## Chapter-II

# REVIEW OF RELATED LITERATURE

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# chapter 2

# CHAPTER-II

# REVIEW OF RELATED LITERATURE

## 2.1 Introduction

From the days of early Greek Philosophers, Psychologist had started studying the functioning of mind. They have attempted to study how human mind works and how inductive and deductive thinking takes place. With the development of laboratory and other psychological equipments, studies have been carried out on human and animal through observations to understand their behaviors. With increase in the number of evidences and empirical investigations the whole Science of information processing system in mind and related theories had grown up to assist the studies in the area of thinking and problem solving.

In order to relate the study with existing knowledge in the area of research there is a need for investigator to be able to locate, organized and use the related literature available in the field. According to Aray (1972), the review of related literature helps the researcher in following ways:

1. Knowledge of related research enables the investigator to define the frontiers of his field.
2. An understanding of theory in the field enables the investigator to place his question in perspective.

3. Through studying related literature investigator learns which procedures and instruments have proved useful and which seem less promising.

4. A thorough search through related researches avoids unintentional replication of previous studies.

5. The study of related literature places the researcher in a better position to interpret the significance of his own results.

Realizing the importance of reviewing related literature investigator carried out review of related literature which is presented under the following categories:

## 2.2 Status of research in the area of thinking

**Ruger (1910)** has attempted and summarized work done in the area of thinking in his lectures on Experimental Psychology of thinking. He developed a set of questions which were asked to various people, their answers were recorded. The thinking processes of individual were studied on their own account through the process of introspection which led them to give those answers. These studies indicated that thinking is insightful activity.

**Burt (1919)** conducted experiments on thinking and indicated that thinking takes place in two parts one the generation of ideas, hypothesis, other logical development and elaboration of ideas by reasoning. The first is called imagination and creative thinking and second is logical thinking, which attempts to make thinking self-consistent and to confirm with factual reality. Further, the following steps have been identified

- A problem that have to be solved in order to reach a goal.
- Ideas are generated that aim towards the solution of problem.

- Certain responses are selected by trail and error and solution is attempted.

**Alper (1928)** studied the problem solving situations of preschool children. Through analyzing their behavior of his subjects he concluded that children often saw the solutions in flash after locating or analyzing a part of a puzzle that was causing the difficulty.

**Hull (1920) et al.** and many others conducted a number of different kinds of experiments to study concept formation and their studies reveled that a person often thinks with concepts. The process of concept formation passes through stages of generalization and differentiation which falls in the domain of thinking.

**Buhler (1959)** conducted various experiments on thinking using paradoxical Aphorism, Matching or Analogous proverbs and Password experiments. Form experiments like these Buhler concluded following results:

- Thought processes are goal directed.
- Thoughts and their relationship to the task are simultaneously conscious.
- Thinking always takes place to perform a task, to solve a problem and to satisfy some motivation.
- Thinking is a function of perception and learning.
- Thinking is not just the activity in the head, it does not occur just in the brain and nervous system but also in the gestures of arms, hand and head.

It is evident from the above information of available research work done in the early years of nineteen century and literature in books that the term thinking is abstract in nature and perceived differently by different psychologist.

As reported in the sixth survey of research in education total 243 studies were completed in the area of creativity. Out of which 223 have been done at the Ph.D. level and 20 at the project level. The year wise distributions of these studies are presented in the table below:

Table 2.1 Number of researches conducted in the area of creativity

| Year | Doctoral level | | | Project level | Total |
|---|---|---|---|---|---|
| | Education | Psychology | Others | | |
| 1961-1970 | 03 | 01 | - | 01 | 05 |
| 1971-1980 | 55 | 13 | 04 | 05 | 77 |
| 1981-1990 | 61 | 33 | 09 | 10 | 113 |
| 1991-1993 | 11 | 03 | 01 | 04 | 19 |
| 1994-2005 | 26 | 03 | - | - | 29 |
| **Total** | **156** | **53** | **14** | **20** | **243** |

Source: (1)Fifth Survey of Educational research
(2)Sixth Survey of Research in Education

From above table it is observed that there has been a gradual increase in the Ph.D. level researches and the institutional level research in the domain of thinking. During the period 1971-80, there has been an abrupt rise in the number of research studies and thereafter, studies in this area have continued.

