmes. In Indian set up, Chatterjee and Mitra (1976), Deshmukh (1978), Piget (1978), Patel (1988) and Rao (1988) tried to show the effectiveness of brain storming.

Smith (1971) conducted a study to see the effect of reading related writing tasks in relation to short stories to promote creative thinking and showed no effect on the written products of the students.

Cheryy (1972) has studied the spontaneous use of analogies in a systematic manner. He investigated, for instance, how experts employ analogies when solving physics problems. The main findings are that both novices and experts frequently make spontaneous use of analogies or at least of comparisons. The studies reconfirm that analogies are common tools for explaining and trying to make sense of the unknown.

Royer and Cable (1976) found that analogies were only employed when the target was difficult to understand i.e. when student felt that it was necessary to look for analogies as an aid to understanding.

Khatena Joe (1977) reports that through a special training programme, the experimental group was taught to use simile, metaphor, personification and allusion as comparison forms within the four analogy classifications, viz., direct, personal, symbolic and fantasy analogy to differentiate between simple and complex images in the production of analogies. Generally high and low creative experiments obtained significant originality scores than high and low creative controls, experimental and controls preferred to use direct analogy, simple image patterns to other analogy image forms; and high creatives of both groups produced more complex images than the low creatives of both the groups and only one symbolic analogy and a few fantasy analogies were produced by both the groups with
experiments producing more fantasy analogies than the controls. Although the training did not serve the function of significantly increasing the use of personal, fantasy and symbolic analogies.

Enyeart (1979) for instance, found no general correlation between analogy use and Piagetian levels. There was only a significant correlation between the use of formal analogies (i.e. analogies representing proportions) and formal operation thought. Gabel and Sherwood (1980) reported a tendency for their analogies to be more effective for students of lower reasoning ability and not especially useful for more capable students.

Prasad (1979) and Mohammad (1989) conducted a study to find out the effect of discovery method of teaching on creative thinking abilities of students. Using the Mehdi's test of verbal creativity as the criterion measure, it was observed that the discovery method of teaching proved significantly effective in developing fluency, flexibility and originality dimensions of creativity.

In all the techniques or teaching programmes reviewed above, there had been some basic characteristics like free expression of imagination, group activity, innovative sessions. But the basic problem with these had been that these cannot be made as a part of the school teaching programme. Reason being that these programmes or techniques can only supplement the teaching activity and particular school discipline cannot be taught through these. There is need for such teaching programme which can become a part of teaching learning activities in the school so that the researchers can suggest the school teachers the effectiveness of the tested programmes of methods of teaching.

Gentner and Gentner (1983) reported that analogies aided problem solving in the area of the electric circuit. They further showed that the analogy employed considerably influenced the problem-solving process. They found that problem solving in the area of the electrical circuit among college and high school students was considerably different from when a "flowing fluid" or a "moving crowd"
analogy was used. These finding point to the fact that the general framework that the analogy provides has a significant influence of the learning process.

**Martis D'lima (1987)** conducted an experimental study to find the effect of synectics model on pupils creative thinking and academic achievement in science. The sample consisted of class IX students selected randomly from two sections of an English medium school. Twin group pre-test post-test design was adopted for the experiment. Torrance tests of creative thinking and achievement test developed by the investigator were the tools used. It was found that verbal and figural creativity and academic achievement of experimental group had been significantly increased after the treatment. The difference between pre-test and post-test mean scores were significant at 0.01 level. The difference between pre-test and post-test mean score of control group was also found to be significant.

**Nicholas Roukes (1988)** designed a study to develop an integrated programme of creativity training based upon the four vital areas of creativity training in cognition or perception, training evaluation and appreciation as well as training in creative problem solving. Using Torrance Test of creative thinking as the criterion measure, it was observed that all the four strategies as well as their combinations have been proved significantly effective in developing students' scores on the criterion test.

**Malhotra (1990)** has investigated the effect of synectics model of teaching on development of language creativity in Hindi. The students after being taught through this model showed more improvement on the factors of fluency, flexibility, originality and elaboration in the various areas of language skills. The improvement had a high positive correlation with the intelligence level of the students.

