CHAPTER - II

REVIEW OF RELATED LITERATURE
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2.0.0 INTRODUCTION

In the previous chapter we have studied about Thinking Skill and the important terms related with it. The objectives, hypothesis, rationale, etc were also given in the previous chapter. Review of related literature is the basis of rational. For this purpose in the present chapter research studies pertaining to the development of the Thinking Skill and its sub skill, the skill of Identifying Pros/Cons (IPC) and studies related with its co variables are given. These co variables are Intelligence, Creativity, Personality, Self Confidence, Study Habits and Tolerance of Ambiguity.

The main objective of the review of the related literature is to provide an opportunity to make the researchers familiar with the current topics and knowledge of already accomplished work. The review of literature helps the investigator to delimit and define his/her problem and bring specificity in work. The researcher can also focus their attention towards new and unexplored areas to avoid the duplication of work. It also gives the investigator an insight into and suggestions about research methodology (Hayman, 1968). All the related studies have been presented under different captions. The studies related with above co variables and Thinking Skill are divided into following different categories.

- Research studies related to Thinking Skill.
- Research studies related to Self Confidence.
- Research studies related to Intelligence.
- Research studies related to Personality.
- Research studies related to Tolerance of Ambiguity.
- Research studies related to Creativity.
- Research studies related to Study Habits.
The detailed studies in above captions are arranged in chronological order which are given as below.

2.1.0 RESEARCH STUDIES RELATED TO THINKING SKILL

The researcher has designed Instructional Material and lesson plans for the development of Thinking Skill. Some of the researches related to this aspect were conducted by Raths, Jonas, Rothstein and Wassermann (1967); Gallagher(1975); Lipmann(1980); Choudary(1983); Worsham and Austin(1983); David(1984); Vora(1984); Costa(1985); Hansler(1985); Mid-Continent Regional Educational Laboratory (1985); Wimbey(1985); Dubey(1986); Herrnstein(1986); Hudgens and Edelman(1986); Beyln-Marom(1987); Desai(1987); Heiman and Slomiankom(1987); Patel(1987); Pogro(1987); Robinson(1987); Trimurti(1987); Amin (1988); Crump and Palk(1988); Piyavadee(1988); Farha(1989); Facione(1989); Ennis(19890; Valeganokar(1989); Tierney et al(1939); Vaun(1990); Gill(1990); Parsania(1990); Tingle and Good(1990); De Bono(1991); Kumaria(1991); Newmann(1991); Cromewell(1992); Enright and Susan(1992); Schonenfield(1992); Shah(1992); Halperl(1993); Hurley(1993); Kiah(1993); Poiort(1993); Wallace and Adams(1993); Fluellen(1994); Orton and Lorenz(1994); Treffingr(1995); Tindel(1996); Facione and others(1997); Wade(1997); Micheal(1998); Boe(1999); Bala(2000); Bers and others(2000); Sharma(2001); Tripathi(2002); Davidson and Bruce W(2003); Walton and Nancy(2004); Asthana(2007); Dhade(2008); Tiwari(2010); Tonke(2011) and Shukla (2014).

Raths, Jonas, Rothstein and Wassermann (1967) decried the lack of emphasis of thinking in schools and noted that “Memorization, drill, home work, The three R’s(and the) quite class room work were rewarded while inquiry, reflectionand the consideration of alternatives were frowned upon” and this tendency hampers free thinking, in order to improve and develop Thinking Skill, they studied the effect of training on Problem Solving and critical thinking . 40 students, aged 11 to 14 were randomly assigned the treatment. The related exercise developed was content based. It was concluded that critical thinking courses and texts, in particular, may result in fragmentation of Thinking.
Skill, thinking cannot be divorced from content, in fact thinking is a way of learning content. Results showed that developed material helped to increase content base thinking of students.

Gallagher (1975) conducted a study to develop a Thinking Skill through different types of content-based activities and stated that thinking must be practical from each content field. While designing the exercise and lesson plans to provide training to randomly selected group of 36 students of class xii, he emphasised that to develop thinking, objectives must include a. Application b. Analysis c. Divergent Thinking d. Opportunities to organise ideas e. Support value judgment. Students' performance showed remarkable improvement in a positive direction.

Lipmen (1980) considered that through thinking exercises like engaging children in constructive argument, debate, discussion and exploratory thinking, learner can exceed the predicted level of competency. Further he reported the results of an evaluation conducted by the educational testing service of Princeton, New Jersey of 200 students aged between 10 to 13 years. Students in two locations participated in the program for two years. The results indicated improvement in intellectual performance and also in critical thinking process. Creative measures within the experimental group.

Chaudhary (1983) investigated into the trends of Creative thinking ability of pupils of age group 11 to 13 in relation to some psycho-socio correlates. Objectives of the study were. 1. To prepare a reliable and valid Creative thinking ability test. 2. To study the trend of Creative ability of pupil of different areas. 3. To study the trends of Creative thinking ability of pupils of different genders. 4. To study the trends of Creative thinking ability of pupils in relation to their socio-economic status (SES), need Achievement (n-ACH), IQ, parental behaviour, anxiety, security, insecurity feelings, radicalism vs. conservatism, flexibility vs. rigidity, suggestibility and emotional stability. The major findings of the study were. 1. There was no significant difference between the mean Creative thinking scores of male and female children of rural and urban areas. 2. The higher the Socio Economic Status, the higher was the thinking ability of students. 3. The higher the n (ach), the higher was the thinking ability of students. 4. The students with high IQ did not have
more Creative thinking ability, than the students with lower IQ. The students with low anxiety had more Creative thinking ability than students with high anxiety.

Raina and Vats (1983) studied style of learning and thinking (hemisphericity), openness to inner experience, sex and subject choice. Results indicated that in an experience as characterized by institution fantasy and imagination were positively associated with right hemisphere style of thinking.

Worsham and Austin (1983) developed a program 'THINK' for high school seniors in Baltimore and made students engaged in Problem Solving activities in which they were encouraged to discuss the rational leading to higher level thinking. The investigator concluded that the developed program had a positive effect and the participants outperformed the control group to a highly significant degree both in and outside the school.

David, (1984) University Professor of Psychology and author of several books on Creativity and thinking in a more recent research in this field said that Problem Solving and problem finding is another area that differentiates the levels of Creativity. He found that middle aged individuals tend to group the entire stimulus away into similar terms. The younger and elders solve their problems in different ways.

Vora (1984) investigated the impact of divergent thinking program in mathematics on Creative level of children of classes 7th and 8th. The main objectives of the study were. 1. To provide reliable divergent thinking in mathematics. 2. To study the effect of a divergent thinking program in mathematics on the Creativity of students of standards 7th and 8th with respect to reinforcement i.e. feedback. 3. To study the effect of divergent thinking program in mathematics on the Creativity components viz. fluency, flexibility and originality. 4. To investigate whether there were grade differences in Creativity. 5. To investigate whether there were gender differences in Creativity. Major Findings of the study were 1. The Creativity increased as a result of treatment of divergent thinking program in Mathematics (DTPM) with and without feedback at both grades. 2. The DTPM was equally effective in both the groups of boys and girls. 3. The experimental group
proved superior in the component of Creativity namely fluency and originality after taking the DTPM than the other group.

Costa(1985) in his book ‘Developing Minds’ identified students’ behaviioral indicators that teachers can observe and record to determine whether instruction in Thinking Skill is having a beneficial effect on students’ intellectual development by introducing thought provoking questions and few exercises related to critical thinking for tenth grade students. Findings indicated that students achieved more content understanding, retained more information and exhibited the development of higher order Thinking Skill.

Midcontinent Regional Educational Laboratory(1985) reports on ‘Thinking Skills Instructional Activities’ and examines the effect of training teachers in how to foster in their students 18 higher order Thinking Skills and sub skills in three areas of learning – (i) to learn skills (ii) content Thinking Skills (iii) basic reasoning skills. Assessment indicated that the students of participating teacher improved in all areas.

Orton(1985) analysed the factor related to the teaching of Critical thinking in junior high school mathematical class room. The Instructional Material was based on 8th class mathematics content and 146 junior high school mathematics students were selected to determine the incidence of activities which tend to foster critical thinking. No statistically significant differences were noted.

Wimbey(1985) developed a program to study the effect of Thinking Skill instruction on test performance and on the transfer of cognitive skills to new and different situations. The sample comprised of 200 students of New Zealand Junior School and found that Thinking Skill instruction both improved academic performance and enabled students to become better problem solver in any given situation both in and outside of school.