It is also observed that most of the studies are descriptive and experimental in nature following quantitative methodology. In the above studies about twenty five percent of research studies, the investigators have developed tools and the tools are based on the theoretical framework proposed by Guilford, Getzels and Torrence for measuring creativity. Moreover, about sixty percent of research studies were co-relational and

studied creativity in relation to personality, intelligence and other socio-cultural variables. Depending upon the nature of population and the purpose of the study, researchers have employed a variety of sampling techniques such as simple randomization, multi-stage randomization, simple and multiple stratified sampling, random stratified and cluster sampling. Researcher has come across limited studies that have drawn samples from pre-primary or primary school students. Torrance test of creativity, Passi test of creativity and Baquer Mehdi test of creativity are used by the researchers. Other tools like questionnaire and observation schedules have been employed and used on the tailor made approach. ANOVA, ANCOVA, t-test and chi-square test were used by the researchers. The most favored statistical tools have been taken from the parametric statistics. The qualitative techniques of data analysis are not popular among the researchers.

## 2.3 Studies conducted on measurement of thinking

Form the age of early Greek Philosophers and Psychologists have theorized about how the human mind works and how inductive and deductive thinking takes place. With the development in Psychology and establishment Psychological laboratory by Wundt in the year 1879, studies in the area of thinking gained momentum. Attempts have been made since mid-eighteen century to understand studies on thinking through observation and later with laboratory experiments. Theories on thinking were built up that describes thinking as a measurable construct and efforts were made to construct instruments to measure attributes of thinking in early nineteen century.

**Burt (1919)** designed a test that measures Deductive Reasoning Ability of children at different age level. The test was in the form of problems with necessary information and the children were asked to draw the conclusion. Virginia Shipman developed test

for measuring Reasoning Skills for children of New Jersey. This is primarily a test measuring ability to reason in language. It concentrates on dialogical thinking which contains no inert items such as vocabulary. Its reading level is 4.5 and its reliability compares favorably with established test ranging from 0.84 to 0.91.

**William (1960)** made a mention of General Test of Critical Thinking Appraisal, which has been designed for high school and college students. The test items are of a multiple-choice type that presents problem, statements, arguments and data similar to that which a citizen might encounter in daily life. Five sub scores can be obtained for (1) Inference (2) Recognition of Assumptions (3) Deduction (4) Interpretation and (5) Evaluation of Arguments. The test is easily administered and readily scored.

Thereafter, a large number of studies were added and tests were developed in the area of thinking during the subsequent fifty years of research.

## 2.4 Studies conducted in India

**Joshi (2009)** conducted a study entitled "effectiveness of the programme for the development of creativity for primary teacher's trainees" following 'synectics' model and implemented to study its impact on creativity of primary school teacher' trainees. Four PTC institutions were selected through purposive sampling technique of sample selection in the study. Experiment was conducted using pre test post test equivalent group design. Major finding of the study were:

**a.** Developed programme was found effective for developing the originality of the experimental group.

**b.** Total creativity of experimental group was significantly higher compare to the control group.

**Wanjari (2005)** conducted a study entitled effectiveness of concept attainment model and inductive thinking model of teaching on student's achievement in Science, Scientific creativity and attitude toward Science. Pretest treatment posttest design was followed by selecting sample purposively from the population of IX class students and using reasoning ability test in Hindi by Bayati, verbal test of scientific creativity by Sharma and Shukla, Science attitude scale in Hindi by Avinash Grewal and self prepared achievement test were used for data collection which were analyzed using t-test and ANOVA. Major findings of the study indicated that concept attainment and inductive thinking model of teaching were found more effective than traditional model of teaching in terms of achievement in Science of IX class students, reasoning ability and scientific creativity.

**Tripathi (2005)** studied the effect of Brainstorming technique on creativity and ability to integrate teaching skills of B.Ed. students with major objectives to study the effect of Brainstorming technique on the level of creativity and ability to integrate teaching skills and to study the role of selected variable in the association between creativity and integrating teaching skills. Study was experimental following pretest posttest single group design. Selected sample comprised of 90 pupil teachers. Verbal test of creative thinking by Baquer Mehdi (1973), Indore teaching Assessment scale by Passi, Deshmukh and Sharma (1960) and SES scale by Kuppuswami (1962) were used for data collection. Data were analyzed using t-test, product moment coefficient of correlation and first order partial correlation. Major findings of the study were brainstorming has a significant effect on level of creative and on the ability to integrate teaching skills. Creativity and ability to integrate teaching skill has a positive association and are affected by institutional climate; where as, SES, academic

achievement and self-evaluation has no significant effect on the association between creativity and ability to integrate teaching skills.

**Singh (2004)** studied scientific creative thinking in relation to achievement motivation and family relationship among the students of senior secondary schools. Researcher developed and standardized the tool to measure scientific creativity thinking and studied relationship of scientific creative thinking with respect to achievement motivation among family relationship as major objectives. Sample of 532 students using cluster random sampling technique was drawn and tools used were scientific creative thinking, achievement motivation and family relationship inventory. Collected data were analyzed with the help of product moment correlation and t-test. Major findings of the study stated that there is a positive relationship between scientific creativity and achievement motivation but not significant statistically. No significant relationship between scientific creative thinking and family relationship was observed. Positive relationship between scientific creative thinking and acceptance dimension of family was reported by the researcher.