**Martis Anandi (1990)** attempted to find out the effectiveness of the synectics model in developing 'making strange familiar' (MSF) competencies and also its effectiveness in developing scientific and
general creativity of graduate student teachers. It was found that the training in MSF significantly improved verbal, non-verbal and scientific flexibility and originality of trainees.

**Anandi and Irene (1996)** undertook a study to prepare instructional materials based on synectics model of teaching for developing creativity. The instructional material developed were found to be effective in increasing fluency and flexibility scores of verbal creative thinking but was not effective in increasing originality scores.

**Sucheta (1996)** studied instructional and nurturant effects of synectics model of teaching on creative ability in Hindi and English languages. It was found that synectics model of teaching had its effect on improvement in all four factors of language creativity i.e. fluency, flexibility, originality and elaboration. The model of teaching was effective in improving general creative capacity of the students. There was significant increase in group cohesiveness. The results were similar in all three grades.

**Siddiqui (1997)** performed a study on “Effects of synectics upon the self concept, creativity and achievement of the learner”. The study was conducted on sixth grade students these subjects were taught social studies through synectics approach. Both verbal and non-verbal tests on creativity as developed by Baquer Mehdi were used to assess creativity. He explored that synectics model of teaching proved to be efficient for developing the creative thinking ability of the respondents of the study.

**Chandra Vaidya Nalakar and Mahapatra (1998)** took up an experimental study to examine the effect of three treatments, Synectics Model (SM), Gaming Strategy (GS) and Traditional Method (TM) of teaching towards creativity and their interaction with sex. The sample comprised of 162 learners of VI grade divided into two, the experimental and control group. Intelligence and age of learners were controlled. It was found that the overall creative scores of the learners taught through SM, GM and TM have differential effect upon creativity of boys and girls.
Krishna Murthy (2003) took up a study to find out the effectiveness of the first strategy ('making familiar strange') of synectics model through teaching of physics in developing creative thinking ability. 40 students of a section of VIII grade of a school formed the sample. Pre-test, post-test experimental design was followed. It was found that there was a significant increase in fluency, flexibility and originality components of creativity. It was equally effective for both boys and girls.

Mary (2004) highlighted "A study of creativity of class VI and class VII children in relation to some variables". Two hundred children were equally distributed between the two sexes and two classes, VI and VII class formed the sample for the study. The tools used were four subsets of creativity test battery of Venkata Rami Reddy. It revealed that the boys were found to be better than girls on the fluency component of verbal creativity. There was a significant difference between intelligence and creativity as measured by verbal tests. There was no significant difference between creativity and self concept, scientific attitude and level of adjustment.

Kaur (2006) carried out a study on "Creativity in children: the impact of school and home environment". The findings are (i) the urban schools were better than rural schools, (ii) children of urban schools higher on all the four aspects of creativity, (iii) a significant positive correlation between creativity and home environment was found.

2.7 Studies Related to the Synectics Model of Teaching

Hebner (1981) conducted a study on "Development of Academic Achievement in Creative Problems Solving and Thinking Strategies for the Gifted and Talented Students Through Synectics Model of Teaching". In this study the effectiveness of synectics model of teaching as a strategy for development of academic achievement was examined for the gifted and talented students ranging from Kindergarten to Intermediate Level. They reported that synectics
strategy plays significant role in developing the academic achievements of the respondents.

Necka (1984) conducted a study to find out the effectiveness of synectics as conditioned by socio-economic and type of task. Results showed that synectics proved effective in a quite favourable climate and in case of well defined problem.

Sanders and Sanders (1984) 'In Thinking in the future: The need to promote creativity in the educational context’ suggests the use of synectics as a classroom exercise to produce new idea combinations.

Hofland (1985) in his paper presented at the Annual Meeting of American Theater Association described that three techniques that can be used to encourage right brain dominance in the generative step of the design process were random stimulation, lateral thinking and synectics.

Passi (1985) also conducted a study to see the effect of synectic model of teaching on creative writing and showed a significant change in creative writing after the students were exposed to synectics model.

Sylberman, C. (1986) and Hartic (1986) used synectics on upper elementary gifted students and found it effective problem solving activity.