Dubey, (1986) studied educational influence on development of Creative thinking among children. The objectives of the study were. There is a symbolic relationship between man, society and nature.2. There is a symbolic relationship between natural/social environment and Creative thinking. The major findings were. 1. Age space, school
education environment, family education environment and social class were found to have significant positive main effects on Creative thinking of children. 2. The interaction between age and space, space and school education environment, school educational environment and family educational environment had significant effect on Creative thinking.

Hudgins and Edelman (1986) designed a program to teach reorganising skill to 4th and 5th graders through teacher led small group discussion. The investigator investigated the effect of tanning program in teaching reorganising skill to small groups. Students exhibited increased level of reorganising skill in some areas after they received training from their teacher.

Desai (1987) investigated Creative Thinking Ability (CTA) of higher secondary students of Gujarat state in the context of some psycho-socio factors. The main objectives of the study were. 1. To study the trend of CTA of pupils of higher secondary school. 2. To study the trends of CTA of pupils of Science and Commerce streams. 3. To study the Creative Thinking Ability of pupils of different socio-economic levels. 4. To study Creative Thinking Ability in relation to scholastic Achievement, anxiety and reasoning ability. The major findings of the study were. 1. There was no difference in CTA of Urban and Rural higher secondary students. 2. The students with good reasoning ability were better in Creative thinking than students with poor reasoning ability. 3. The students with higher scholastic Achievement were found better in Creative thinking than students with low scholastic Achievement. 4. There was no significant difference between the mean of high SES and low SES students.

Heiman and Slomianko (1987) presented a series of 35 essays on the importance of teaching Thinking Skill and on Instructional strategies for developing Thinking Skills in students. The essays addressed Thinking Skill instructional within and across disciplines and claim that instructional practice in Thinking Skills should be incorporated into all secondary level academic courses. Program showed improvement in students' thinking capacity.
Patel (1987) investigated the effectiveness of the Creative thinking program on the Creative abilities of elementary school children. The objectives of the study were: 1. To provide standard Creative thinking program in Gujarati for elementary school children; 2. To study the effect of the program on the Creativity level of children; 3. To study the effect of the program on the Creative components viz. Fluency, Flexibility and Originality. The findings of the research were: 1. The researcher confirmed the effectiveness of Creativity thinking training in Indian setting; 2. The Creativity training could be practically imparted to the children in a developing country like India; 3. The main effect of training given to the experimental group was significant for Creativity and its two component measures viz. Fluency and Originality.

Pogrow (1987) conducted a study entitled “The Role of Computers in developing Thinking Skills” found the HOTS (Higher Order Thinking Skill). Program approach differs from other program using computers to enhance Thinking Skills, emphasizes the need for instructional software to force the average and below average students to make inferences rather than simply teaching them about the inferences.

Robinson (1987) developed a program to incorporate Higher Order Thinking Skill into teaching and learning for grades K-3. He studied the effect of a series of teacher in service session and the use of junior grade books and programs on (i) teacher’s skill and attitude towards providing and designing Thinking Skill activities to K-3 graders (ii) the performance of students on task at different levels of Bloom’s Taxonomy of Educational Objectives. Significant improvement was found in students’ performance at different level.

Trimurthi (1987) studied Creative Thinking Ability (CTA) of secondary school students in the context of some psycho socio factors. The objectives of the study were: 1. To determine the extent to which sex influenced CTA; 2. To determine the extent to which urban rural location influenced CTA; 3. To study the trends of CTA in relation to age and IQ. The major findings of the study were: 1. The boys were better than the girls in verbal and non verbal CTA; 2. The Urban students were better than the rural students in...
The students with high IQ were found more Creative than students with lower IQ in verbal CTA.

Amin (1988) studied the effectiveness of Creative thinking programs on the Creativity level of the school children in relationship to the program correlates. The objective of the study was to develop a Creative Thinking Program (CTP) for enhancing the level of Creativity in children with special reference to time duration for implementing the program, teacher variability, discussion pattern in a group and program correlates. The major findings of the study were: 1. The main effect of the treatment, the training of Creativity by the Creative Thinking Program was significant for Creativity and its component measures that is fluency and originality. 2. The main effect of program instructor was not significant.

Crum and Palk (1988) developed a model to teach inverted 'HOTS' in the middle and high school. A district level initiative was taken in developing Higher Order Thinking Skills. Results of the evaluation professed the effectiveness of training. Nearly all teachers and administrators in Alabama district schools were employed in 'Talents Unlimited Model' to teach Higher Order Thinking Skills that include application and analysis level questions and exercises. Teachers' self reports were positive and the performance gains of middle and high school students on Thinking Skill assessment indicated that the program was successful.

Michael (1988) prepared and tried out the program for developing Creative thinking ability in the students of the age group 10 to 12 controlling some psycho-socio factors. Objectives of the study were: 1. To prepare program for developing Creative Thinking Ability (CTA) in students of grades V, VI and VII. 2. To construct a non verbal test measuring entrance and criterion CTA behaviour of students of grades V, VI and VII. 3. To construct a verbal CTA test measuring entrance and criterion CTA behaviour of students of grades V, VI and VII. 4. To study the effectiveness of the CTA development program on the students of grades V, VI and VII. Major findings of the study were: 1. The experimental group gained by the CTA program more than the control group which did not receive any treatment. 2. The adjustment means of the two experimental groups did
not differ from each other whereas the mean of the control group was found significantly lower than the means of the experimental group. 3. The CTA treatment was found to be affected when different variables like anxiety, parental behaviour, and self done activities, school Achievement, self sufficiency, emotional stability and IQ were controlled.

Piyavadee (1988) studied the Creative thinking ability of students of higher secondary school of Bangkok in the context of some psycho socio factors. Objectives of the study were 1. To prepare a Creative thinking ability test. 2. To study the main effect of gender, grade and Socio Economic Status on the students. 3. To study CTA in relation to students adjustment anxiety, neuroticism, radicalism and student self done activities. Major findings of the study were 1. There was no significant difference between the main performance of boys and girls included in the sample. 2. There was no difference in Creative ability between students coming from high SES and low SES.

Dutt (1989) studied the effect of Problem-solving strategies on the Problem Solving ability in Science of high school students in relation to Anxiety, Cognitive style and Intelligence. The objectives of the study were 1. To study effect of different Problem Solving strategies on Problem Solving in Science. 2. To study the relationship of Cognitive style with Problem Solving ability among students. Major findings of the study were 1. Strategies of Problem Solving significantly affected the Problem Solving ability of students. The focusing strategy was found to be superior to the scanning strategy. 2. High Intelligence students irrespective of the strategies of training, scored higher on Problem Solving ability test than low Intelligence students. 3. Anxiety did not influence the Problem Solving ability of students.

Farah (1989) presented a paper ‘BEYOND LOLLIPOP TRESS’ at the annual meeting of the American Education Research Education and made an attempt to teach Thinking Skill through arts. The sample comprised of 140 students of 4th, 5th and 6th standard. The investigator sought to determine the effect of an Innovative Art Education Program on the art content learning and general Achievement. The results
indicated that experimental group outperformed controlled group in learning of art content and effects on Achievement were inconclusive.

Valeganokar (1989) conducted research to develop teaching strategies to encourage students to solve problems in Science activity. The study was conducted with the purpose of encouragement of the students for Problem Solving in Science Creativity through specific strategies. The findings of the study were 1. Though there was no significant increase in the ability of thinking as per the result of the post test, the students responded well during the conduct of the experiment. 2. The students could not reach the final solution due to lack of time and equipment for experimentation.

Baum (1990) constructed and evaluated “Instrumental Enrichment” programme for upper elementary and secondary students from four different countries (Israel, USA, Canada and Venezuela). They belonged to middle and social groups and in both mixed ability and educationally disadvantaged groups. The investigator engaged them in clusters of Problem Solving tasks, in non verbal reasoning and general thinking exercises that were designed to make students “Active Thinkers”. A review of evaluation concluded that statistically significant difference had been reported between instrumental enrichment trained group and control groups. The program was found to be effective in enhancing general thinking ability and increasing non verbal reasoning.