**Londhe (2003)** studied teaching aptitude of student teacher with respect to creativity and teaching competency. Nature of the study was survey type. Student teachers of B.Ed. colleges of Ahmadnagar, Nasik and Pune were included in the sample. Tests developed by Torrence, Passi and Shah were used for data collection. Collected data were further analyzed by t-test and correlation. Findings of the study reported no significant difference between creativity of male and female; rural and urban; graduate and postgraduate student teachers. However, significant difference in teaching competence of rural and urban; graduate and postgraduate students was observed. Study reported significant correlation between creativity and teaching aptitude.

**Naik (2002)** studied creativity of students in relation to their personality characteristic (PC), motivational characteristic (MC) and school background (SB)in order to ascertain the gender difference and the school type differences with respect to (a) self-esteem (b) MC, (c) SC, (d) Locus of control (LOC) and (e) creativity as major objectives. Investigator constructed and tested 15 research hypotheses and employed descriptive survey as a method of investigation. Twelve English medium secondary schools of Mumbai were selected by stratified random sampling technique. Tools were constructed and standardized by the investigator for data collection which was further analyzed through correlation, t-test, z-test, Chi square test and multiple correlation. Major findings of the study were:

a. Boys and girls did not differ in self-esteem and school climate, however, girls found significantly higher on motivation characteristic, locus of control and creativity.

b. Significant relationship of creativity with (a) self-esteem (b) motivation characteristic (c) school climate (d) internal locus of control was reported by the researcher.

**Devi (2002)** studied creative thinking of secondary school students in relation to disciplinary practices, school climate and need achievement. Studying incidence of creative thinking in secondary school and the effects of school climate and parental disciplinary practices on creative thinking of students were major objectives of the investigation. Sample constituted 400 secondary school students from one district. Tools developed by Torrence, Gopal, Gung and Mishra were employed by the investigator for the purpose of data collection. Major findings of the study reveled positive correlation between disciplinary practices with creativity. Factors constituting

school climate such as creative stimulation, cognitive encouragement and rejection were found to be highly correlated in development of creativity. In this study girls were found to be superior in the score of fluency, where as, score on flexibility and originality did not differed significantly. It is also reported that urban male, urban female, rural male and rural female were not having significant difference on creativity as a whole.

**Pathak (2002)** conducted a study entitled, "Preparation of a creativity programme for pre-service teacher trainees at primary level and study of its effectiveness" with following major objectives.

- To construct and standardize a creativity test for pre-service teacher trainees at primary level.
- To identify the creativity level of pre-service teacher trainees at primary level.
- To prepare a creativity programme for pre-service teacher trainees at primary level.
- To study the effectiveness of the creativity programme with respect to creativity components, cast category and academic stream.

Researcher followed pre test post test equivalent group experimental design. The purposive sampling method was employed in the conducted study. The data were analyzed through Analysis of Covariance. The major findings of the study reported that the developed creativity programme was effective for the enhancing creativity. It further reveled that caste category and academic stream have no significant impact on the total creativity scores obtained by pre-service teacher trainees.

**Meghani (1999)** conducted a study entitled, "A study of the effectiveness of a teaching-learning strategy for developing critical thinking in students of std. XI using

Psychology as content". Investigator developed a critical thinking measurement tool in order to study the effectiveness of the developed instructional strategy. Following one group pre test post test experimental design and selecting sample of 12 students of Art stream researcher conducted the study. Major findings of the study reported that there is a significant improvement in the all selected sample group of student's critical thinking through the implementation of developed instructional strategy.

## 2.5 Studies conducted abroad

**Chennabathni, Revathi (2007)** conducted a case-study of a creative teacher. Alice, a secondary teacher from Quebec, Canada is the focal point of this qualitative case-study research. Investigator employed intended five one-to-one interview with the subject. Interview with June (mentor-colleague) and Jane (department head); two classroom observations and artifacts of student's work were additional data sources. Researcher study reported that Alice's Philosophy of grounding education in the community determines who she is, and encompasses her creative process which begins with recycling of community resources and giving back to the community through the creative products developed by her students. Her values guide her practice and teaching decisions. This case study of creative teaching presents an inspirational model for individual in the teaching profession.