Griffith (1986) tried deliberate use of imagination particularly in connection making with the help of synectics and got significant improvement.

Sucheta (1990) conducted a study on the instructional and nurturing effects of synectics model of teaching on creative ability in Hindi. The sample consisted of 250 students studying in VII, VIII, IX grades. The findings were:

i) Synectics model of teaching had its effects on the improvement in all the four factors of language creativity i.e., fluency, flexibility, origination and elaboration.

ii) Synectics model of teaching effected the improvement in general creative capacity of the students.
iii) Synectics model of teaching effected the improvements in the gain scores of essay/paragraphs writing.

iv) Synetics increase in group cohesiveness scores was found after treatment.

Malhotra (1990) conducted a study to see the effects of synectics method of teaching on the development of language creativity in Hindi. The following findings were received.

i) The students who were exposed to the synectics method of teaching allowed significant improvement on all the four factors viz., fluency, flexibility, originality and elaboration as well as on their total scores of plot building aspect of language creativity.

ii) The synectics model of teaching affected the improvement of the students on all the four factors viz., fluency, flexibility, originality and elaboration as well as on their total scores of plot building aspect of language creativity.

iii) The students after the treatment of the synectics model of teaching showed improvement on the poetic diction aspect of language creativity.

iv) The treatment affected improvement on all four factors viz., fluency, flexibility, originality and elaboration as well as on their total scores of the descriptive style.

v) The groups of students who were exposed to the synectics method of teaching showed significant improvement on all the four factors viz., fluency, flexibility, originality and elaboration as well as on their total scores of vocabulary test aspect of language creativity.

Warute (1990) conducted a study to find out the effectiveness of synectics method and found it the most effective for the development of scientific creativity in high school students.

Meador Karen (1994) made a study on 107 Kindergarten Children who either were or were not in a gifted programme and received or did not receive special training synectics and found...
significant improvement in creativity scores for experimental but not control groups but not more for gifted than for non gifted children.

Chaudhri (1999) explored Effect of synectic model, gaming strategy and traditional method towards achievement and their interaction with the learner. The study was conducted with a class of VI students of Indore city. They reported that the synectics model of teaching had a differential impact on a academic achievement of the students. Further, the study reported that the boys showed lower academic achievement in comparison to the girls. However, there was an increase in the achievement of the groups.

Talawar and Sheela (2004) conducted a study on the synectics model of teaching. Education is one of the patent instruments for development of creativity and problem solving ability, if it is properly geared for this purpose.

Shreyashi Paltasingh (2008) conducted a study on "Impact of synectics model of teaching in life science to develop creativity among pupils in Banpur town of Orissa". Jalota’s group test of general mental ability was used to measure intelligence and Mehdi’s verbal test of creative thinking was used to find out creativity. It found that there is significant difference between effects of synectics model and traditional method of teaching life science in development of creative thinking ability of the students.

Sesadeba Pany (2009) conducted a study on "Effectiveness of synectics model of teaching in enhancing creativity, academic achievement and achievement motivation of learners". The study was done in two primary school of Bhuvaneshwar city. The experimental group was taught by the Make Familiar Strange (MFS) approach of synectics and control group was taught by traditional method. Comprehensive achievement test on general science and achievement motivation inventory were developed and standardized by the investigator. It was found that the Making Familiar Strange (MFS) approach of synectics model found to be effective in enhancing the
creative thinking of the learners. But it didn't proved to be effective in enhancing the achievement motivation of the learners.

2.8 Studies Related to Achievement Motivation

Christian (1973) A study was done on 'Group dynamics, academic motivation, creativity and academic performance'. The major objective of the study progress of classroom group pupil and to study the academic motivation, classroom climate and creativity. The major findings were that (i) urban classrooms have higher mean scores on academic motivation, (ii) the girls shown higher mean scores on academic motivation, (iii) creativity and academic motivation are positively co-related.