De Bono (1991) developed “Thinking Hats” through the Cognitive Research Trust (CoRT). It consists of six sections, each of 10 lessons including a teacher’s hand book and lessons notes for pupil. Each section covers one aspect of definition of thinking, breadth, organisation, interaction, Creativity, information, feeling and action. The lessons encourage learner to stop in the middle of a lesson and consider the views of other people involved in the situation. Its overall objective was to translate thinking which, De Bono claims, “a pretty nebulous subject and needs anchoring with some focus of attention” by using structured exercises. The experiment was constructed on primary classes children aged between 10-11. The findings showed that much “wider ideas immerged from CoRT trained group (experimental group) than control group.
Gill (1990) studied the effect of training strategies on Identifying Pros/Cons skills and cerebral dominance in relation to Intelligence and Cognitive style. The objectives of the study were 1. To determine whether the training strategies affect Creative Problem Solving skills and Cerebral dominance. 2. To study whether Intelligence, Personality and cognitive style affect Cerebral dominance. Major findings of the study were 1. The right brain training strategy emerged as superior to the left brain training strategy so far as Creative Problem Solving skills in mathematics were concerned. 2. High intelligent subjects scored higher on originality than low intelligent subjects irrespective of training strategy. Whereas fluency, flexibility and Creative Problem Solving totals were not affected by levels of Intelligence. 3. Introverts scored higher on originality in solving mathematical problems than extroverts irrespective of the strategies of training. 4. The group having the field independent cognitive style scored higher on originality than the field dependent group on Creative problem-solving skill test. 5. Personality type and cognitive style interacted with the training strategy type.

Parsnia (1990) conducted an independent study on development of a Problem-solving ability test for students of standard 9th. Objective of the study were 1. To construct a test for measuring the Problem-solving ability of Marathi medium students of standard ninth. 2. To find out reliability and validity of the test. Major outcomes of the study were 1. In the final test, 10 items were retained. 2. The facility indices ranged from 0.61 to 0.29. 3. Discriminating power ranged from 0.42 to 0.70.

Frisby (1991) constructed Thinking Skills Instructional Programme to raise Achievement levels, and create better citizens. The random sampling technique was followed. The sample comprised of 8th and 9th grade students aged between 13 to 15. The investigator stated that Thinking Skill Instructions should be measured by short term goals, a changed classroom atmosphere, concrete behavioural criteria and the improvement of specific task performance. The developed programme included all the above mentioned criteria. It helped in raising academic Achievement, providing citizenship education and improved the way of thinking to a great extent.
Kumaria (1991) worked on Problem Solving strategies and Cognitive capabilities of children of age group 10-12. The objectives of the study were 1. To identify, analyze, describe and define a variety of Problem Solving strategies used by children of 10 to 12 years of age. 2. To assess the cognitive capabilities of children. 3. To examine this relationship with Problem Solving strategies. Major findings of the study were 1. The overall Problem Solving ability and success on different types of problem were significantly and positively related to each cognitive capability separately as well as globally. 2. There was evidence of some sequential steps in Problem Solving and different forms or levels of responses to be associated with the tactics used by children. 3. A wide range of meaningful variations in the tactics were evident in relation to the nature of the problems.

Enright and Susan (1992) conducted a study for assessing Critical thinking in Mathematics. A five step hierarchy for Problem Solving in mathematical word problems, called “SOLVE”, has been developed: it involves study the problem, organise data, line up a plan, verify plan, and evaluate the match. The target population were teachers and practitioners. Result of the study indicated that implementing the “SOLVE” strategies enable teachers to assess and teach skills needed by students with mild disabilities and improves students’ success rates.

Shah (1992) conducted a study on Effectiveness of Educational programs for developing skills of Thinking. Objectives of the study were 1. To develop programs for Developing decision making skills and Creative Thinking Skills. 2. To develop a test for measuring decision making skills. 3. To examine the effects of program on decision making skills, Creative thinking and intellectual skills. Major findings of the study were 1. The effect of decision making program was found to be more highly placed among girls than boys in the samples characterized by a lower Intelligence. 2. The Creative Thinking Skills development program led to the development of fluency and originality skills in all the groups. 3. The Intelligence scores of all the groups showed a significant increase, particularly for items of opposite words, class identification, mathematical reasoning and social reasoning.
Kiah (1993) conducted a study “A Model for Assessing Critical Thinking Skills” at the State council of higher education for Virginia (1993). In response to a state wide call for a review of general education in Virginia community colleges, the student assessment committee (SAC) was formed at John Tylor community college (Virginia) to evaluate students’ outcomes for the college’s general education component. After concluding that standardised test did not provide an adequate measure the SAC decided to focus on the evaluation of student’s critical Thinking Skill as a measure of college success. A flow chart for interviewing students to determine their critical thinking capabilities was developed based on the following elements of critical thought (1) identifying the problem (2) stating the problem (3) interpreting facts which must be known to solve the problem (4) posing a possible answer (5) developing an applicable solution from the answer; and (6) applying solution to similar problems. Interviews were conducted with 47 of 100 associate degree candidates for graduation in 1993, which identified students by programme and noted differences in critical thinking level of experimented groups.

Kumari (1993) studied effect of CoRT (Cognitive Research Test) treatment upon Creative thinking & Problem Solving of 9th class students. The major objectives of the study were 1. To study the change in thinking habits through an analysis of the response given by the students for various practice items. 2. To study the effect of CoRT upon Creative Problem Solving ability having components originality & elaboration as measured by Creative Problem Solving test. The findings of the study were 1. The CoRT helps in changing ‘Natural Pattern of Thinking’ i.e. a free drift from idea to idea, to ‘Directed Thinking’ i.e. organized thinking in different specific direction. 2. The CoRT (critical thinking strategy along with interactive thinking strategy) is effective in developing Problem Solving ability component as well as Creative Problem Solving ability of 9th class students.

Singh & Gosain (1993) did a study on Critical thinking with relation to Intelligence & Socio Economic Status of Uttar Pradesh intermediate girls coming from correspondence course & regular schooling. The objectives of the study were 1. To study
the correlation between Creative thinking scores of children coming from formal & non formal academic environment. 2. To study the correlation between Creative thinking scores with Intelligence separately for formal & non formal academic environment. 3. To study the correlation between Creative thinking scores with Socio Economic Status separately for formal & non formal academic environment. The major findings of the study were 1. Creative thinking & academic environment significantly correlated with each other. 2. There is significant relationship between Creative thinking & Intelligence for girls of formal academic environment. 3. There is no significant correlation between Creative thinking & Socio Economic Status in formal academic environment.

Fluellen (1994) presented a paper on “Developing 21st century strong sense critical Thinkers”. This paper examines the purpose of education and posits a model for developing Strong Sense Critical Thinking (SSCI) skills among elementary school students of Philadelphia’s Joseph Pennell academics. The theme incorporated in this paper was to make students understand the arguments and rational of others, and to reason dialectically in such a way as to determine when one’s own point of view is at its weakest and when an opposing point of view is at its strongest. Forty items were there to judge this aspect. The results indicated that the model was found to be effective to examine the possible scenarios for developing strong sense critical thinking.

Cromwell, (1995) conducted a study for assessing Critical thinking ability of community college students. The investigator provided new direction, offered guide lines and developed different types of instructional techniques suggesting that assessment be integral to learning, involve a range of behaviours, emphasise expected course, programme or instructional outcomes, incorporate structured feedback and an external dimension, and be cumulative. The programme developed on the basis of above mentioned criteria helped in the assessment of Critical thinking ability to a great extent.

Treffinger, (1995) presented a paper “Productive Thinking: Toward Authentic instruction and Assessment”. This paper discusses a multi component approach to assessment of productive thinking with gifted students. It presents a model of productive thinking encompassing Creative and critical thinking, Problem Solving and decision
making. Emphasis was on planning, profiling, instruction, evaluation and documentation. Profiling, performance assessment, portfolios and authentic instructions were the important tools used for assessing productive thinking. The results indicated the effectiveness of programme and recorded gains on specific assessment procedure.

Tindal and Gerald (1996) presented a paper “Critical Thinking Skill in content areas” curriculum based management in middle and high schools. The article outlines essential features of Critical thinking assessments, development of CBM Problem-solving prompts and examples of scoring system. The sample comprised of students with learning disabilities. Curriculum- based management helped to develop Critical thinking and the learner exceeded the predicted level of competency.