**Ingle, Cynthia Ohler (2007)** studied predictors of critical thinking ability among college students with an objective to address a deficit in the literature. Participants consisted of 296 community college and university students. A total of 283 test packages were employed for data collection. The assessment instruments that were administered included the Demographic questionnaire, the California Critical Thinking Skills tests, the Ennis- Weir Critical thinking Essay and the motivated

strategies for learning Questionnaire. Hierarchical multiple regression was run to explore whether meta cognitive self-regulation, elaboration, application, organization, peer learning, help seeking, type of collegiate institution, age and sex of participant predicted critical thinking ability as a group and individually. The results of the study support and contradict; and extend previous research by illustrating the need for additional empirical exploration. The current study adds to the understanding of critical thinking by contributing to the limited empirical evidence suggesting a link between meta cognitive self-regulation, elaboration and critical thinking proficiency. A number of practical implications were suggested for educators by the investigator.

**Robert John Bertrand (2006)** conducted a meta analytic review of researches on creativity training programmes conducted by various researchers in order to evaluate their efficacy and the impact of specific programme features on creative ability. The meta-analysis results suggested that creative ability can moderately be enhanced by training. Significant improvement of verbal creativity rather than figural creativity was observed by the researcher. It is also reported that neither the frequency nor the length of training appeared to influence creativity although groups of 30 or less had significant greater gains than larger groups.

**Virgolim, Angela M. Rodrigues (2006)** studied relationship between intelligence and creativity test scores of identified gifted and talented students attending an enrichment programme in the Federal district, Brazil and determined how students and their resource room teachers perceived intelligence and creativity. An expost facto design was used to investigate the correlation between intelligence and creativity test scores of 100 identified gifted and talented students ages 9-17, and 15 teachers in grade 4 through 8 of an enrichment programme for gifted students in Federal district. A Pearson product moment correlation was consulted to determine

the magnitude and the degree of relationship between students scores on Reven's progressive matrices and the Urban and Jellen's test for Creative thinking – drawing production. Qualitative and quantitative methods were used to address students' and teachers' perceptions of creativity and intelligence. Multiple case studies were used to gather data from students and their teachers; information on students' ability, interests, learning styles, self concept and behavioral characteristics were coded and categorized for patterns and themes.

The results of the correlation analysis indicated a significant relationship between intelligence test scores and creativity test scores. (r=.21, Effect size=.04). Students and teachers perceived creative and intellectual ability favorably. Teachers and students defined intelligence as reasoning and knowledge, teachers also acknowledged creative thought. Both teachers and students perceived creativity as divergent thinking ability and recognized the role of knowledge in problem solving. Students and teachers considered creative intelligence and giftedness as related constructs.

## 2.6 Implications for the present study

Following research gaps have been identified by the researcher through critical study of the related literature.

- Conducted researches in the area of creativity are significantly large in number, whereas, in the area of critical thinking only three studies have been reported by the researchers.
- Majority of the studies were conducted at secondary and senior secondary level, whereas, primary and pre-primary level research studies are very limited in number.

- All the studies dealt with creative and critical thinking as a separate process and aimed to develop these separately.
- Studies related to training of teachers are very few in numbers, whereas, studies on correlates of creativity with other variables are repeatedly conducted at various parts of the country.
- Studies conducted in the area of creativity in India and abroad shows perfect correlation in terms of number, variables, and other aspects of research methodology, however, in the area of critical thinking very few researchers have contributed.

It is interesting to learn that study in the area of thinking and its measurement is gaining momentum in last thirty years of research. A large majority of research work is done in the area of creative thinking, its measurement and its relation with other variables. As many as seventy seven studies during the year 1971-1980 and 113 studies in the year 1981-1990 showed an abrupt rise in the number and thereafter, studies in this area have continued indicative of the importance possessed by this area in the field of research and education too. The framework of Guilford, Getzel and Torrence were utilized by many researchers for measurement of creativity in abroad. In India, Passi's test of creativity and Mehdi's test of creativity were utilized by many researchers to construct the test or to conduct the experiments.

Majority of these studies are experimental and descriptive in nature. Studying creativity in relation to personality, intelligence and socio-cultural variables have dominated the area of creativity in the $20^{th}$ century. However, few studies in sixth survey of research in education are related to use of concept attainment model of teaching in science, scientific creativity, effects of brainstorming method on creative

ability in teacher trainees, study of teaching aptitude in relation to creativity which are recent in the area of teacher education.

Realizing the importance of creativity and critical thinking in teaching-learning process, there is a dire need to inject basic component of these skill in the elementary level of learning and teacher training both pre-service and in-service. Designing learning materials and innovative methods of teaching should be the focus of further research at various levels of schooling. Teaching methods, classroom interaction pattern and school climate are very important element for development of thinking of students. Realizing the need to have more and more rigorous studies in the area of thinking investigator made an attempt with the primary teachers of Gujarati medium schools integrating content of school subjects with thinking tools and thinking strategies in order develop creative and critical thinking skills together.