Parik (1975) made a study on 'Achievement motivation, school performance and educational norms of pupils'. Study has been taken to study the relationship of achievement motivation, school performance and educational norms of pupils. The sample is secondary school pupils of VIII, IX and X studies in throughout Gujarat, and English has a medium of instruction in the city of Bombay. The findings were; (i) there was a positive relationship between academic motivation and achievement motivation. This is dependent upon the school system. (ii) highly motivated pupils show a greater level of academic achievement.

Rao (1975) a study on 'Self perception, creativity, achievement motivation and academic performance' was done the objective was to study the level and relationship of self perception, creativity achievement motivation and academic performance. The sample of secondary teacher trainees have taken in Madras. The findings were; (i) the creativity and academic performance are significantly co-related. (ii) positive perception of work and achievement were significantly co-related.

Lewis (1991) In a study of 400 Carribbean immigrant students studied the relationship between achievement motivation, academic
performance and creativity found that motivation influence academic achievement and creativity.

**Salim (1994)** while studying the impact of approaches studying of achievement in biology in relation with the intelligence and achievement found that a significant mean effect of achievement motivation in knowledge category existed in achievement in biology.

**Memathas (2001)** studies on psychological variables as predictors of maths achievement found that achievement motivation has significant relationship with achievement in maths and general creativity.

**Krishnamurthy (2003)** Studied on the relationship between achievement, interest, creativity and found that relationship between achievement motivation and academic achievement are significant and positive.

**Hannula (2005)** in the study titled ‘Cognitive linguistic skills and motivation as longitudinal predictors of reading and arithmetic achievement’ found that motivational orientations started to make unique contributions to subsequent accuracy, reading comprehension and arithmetic from pre-school standards and over and above the effects of prior linguistic and maths skills. High task orientation was beneficial for beginning reading were as high social dependence orientation was detrimental for reading comprehension and arithmetic

**Ramakrishna (2005)** conducted a study of ‘Scholastic motivation of secondary school pupils in relation to intelligence, creativity, self-concept, classroom climate and parental involvement’. This study shows positive relationship between the variables.

**Sadaghat (2011)** the purpose of the study was to test predictions of a model explaining the impact of motivational factors include creativity, perceived ability, perceived instrumentality, achievement goals on cognitive engagement and academic achievement. The result strongly supported that perceived ability, perceived instrumentality and achievement goals predicted cognitive engagement and academic achievement.
2.9 **Rationale of the Study**

The findings of all the studies are inconclusive and conflicting:

- The reason may be that they used synectics model of teaching with the different cultural samples and subjects.
- Another reason may be that they used different structural design of the model.
- The result of almost all the studies cited above indicate positive impact of different teaching strategies in developing the academic achievement of the learners.
- Only a few researchers have studied the impact of synectics model in developing the academic achievement and achievement motivation of the learner.

Keeping reasons in view, a need is felt that effectiveness of synectics model is to be tested according to the structure of the model given by Gordon in 1961.

The studies reviewed have not studied the effectiveness of synectics model Strategy-I and Strategy-II.

2.10 **Conclusion**

From the related studies on synectics of teaching, it can be noted that:

i) Synectics is an effective technique in nurturing creativity.

ii) It is found effective in problem solving activity.

iii) It is useful in the development of scientific creativity.

iv) Synectics is an effective in developing language creativity.

v) Effectiveness of synectics is dependent on socio-economic climate and type of task.

vi) Synectics is effective among kindergarten students.

vii) Synectics is a success in classroom activities to produce new ideas, new, combinations etc.

viii) Creativity, both verbal and non-verbal can be nurtured.

ix) There are different methods to develop creativity.
x) Development of creativity depends not only on the methods employed, but also on the teaching climate and the teacher.

Educational research in general and research in the field of models of teaching in particular, are of recent origin. It is hopeful sign that research on models of teaching is generally receiving due importance.

It was observed that studies on models of teaching were by and large based on experimental designs. Most of the experiments have been carried out in actual classroom settings and are quasi experimental. Designing such studies in the classroom situation has an advantage of assessing the effectiveness of a teaching strategy in real conditions. It was also observed that creative thinking and ability to solve problems could be enhanced by disciplined procedures like training in creative problem solving, creative writing exercise etc.

After having discussed the related studies and their implications to the present study, the methodology followed in the study is being discussed in the next chapter.