McGuinnesss et al (1997) have made a project Activating Children’s Thinking Skill (ACTS). This project aimed to promote the development of Thinking Skills in ordinary classrooms in North Ireland at key stage- II. A “Handbook” was developed by McGuinness and a small group of teachers to identify a list of “Big Concepts”. These include cost and effect, classification, planning, decision-making etc. Thinking diagrams or “graphic organisers” were produced as an aid to making the steps in thinking explicit to learners. The participating students showed the remarkable improvement in a positive direction. The lessons encouraged concept development, the development of children’s vocabulary for talking about thinking and the use of talk and group work.

Wade(1998) presented a journal article entitled “Using writing to develop an Access critical and Creative thinking.” He asserted that written work has advantage over oral discussion in the development and assessment of students’ Critical and Creative Thinking Skills. The sample comprised of college students of Art stream. The tool was developed by selecting the items from college psychology courses. A set of short writing assignment that focuses on 8 essential aspects of critical and Creative thoughts were used as a tool to assist the development of Thinking Skills through writing. Finding supported that writing work has advantages over oral discussion. The students of frequent group treated through this technique outperformed control group and marked level of
improvement has been noticed in their way of thinking and critically analyzing the critical aspects of given problems.

Boe (1999) developed the way of using collective critical thinking and assessment process. He emphasised the use of collective critical thinking about issues as an assessment technique instead of or in addition to written test and examined the role of assessment and alternative strategies such as group oral exams in classes where cooperative activities and learning have been emphasised and works efficiently. The experiment was conducted on the students belonging to different classes in a non-threatening environment; students use individual input and reflection as well as group skills to synthesize group response.

Bala (2000) conducted a study entitled developing Lateral and Vertical Thinking Skills among Elementary school children through instructional packages. The objectives of his study were: 1. To find out the effect of instructional packages upon lateral thinking of students. 2. To find out the effect of Instructional Material upon vertical thinking of the students. 3. To study the process that goes on in the minds of children during thinking (both lateral and vertical). 4. To find out the reactions of the students towards instructional packages. The main findings of the study were: 1. High Intelligence students achieved higher on fluency than lower Intelligence students. 2. Fluency scores of the students were the highest after the exposure of lateral thinking exercises. The experimental group achieved the highest score on posttests than its counter parts in control group. 3. The students belonging to high Socio Economic Status of experimental group scored highest in the post tests.

Fonseca and Pinto (2000) studied and experimented on “Nurturing Creative thinking in first generation learners.” The main objectives of the study were to find out first generation learners. The guidelines were provided by the investigator to the experimental group for nurturing Creative thinking and divergent thinking; the results indicated a marked level of improvement in their way of thinking critically and divergently in a given situation.
Sharma (2001) developed an Instructional Material for Thinking Skills of
Classification at primary level. The major objectives of the study were: 1. To prepare
Instructional Material on thinking skill of Classification at primary level. 2. To find out the
effectiveness of Instructional Material in terms of Achievement of students. 3. To find out
the Effectiveness of Instructional Material in terms of development of Thinking Skill of
Classification. 4. To find out the reactions of students towards Instructional Material.
Major findings of the study were: 1. The Instructional Material was found to be effective
in terms of Achievement of students on criterion test. 2. The Instructional Material was
found to be effective in terms of development of Thinking Skill of Classification on
criterion test. 3. The Instructional Material was found to be effective in terms of students’
reactions towards it.

Bres and others (2002) attempted to find the “Disposition to think critically among
community college students”. The sample comprised of 50 students of Illinois State
University, USA. The California Critical Thinking Disposition Inventory (CCTDI),
highlighting the test’s seven subscales: Inquisitiveness, open-mindedness systematically,
analyticity, truth-seeking, critical thinking, self-confidence, and maturity. By using this
inventory the investigator tried to determine the relation between community college
students’ disposition to think critically and their characteristics and academic
performance. The result showed the effectiveness of the program as the students of
experimental group exhibited better disposition in critical thinking and also excelled in
academic than control group.

Tripathi (2002) studied the effectiveness of Instructional Material on Thinking
Skill of Creative Problem Solving in terms of Achievement and students reaction at
primary level. Objectives of the study were: 1. To conduct a pilot study for preparing the
initial draft of Instructional Material on Thinking Skill of Creative Problem Solving at
primary level. 2. To conduct final study for preparing the final draft of Instructional
Material on Thinking Skill of Creative Problem Solving. 3. To find out the effectiveness of
Instructional Material in terms of Achievement of the students. 4. To find out the
effectiveness of Instructional Material in terms of development of Thinking Skills of
Creative Problem Solving.5. To find out the effectiveness of Instructional Material in terms of reactions of students towards Instructional Material. The major findings of the study were 1. The Instructional Material was found to be effective in terms of Achievement of students. 2. The Instructional Material was found to be effective in terms of development of Thinking Skills of Creative Problem Solving. 3. The Instructional Material was found to be effective in terms of students’ reactions.

Davidson and Bruce (2003) studied the role of English as a foreign language. In this study the investigator used, the Ennis-Weir Critical Thinking Essay Test to assess progress in critical thinking after a year of intensive academic English instruction for 36 Japanese students enrolled in a private 2 year women’s junior college in Osaka, Japan. Control group received only content based intensive English instruction, while the treatment group received additional training in critical thinking. The crucial group scored significantly higher in the test (“F” = 0.000). The result employed that critical Thinking Skills can indeed be taught as part of academic EFL/ESL instruction.

Walton and Nancy (2004) investigated the role of both Critical and Creative Thinking Skills to enhance the educational process in language arts. The targeted population consisted of 4th and 7th grade students on two growing middle class communities located in Northern Illinois. The lack of higher order Thinking Skills was documented through teacher made inventories. Analysis of probable cause data revealed that students lacked skills related to higher order thinking, ability to explain Problem Solving strategies and the ability to transfer knowledge to the new situation. Reviews of curricula and instructional strategies revealed a curriculum under emphasis on information pertaining to higher order Thinking Skills. The solution of the problem resulted in implementation of a teacher constructed program that includes 10 sample lesson concerning brain storming, predicting, compare/contrast, questioning, cause/effect, sequencing, Problem Solving and inerring with an increased emphasis on higher order thinking processes. Post intervention data indicated an increase in students in the use of higher order Thinking Skills.
Asthana (2007) studied, “Effectiveness of Instructional Material on Thinking Skill of Classification in terms of students’ Achievement and reactions at middle school level.” The major objectives of the study were-1.To develop the Instructional Material on Thinking Skill of Classification. 2. To study the effectiveness of Instructional Material in terms of Achievement of students’. 3. To study the effectiveness of Instructional Material in terms of development of Thinking Skill of Classification. 4. To study the effectiveness of Instructional Material in terms of reactions of students towards the Instructional Material. 5. To compare the adjusted mean post Achievement scores of the students of experimental and control group by considering Intelligence and pre-Achievement as covariate. 6. To compare the adjusted mean post Thinking Skill Classification scores of experimental and control groups by considering, Intelligence and pre Thinking Skill of classification as covariates. 7. To compare the adjusted mean post Achievement scores of the students of the experimental and control groups by considering Self Confidence as covariate. 8. To compare the adjusted mean post Thinking Skill of Classification scores of the students of the experimental and control groups by considering Self Confidence as covariate. 9. To find out the effect of treatment, Intelligence and their interaction on the post Achievement of students by considering pre Achievement as covariates. 10. To find out the effect of treatment, Intelligence and their interaction on post Thinking Skill of classification of students by considering pre Thinking Skill of classification as covariates. 11. To find out the effect of treatment, Self Confidence and their interaction on post Achievement of students by considering Intelligence and pre Achievement as covariates. 12. To find the effect of treatment, Self Confidence and their interaction on post Thinking Skill of classification of students by considering Intelligence and pre Thinking Skill of classification as covariates. 90 students of class VII of Christian Eminent Higher Secondary school, Indore were taken as sample for the study. The research design was Non-equivalent control group design. For data collection several tools were used. The Achievement test, Thinking Skill of Classification test and reaction scale were developed by researcher. Intelligence was assessed by Ravens Standard Progressive Matrices. Self-confidence of students was assessed with the help of Agnihotri’s Self-Confidence
Inventory (1985). For data analysis, co-related t-test, one-way ANCOVA, 2x2 factorial design ANCOVA, and percentage were used. The findings of the study were:

1. The Instructional Material was found to be significantly effective in terms of Achievement of the students.
2. The Instructional Material was found to be significantly effective in terms of the development of Thinking Skill of Classification of students.
3. Students expressed favourable reactions towards different aspects of Instructional Material.
4. The experimental group was found to be superior to control group in terms of Achievement of students when pre-Achievement and Intelligence were taken as covariates.
5. The experimental group was found to be superior to control group in terms of the development of the Thinking Skill of classification when pre-Thinking Skill of classification and Intelligence were taken as covariates.
6. The experimental group was found to be superior to control group in terms of Achievement of students when Self Confidence was taken as covariate.
7. The experimental group was found to be superior to control group in terms of the development of the Thinking Skill of classification when Self Confidence was taken as covariate.
8. There was significant effect of treatment on post-Achievement of the students when pre-Achievement was taken as covariate.
9. Achievement was found to be independent of Intelligence when pre-Achievement was taken as covariate.
10. There was significant effect of treatment on post-Thinking Skill of Classification of students when pre-Thinking Skill of Classification is taken as covariate.
11. Post-Thinking Skill of Classification of students was found to be independent of Intelligence when pre-Thinking Skill of Classification was taken as covariate.
12. Thinking Skill of Classification was found to be independent of resultant of interaction between treatment and Intelligence when pre-Thinking Skill of Classification was taken as covariate.
13. Self Confidence produced significant effect on post-Thinking Skill of classification of students when pre-Thinking Skill of classification was taken as covariate.
14. The interaction between treatment and Self Confidence produced significant effect on post-Thinking Skill of Classification when pre-Thinking Skill of Classification was taken as covariate.
Dhade (2008) studied the effectiveness of Instructional Material in Science based on Thinking Skill of Creative Problem Solving in terms of students' Achievement and reactions at middle school level. The objectives of the study were 1. To compare the mean Achievement scores of students taught through Instructional Material at the pre and post test stages. 2. To compare the mean Thinking Skill scores of Creative Problem Solving of students taught through Instructional Material at the pre and post stages. 3. To find out the effectiveness of Instructional Material in terms of reaction of students. The major findings of the study were 1. The Instructional Material in Science based on Creative Problem Solving Thinking Skill was found to be significantly effective in terms of Achievement. 2. The Instructional Material based on Creative Problem Solving Thinking Skill was found to be significantly effective in terms of development of Thinking Skill of Creative Problem Solving among students. 3. The Instructional Material was found to be effective in terms of students' reactions towards Instructional Material.

Tiwari (2010) studied The Effectiveness of Instructional Material in Science based on Thinking Skill of Identifying Pros/Cons in terms of students' Achievement and reactions at secondary school level. The objectives of the study were- (1) To compare the mean Achievement scores of students taught through Instructional Material at the pre and post test stages. (2) To compare the mean Thinking Skill scores of Identifying Pros/Cons of students taught through Instructional Material at the pre and post stages. The major findings of the study were: (1) the Instructional Material in Science based on Identifying Pros/Cons Thinking Skill was found to be significantly effective in terms of Achievement of students. (2) The Instructional Material in Science based on Identifying Pros/Cons Thinking Skill was found to be significantly effective in terms of development of Thinking Skill of Identifying Pros/Cons among students.

Tonke (2011) studied the, “Effectiveness of Instructional Material in Social Science based on Identifying Propaganda Thinking Skill in terms of students’ Achievement and Reaction at 9th school level.” The objectives of the study were (i) To compare mean Identifying Propaganda Thinking Skill scores of students at pre and post test stages. (ii) To compare mean Achievement scores of students in Social
Sciencetreated through Identifying Propaganda Thinking Skill at pre and posttest stages. (iii) to compare mean Social Intelligence scores of students at pre and posttest stages. The major findings were (i) The Achievement in Identifying Propaganda Thinking Skill was found to be significantly effective in students treated through Identifying Propaganda Thinking Skill. (ii) The Achievement of the students in Social Science was found to be significantly effective taught through Identifying Propaganda Thinking Skill. (iii) The Social Intelligence of students taught through Identifying Propaganda Thinking Skill was found to be significantly effective.

Shukla (2014) Conducted a study emitted Effectiveness of Instructional Material and Traditional teaching method based on Problem Solving and Identifying Propaganda Thinking Skill in social Science in terms of students’ Achievement and Reaction at Higher secondary level. The objectives of the study were (i) To study effectiveness of Instructional Material-A (Problem Solving skill) in terms of Students’ Achievement. (ii) To study effectiveness of Instructional Material-A (Problem Solving skill) in terms of development of Problem Solving thinking. (iii) To study effectiveness of Instructional Material-B (Identifying Propaganda Thinking Skill) in terms of students’ Achievement. (iv) To study effectiveness of Instructional Material-B (Identifying Propaganda Thinking Skill) in terms of development of Identifying Propaganda Thinking Skill. (v) To study reactions of students towards Instructional Material-A based on Problem Solving Thinking Skill. (vi) to study reactions of students towards Instructional Material-B based on Identifying Propaganda Thinking Skill. 80 students of ShashkiyaMalavKanyaUchttarVidyalaya, Indore were taken as sample. Research design was Non-Equivalent Control Group design. For data collection several tools were used. On the basis of Instructional Material A and B, the Achievement test, Thinking Skill tests and reaction scale were developed by the researcher separately for both of them. Intelligence was assessed by Verbal Intelligence Test made by Ojha and Ray Choudhary (1958). For Personality, Mandsley’s Personality Inventory was used. Creativity was assessed by Passi Test of Creativity. For data analysis correlated t-test, one way ANCOVA, 2×2×3×2 factorial design ANCOVA and percentage were used. The major
findings were (i) Instructional Material-(A) was found to be significantly affected in increasing Achievement of students in Social Science. (ii) Instructional Material A was found to be significantly effective in enhancing Problem Solving Skill assessment (iii) Instructional Material B was found to be significantly effective in increasing Achievement of students in Social Science. (iv) Instructional Material B was found to be significantly effective in developing Identifying Propaganda Thinking Skill. (v) the reactions of the students towards Instructional Material A based on Problem Solving Thinking Skill were found to be positive (vi) the reactions of students towards Instructional Material B based on Identifying Propaganda Thinking Skill were found to be positive.

In addition to these, several other thinking programs and techniques were developed by researchers taking different subjects and areas like Computer Assisted Instructions to develop Thinking Skills. Supportive researches include Bass and Perking (1984), Sadowski (1984-85), Riding and Powell (1986), Pogrow (1988), Baum (1990) the results of all these studies supported the effectiveness of all programs.

Apart from these several other effective programs were constructed like Sol Stenberg and Bhana (1986) (based on Guilford’s Structure of Intellect Theory). The program is organized around the development of 120 intellectual skills from foundation level to higher order thinking.


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Fisher (2002), Thinking through History"; Cloyd and Weaver (2006) “Project to teach students about Thinking Skill”.

The broad general findings from these researches indicated that nearly all the Thinking Skill programs and practices were found to make a positive improvement in the Achievement and thinking level of participating students except studies conducted by Blagg (1991) and Orton (1985) were found to be insignificant and ineffective in the development of Thinking Skill.

2.2.0 RESEARCH STUDIES RELATED TO SELF CONFIDENCE

Marsh et al. (1992) studied the correlation of Self Confidence and thinking. The sample comprised of 452 students of School of Education, Boston. The investigator developed the Self Confidence inventory to assess the level of Self Confidence of students. The inventory incorporated the internal and external factors that affect the level of Self Confidence and thinking, according to the external comparison principle the development of Self Confidence is influenced by the process of social comparison and in an eternal comparison principle, a person compared self-perceived ability and way of thinking. The findings revealed that high Self Confidence students tend to be prompt in decision making, Problem Solving and showed better performance on a variety of test.

Metcalfe and Shimamura (1994) explode the role of Self Confidence and Decision making and ways of thinking. A key aspect of decision making is the notion of uncertainty. One mechanism that helps humans to deal with uncertainty is the level of Self Confidence. Based on this concept a tool was developed. The sample comprised of 150 graduate students belonging to the Ohio State University. The data were collected by using questionnaires having 75 statements related to the situation in which certain parameters reduced are unknown. The data were subjected to factor analysis employing centroid method. The self-confident students were found to possess more decision power,
Problem Solving Ability and to appraise and judge the quality of one's own cognitive work.

Harvey (1997) studied the unique Immediate Confidence Judgment. To judge the confidence level of student, a test and confidence rating scale was developed on the sample of 298 high school students. Immediately after responding to an item in a test participants were instructed to give a confidence rating (usually expressed in terms of percentage) indicating how confident they are. These confidence judgments are regarded as an integral part of self-monetary, process of metacognition. It was found that high self-confident students were emotionally controlled, self-assured and reflect once belief in the accuracy of the decision.

Crowford (1997) studied the different well established areas of academics, thinking power and its relation with Self Confidence to judge this aspect Scales were utilised for the assessment of mathematical thinking capacity and verbal facts. The sample of the study comprised of 495 students. The reported findings were that Self Confidence was found to share a low correlation with rating measured on a vocabulary test and mathematical thinking capacity test.

Barons (2000) studied the tendency towards open mindedness, objective and reflective thinking which are said to characterise good decision makers. These constructs, were commonly labelled as “Cognitive or Thinking” styles. Despite differences in labels and the scope of these approaches, there seems to underlie individual differences in information processing and judgment mechanisms. The suggested major given by the investigator was the label the Self Confidence. He revealed this fact after an extensive review of literature and research. The sample of the study comprised of a group of 12 graders, belonging to different socio economic background. The investigator concluded that Self Confidence, thinking, decision making and all the cognitive styles are inseparable entities.

Kleitman and Stankov (2001) in their study focused primarily on confidence judgement that people assign to their answers to cognitive test items. The main findings presented showed that self-confidence is a stable, broad physiological trait affected by the
dynamics occurring during decision making in test taking activities. An extensive battery of different thinking dispositions relating to the way, in which people react to, and deal with, uncertainty was employed and also structural equation modelling techniques were employed. The main findings of the study revealed that for any type of thinking disposition, Cognitive acceleration abilities and Self Confidence is must.

Jonson and Allwood (2003) studied the correlation of Thinking and Self Confidence and found that it has high eternal consistency (reliability estimates a typically higher than .90). Importantly there are systematic individual differences in confidence ratings. The correlation between accuracy and confidence scores from the same test of significance (average between 0.40 to 0.50). Nevertheless, correlations between confidence ratings from a diverse battery of cognitive tests have been consistently high enough to define a strong correlation of thinking and Self Confidence.

In addition to these some other research studies related to Self Confidence were conducted by Sharma (1979), Goswami (1980), Mehta and Kour (1997), Pattanayak (1998), Nayak (1998), Pradhan (1999) and Ise (2006). These are as follows:

Sharma (1979) conducted a study to find out the relationship of Self Confidence with fluency, flexibility and originality components of Creativity. The flexible and original students were found to be self-confident.

Goswami (1980) conducted a study on topic of Self Confidence and found that a self-confident girl can adapt herself to surrounding whether it is favourable or unfavourable and controlled the environmental condition.

Mehta and Kaur (1997) conducted a study on the effect of Achievement motivation, Self Confidence and Assertiveness upon adjustment of adolescent girls. They found that highly Achievement motivated rural girls were found to be significantly more adjusted educationally and in total. Self-confident girls were found to be more adjusted in total and in all areas.

Pattanayak (1998) did a comparative study of male and female teacher trainees in terms of Self Confidence, Self Concept and Social Intelligence. The main objective of the study was to compare the mean Self Confidence scores of male and female B. Ed. teacher
trainees. The main finding of the study was the male and female B. Ed. teacher trainees did not differ significantly in their mean self-confident scores.

Nayak (1998) did comparison of B. Ed. activity with B. Ed. traditional students on the basis of Achievement, Self Confidence and Creativity. The main objective of the study was to compare B. Ed. activity students with B. Ed. traditional students in terms of mean Self Confidence scores. The main finding of the study was Self Confidence among B. Ed. Activity students was found to be significantly higher than B. Ed. traditional students.

Pradhan (1999) did a comparative study of male and female high school teachers of Indore city in terms of Self Confidence, Job satisfaction, Social and Aesthetic values. The objectives of the study were (i) To compare the mean Self Confidence scores of male and female high school teachers (ii) To compare the mean Self Confidence scores of private and government high school teachers. The main findings of the study were (i) Male high school and female high school teachers significantly differ in their mean Self Confidence scores. (ii) Male government and female government high school teachers did not differ significantly in their mean Self Confidence scores.

Ise (2006) studied effectiveness of Instructional Material on Guidance and Counselling in terms of Achievement, Self Confidence and their reactions at B. Ed. level. The objectives of the study were (i) To compare the mean pre and post Self Confidence scores of B. Ed. Guidance and Counselling students treated with intrinsic Programmed Learning Material. (ii) To compare the mean Achievement scores of B. Ed. students treated with intrinsic programmed learning material having higher and lower Self Confidence. The major findings of the study were (i) The mean Self Confidence scores at post test stage were significantly lower than the mean Self Confidence scores at pre-test stage.

According to Agnihotri (1987), the fewer the score, the higher is Self Confidence so it indicates that the mean Achievement scores of low self confident student’s group. It indicated that the high Self Confidence students scored high in Achievement test than low Self Confidence students.
2.3.0 RESEARCH STUDIES RELATED TO INTELLIGENCE

Intelligence means having the ability to think. The term ‘Intelligence’ and ‘Thinking’ prove entirely synonyms. The level of thinking of any intelligent person can be at a higher level as compared to an average person. Some of the researches showing strong Correlation between thinking and Intelligence are:

Getzels and Jackson (1962); Taylor and Holland (1962); Burt and Thorndike (1962-63); Wallach and Kogan (1965); Yamamoto (1965); Hasan and Butcher (1966); Vinset (2002); Nisbett (2003); Sternberg and Yang (2003) and Decker (2005).

Getzels and Jackson (1962) emphasised that pedagogical approaches to the promotion of Thinking Skills in young children are developmentally appropriate in helping children to construct rules for solving problems, hypothesis about possible eventualities, suggest alternative or reason from given information should be given in the light of young children’s cognitive abilities, mental terminology and learnings. They then proceeded to new divergent thinking test based on different conceptualisation to judge its correlation with Intelligence. The test was administered in a congenial atmosphere to a group of fourth graders and results indicated positive but low correlation between thinking and Intelligence.

Taylor and Holland (1962) after an extensive review of literature and research, constructed a test to show correlation between Thinking and Intelligence. The test was administered to a group of 90 students of 8th graders. The investigation reported a positive but low correlation between the two constructs (0.20-40) for general population and almost no correlation at the higher ability levels.

Burt and Thorndike (1960-63) in reviewing past studies, considering the underline dimension tapped by measures of divergent thinking, pointed out that while the relation between the Divergent Thinking Measure and Intelligence were low, the correlation between various divergent thinking test were often found to be of same magnitude. They concluded that the Thinking and Intelligence possessed internal consistency.
Wallach and Kogan (1965) after a most extensive review of studies and research concluded that, divergent thinking tests used were not measuring an attribute distinct from general Intelligence. They then proceeded to build few new divergent thinking tests based on a different conceptualization which they administered with no time constraint and in a game like atmosphere to group of 6 graders. Correlating the results with measures of Intelligence they concluded that the construct of divergent thinking possessed an internal consistency and comprehensiveness similar to that possessed by the General Intelligence.

Yamamoto (1965) administered Minnesota Test of Creative Thinking and Intelligence on a group of 150 students and has reported a low correlation between Thinking and Intelligence but concluded that these tests do not measure a wholly independent and exclusive factor from general Intelligence.

Hasan and Butcher (1966) after an extensive research and evaluation of this aspect constructed a test to find out the correlation between Intelligence and Thinking. A random sampling technique was followed for the selection of sample. The sample comprised of 450 Scottish children belonging to different zonal schools of Scotland. The developed test was administered and the result showed significantly higher correlation between thinking and Intelligence.

Andrea (2002) developed a programme and studied the relationship among Intelligence, expertise and divergent thinking as they influence Creative Problem Solving and performance in a sample of 110 military leaders. In a series of casual analysis, it was found that divergent thinking exerted unique effects on Creative Problem Solving that could not be attributed to Intelligence or expertise. Intelligence and expertise, however also contributed to Creative Problem Solving.

Nisbett (2003) in “The Geography of Thought” concluded that thinking and Intelligence are two correlated words. Both the terms are related to cognitive domain, but the influences of culture have developed cognitive styles that differ in fundamental base and affect Thinking and Intelligence.
Strenbert and Yang (2003) found that construction of Intelligence emphasize to understand think rationally and deal effectively including knowing when to act and show one’s Intelligence.

Decker (2005) drawing upon holographic principles developed a model called "Natural Thinking and Intelligence" (NATI). The model possesses that we can realize potential and solve problems by implementing whole brain thinking, as it the mind’s natural way which focuses to problem, multiple issues, weakness and polarities for the purpose of development. To find the effectiveness of the model, the experiment was conducted on a group of 200 students belonging to Boston College. The investigator concluded that whole brain thinking makes possible a higher level of functioning in every individual.

In addition to these some other research studies related to Intelligence were conducted by Bhardwaj (1978), Chatterji (1983), Damle (1987), Gupta(1988), Mian(1988), Kohli (1989), Sharma(1989), Swami(1989), Yadav and Shrivastava(1989) and Kumari(1990). These are as follows:

Bhardwaj (1978) studied Vocational interest as function of Creativity components, Intelligence and Socio-economic status among college going students. The objective of the study was to study interaction among Creativity, Intelligence and Socio-economic status on bivariate and trivariate levels of operation while influencing the growth of vocational interest. Researcher found that Intelligence was more vocational interest promoting in low Creative on the middle SES.

Chatterji (1983) did a comparative study of Personality, Intelligence and Achievement motivation of students in different academic groups. The main objective of the study was to compare the Personality, Intelligence and Achievement motivation of different academic groups at +2 stages. Researcher found that out of the four academic groups, Science groups were the most intelligent and art students the least.

Damle (1987) did an experimental study of Personality, Intelligence distribution of practice and motivation as related to psychomotor learning and retention. The objective of the study was to investigate experimentally the relation of Personality, Intelligence,
Mode of practice and Augmented feedback to the learning and retention of a psychomotor task. The finding was that the general Intelligence significantly contributed in the learning and retention of the psychomotor skill.

Gupta (1988) studied Intelligence, Adjustment and Personality needs of effective teachers in Science and arts. The main objective of the study was to correlate teacher effectiveness with Intelligence, Adjustment and Personality needs. Researcher found that Science teachers were, significantly more intelligent than art teachers.

Mian (1988) did a comparative study between boys and girls about Intelligence, Neuroticism, Scholastic Achievement and need Achievement. The objectives of the study were- (i) To study the difference between boys and girls in the degree of neuroticism, level of Intelligence, scholastic Achievement and need Achievement. (ii) To compare boys and girls with high/low Intelligence on neuroticism, scholastic Achievement and need Achievement. Researcher found that the girls were superior to boys in Intelligence and scholastic Achievements.

Kohli (1989) studied Attitude of students towards religion in relation to Personality characteristic, Intelligence and Socioeconomic status. The objectives of the study were- (i) To study the effect of Intelligence, Socio-economic status, and Sex on the attitude of the students towards religion. (ii) To study the interaction effect of Intelligence, Socio-economic status and sex differences on the religious attitude of the students. He reported that students belonging to high Intelligence group and high SES were more religious in attitude then the students of the low Intelligence group and low SES.

Sharma (1989) did an experimental study of Psychomotor performance and Reminiscence as determined by Personality, Intelligence, sex and practice. The objective was to study the relationship of Personality and Intelligence with psychomotor performance and reminiscence. Researcher found both extroversion and neuroticism had positive correlation with psychomotor performance while Intelligence had a low correlation with it.
Swami (1989) studied the Adjustment, Anxiety, Self-concept and Intelligence of orphan students as compared to normal students. The objective of the study was to study the adjustment, anxiety, self-concept and Intelligence of orphan students in comparison with those of normal students. Researcher found that the Intelligence of normal students was higher than the Intelligence of orphan students.

Yadav and Shrivatava (1989) attempt to find the correlation between Intelligence and Creativity of high school art group students. The IQ and Creativity were found to be positive and significantly correlated.

Kumari (1990) studied Personality characteristics, Intelligence, Achievement motivation, adjustment and socioeconomic status of juvenile and adult female offenders. The main objective of the study was to study the Personality characteristics, Intelligence, Achievement motivation, adjustment and socio-economic status in respect of juvenile delinquents and adult offenders. Researcher found delinquents had low Intelligence and Achievement motivation.

2.4.0 RESEARCH STUDIES RELATED TO PERSONALITY

Parwal's (1987), objective of the study was to know if disciplined and undisciplined students differ in introversion and extroversion and mental abilities in terms of verbal reasoning, space relation, numerical ability, clerical speed and accuracy and language usage. The disciplined students were found to be more introvert than indiscipline students, irrespective of gender, Achievement level and parental income.

Dagur (1988) studied relationship between neuroticism, anxiety and Creative thinking in the context of extraversion, psychoticism and sex. The main objectives of the study were (i) To find the difference between extroverts and introverts with different level of anxiety, in respect of Creativity. (ii) To compare extroverts and introverts on Creative thinking abilities. The findings were (i) At low level of neuroticism female extroverts showed more flexible and fluent behaviour than introverts. (ii) Anxiety affected both introverts and extroverts in their Creative thinking.
Leela (1988) studied religiosity in relation to certain Personality traits of college students. The objectives of the study were: (i) To find out the relation between religiosity and Personality factors. (ii) To compare the Personality profile of high and low religious groups. The findings were (i) The difference in mean scores of the high religious group on Personality factors $o$, $q_1$, $q_2$ and $q_4$ were significantly higher than those for the low group. (ii) The Personality profile of the high and low religious group was not similar.

Pal (1988) studied competition and co-operation in high school children as related to Personality and parental orientation. The objective of the study was to investigate the relationship of Co-operation and Competition with Personality and parental orientation. The findings were (i) Subjects high on co-operation were found to be warm hearted, obedient and conscientious than those low on co-operation. (ii) Subjects high on co-operation were found to be less intelligent, more affected by feelings, excitable, enthusiastic, tender minded and tensed as compare to those low on competition.

Samouel and Goodchild (1988) researched on Personality socialization and moral development of high school students. The objectives of the study were (i) To find out if the stages differ with differences in the Personality and social skills of a person. (ii) To find out the moral development of children and study how far Personality and Social factors influence moral development in children. The findings were (i) There was a significant association between the moral development stage and Personality traits on the one hand and social factors on the other. (ii) The stages differed with Personality traits, SES, extraversion and Intelligence.

Kumari (1990) studied Personality characteristics, Intelligence, Achievement motivation, Adjustment and Socioeconomic status of juvenile and adult female offenders. The main objective of the study was to study the Personality characteristics, Intelligence, Achievement motivation, Adjustment and Socio-economic status in respect of Juvenile delinquents and Adult offenders. The findings were (i) Offenders had the traits of psychoticism and neuroticism but they were not extroverts. (ii) In the case of juvenile and adult female offenders, no significant differences were observed in case of Personality
characteristics, Intelligence, Achievement motivation and adjustment except in case of SES and health adjustment.

Pareek's (1990) objectives of the study were-(i) To explore the Self concept, aspiration and Personality traits of students in different types of schools. (ii) To determine the relationship between Self-concept, Personality traits and aspiration of adolescents studying in different schools. Researcher found no significant relationship between Personality traits and level of aspiration among students from different type of schools as private, central and government schools.

Vijyalaxmi (1991) studied relationship between self concept and Personality adjustment of family reared and institution reared children. The objectives of the study were- (i) To find out the relationship between the self concept, and the Personality adjustment of children at home and of those who are institutionalized. (ii) To assess their level of Personality adjustment. The findings were (i) Family reared and institution reared children were similar in their self concept. (ii) They were also similar in their Personality adjustment.

Bhoj (1992) researched pattern of cerebral dominance and its relation to handiness, cognitive style, Creativity and Personality. The objective of the study was to study the pattern of cerebral dominance in young adults and determine its relation with handiness, cognitive style, Creativity and Personality variables of the individual. Researcher reported that (i) Cerebral dominance was not found to be significantly associated with either productivity or uniqueness measure of the Creativity tests. (ii) Introversion/extroversion scores showed no association with the pattern of cerebral dominance.

2.5.0 RESEARCH STUDIES RELATED TO TOLERANCE OF AMBIGUITY

Rani (1986) studied the intellectual and non intellectual correlates of Creative female school subjects. WallchKogan's battery of Creative instruments and Tolerance of
Ambiguity scale were used for data collection. Positive and significant correlation was obtained between Creativity and in Tolerance of Ambiguity.

Websters (1962) defined the term ‘Ambiguity’ as the quality or state of being ambiguous. He said those words or situations ‘ambiguous’ which are heaving two or more possible meanings, not clear, indefinite, uncertain and vague. ‘Tolerance’ word according to Webster (1962) means tolerating or being tolerant of others beliefs.

Bhavalkar (1992) studied the relationship between Tolerance of Ambiguity and Scientific Creativity. The partial correlation coefficient between Scientific Creativity and Tolerance of Ambiguity, while partialling out the effect of Self Confidence, Intelligence, Scientific attitude and Dependency, was not significant. On further analysis it was found that higher the level of Tolerance of Ambiguity, the higher was the scientific Creativity of student.

Singh (2001) explored the relationship between Tolerance of Ambiguity and Verbal Creativity and its dimensions. The Tolerance of Ambiguity did not influence Verbal Creativity and its dimensions significantly.

Lulla (2012) compared effectiveness of Co-Operative learning and Lecture method in terms of Achievement in Science of class VIII students. The objective of the study was to study the effect of Treatment, Tolerance of Ambiguity and their Interaction on Achievement in Science of students by considering Pre- Achievement in Science as covariate. The findings were i. students belonging to low, moderate and high Tolerance of Ambiguity were found to have similar Achievement in Science when groups were matched with respect to Pre-Achievement in science. ii. Irrespective of level of Tolerance of Ambiguity, the Achievement in Science of students can be improved equally well by using Co-Operative Learning Strategy when the groups were matched with respect to Pre Achievement in Science.
2.6.0. RESEARCH STUDIES RELATED TO CREATIVITY

Joshi (1989) studied Creativity in relation to Personality, locus of control and alienation. The objectives of the study were- (i) To study the Creativity of the students studying in four different professional fields (Management, Medicine, Engineering and Law) in relation to their Personality trait, locus of control and alienation. (ii) To study the Personality pattern of high and low Creative students of each group. Researcher reported that all the four groups (management, medicine, engineering and law) were found to be significantly different on the various measurements of Creativity, Personality, locus of control and alienation.

Singh (1989) studied the interactive effect of Need Achievement, Creativity components and second order Personality factors on learning of college going students. The main objective of the study was to study the separate and interactive influence of Need Achievement, Creativity components and second order Personality factors on anagram task learning of female college students. Researcher found that the success of female adolescents on anagram task learning was significantly influenced by their Creativity components.

Singh (1990) studied the effect of discipline of students on their Creativity. The finding was that the non schedule caste students under Science group were significantly higher in Creativity than their counter part of rural art groups.

Afshan (1991) found that rural gifted girls in comparison to urban gifted girls were higher on Creativity.

Shrivastava, Sushila and Srilatha (1992) found that the enrichment activities affected sufficient improvement in the Creativity levels of gifted students both boys and girls.
Prociuk and Breen (1974) examined the relation between control focus (inner-outer), Study Habits, attitudes and academic performance. They found that there is a positive relation between them.

Zimmerman and Pons (1986) found that students with high metacognitive and self-regulatory abilities actively involved in their own learning process, plan and monitor the task they are focusing on, their own study attitudes and the task and the study attitudes fits together.

Powell, Williams and Wechsler (2002) presented a paper on Study Habits and the Level of Alcohol Use Among College Students. This paper draws on the 1997 and 1999 waves of the College Alcohol Study to examine the effect of alcohol consumption among college students on Study Habits. A two-stage generalized least squares estimation procedure is used to account for the potential and correlation in the unobserved characteristics determining drinking behaviour and Study Habits. The results revealed that failing to account for the endogeneity of the level of drinking leads to an over-estimate of its effect on the likelihood that a student misses a class or gets behind in school. Researchers also found deferential effects of drinking on the Study Habits of freshman students and their upper-year counterparts.

Ozsoy, Memis and Temur (2009) investigated the relationship between fifth grade students' metacognition levels, and their Study Habits and attitudes. Participants of the study consist of 221 students, 125 female and 96 male, enrolling to six public primary schools in Turkey. The results revealed that there is a medium positive relationship between metacognitive knowledge and skills and Study Habits (r = .351, p < .05), Study attitudes (r = .415, p < .05) and Study orientation (r = .434, p < .05). Additionally, the results of the study showed that there is no significant relationship between metacognition and Study Habits and attitudes for low and medium achievers but, there is a significant relationship for high achievers.
Mbah (2010) investigating the impact of Information and Communication Technology (ICT) on students’ Study Habits. The research was conducted with two main purposes: Firstly, to investigate students’ familiarity and attitude towards ICTs, and secondly, to examine the possible relationship between students’ use of ICTs and Study Habits. The results revealed that students have a positive attitude towards ICTs as some use them to facilitate learning, although male students are more favourable toward ICT usage and likely to find that ICT’s help them at their studies. As such students constantly change their Study Habits based on the type of ICT they use to ease studies.

2.8.0 SUM-UP

From the review presented above it can be said that different Training programmes, Instructional Materials were designed, constructed by various researchers for the development of Thinking Skill. The studies by Raths, Jonas, Rothstein and Wassermann (1967) decried the lack of emphasis of thinking in schools and noted that “Memorization, drill, home work, The three R’s(and the) quit class room work was rewarded while inquiry, reflection and the consideration of alternatives were frowned upon” and this tendency hampers free thinking. Gallagher (1975) conducted a study to develop Thinking Skill through different types of content based activities, stated that thinking must be practical from each content field. Lipmen (1980) considered that through thinking exercises like engaging children in constructive argument, debate, discussion and exploratory thinking, learner can exceed the predicted level of competency. Choudhary (1983) conducted an investigation into the trends of Creative thinking of people of age 11+ to 13+ in relation to some psycho socio correlates. Raina and Vats (1983) studied style of learning and thinking (hemisphericity), openness to inner experience, sex and subject choice. Worsham and Austin (1983) developed a program ‘THINK’ for high school seniors in Baltimore and made students engaged in Problem Solving activities in which they were encouraged to discuss the rational leading to higher level thinking. Vora (1984) conducted an investigation on the impact of Divergent thinking program in
9th school level. Shukla (2014) Effectiveness of Instructional Material and Traditional teaching method based on Problem Solving and Identifying Propaganda Thinking Skill in Social Science in terms of students’ Achievement and Reaction at higher secondary level.

Other than these researches the research studies related with the covariates of this study are summed up as follows.


Tolerance of Ambiguity is an ability of individual to withstand frustration generated by stimuli which are equivocal or unstructured. Very few studies were found related with this factor. They are-Rani (1986) studied the intellectual and non intellectual correlates of Creative female school subjects. Bhavalkar (1992) studied the relationship between Tolerance of Ambiguity and Scientific Creativity. Singh (2001) explored the relationship between Tolerance of Ambiguity and Verbal Creativity and its dimensions.

Study Habits affect learning significantly. The studies found were by Prociuk and Breen (1974), Zimmerman and Pons (1986), Powell, Williams and Wechsler (2002), Ozsay, Memis and Temur (2009), Mbah (2010).

From the above mentioned researches in the field of Thinking Skills it is evident that very little work has been done for the development of Thinking Skills among students. Maximum work has been done for primary and middle grade students as compared to the secondary grade students. So there is a need to develop Instructional Material on Thinking Skill of Identifying Pros/Cons for secondary grade students. One should be teaching students, ‘how to think?’ instead teaching them ‘what to think?’ Teachers are more concerned with what answers are given rather than with how they are produced. The present formal system of education is not fulfilling the need of society and educationists properly. The lecture method still predominates as an important method of instruction at all levels. This method can not make the students to think. The students also believe in rote memorization of concepts. The teaching method should be such that it encourages students to think rather than to cram.

From the researches presented in this chapter, it is obvious that they differ in respect of tools, sample, duration, age and grades. Therefore generalisation cannot be made. So, there is a need to conduct more researches so that generalisation may be arrived at.

As thinking leads to a strong motivation for the particular problem that is why it is very essential to develop Thinking Skills among children. Students can learn to think if school concentrates on teaching them how to do so? As the researcher is post graduate in Science, she has interest in the field of Thinking Skills. The Thinking Skills have a sound basis in the research and theoretical literature. Thinking Skills are important to study the mental process in systematic and sophisticated manner. Thinking Skills provide a mechanism for simulating thoughts and a framework for conceptualizing mental process,
to construct new knowledge and to develop both discipline and logical analysis. Every concept or phenomenon has two aspects, one is positive and other is negative. The Thinking Skill of Identifying Pros/Cons helps the students to think about both the aspects of a concept or phenomenon. It develops the positive and negative thinking approach simultaneously which helps the students to evaluate the concept/phenomenon properly. That is why the researcher decided to work on the Thinking Skill of Identifying Pros/Cons.