Chapter 2
Review of Related Literature

The literature in any field forms the foundation, upon which all future work will be built

- Walter R. Brog
Review of Related Literature

Research takes advantage of the knowledge which has accumulated in the past as a result of constant human endeavour. It can never be undertaken in isolation of the work that has already been done on the problems, which are directly or indirectly related to a study, proposed by a researcher.

A careful review of research journals, books, theses, dissertations and other sources of information pertaining to the problems to be investigated is one the important steps in the planning of any research study. A review of related literature must precede any well planned research study.

Review of the related literature, besides allowing the researcher to acquaint himself with current knowledge in the field or area in which he is going to conduct research serves with many specific purposes.

The knowledge of related literature, brings the researcher up to date on the work which others have done and thus to state the objectives clearly and concisely by reviewing related literature the researcher can avoid unfruitful and useless problem areas. He can select those areas in which positive findings are likely to add to the knowledge in a meaningful way.

Through the review of related literature, the researcher can avoid unintentional duplication of well established findings. It is no use to replicate a study when the stability and validity of its result have been clearly established.

The review of related literature develops in the researcher an understanding of the research methodology, which refers to the way the study is to be conducted. It helps the researcher to know about the tools and instruments, which proved to be useful and promising in previous studies. The advantage of related literature is also to provide into the statistical methods through which validity of results is to be established.
The final and important specific reason for reviewing related literature is to know about the recommendations of previous researchers listed in their studies for further research. If we want to do some new research in a subject, it is essential that we should know the past of that subject. By the review of previous literature researcher can bridge the gap between new and old knowledge and new researcher will not feel he has jumped from one shore to another but feels that he is doing his work systematically and correctly.

In words of Walter .R. Brog, “The literature in any field form the foundation upon which all further work will be built.” Review is not only important from theoretical point of view but it also gives guidelines to procedure and tools to be used”. Obviously, the investigator should become familiar with uses of sources of educational information.

A review of related literature in respect of the present study has been classified mainly in two parts:

- Studies conducted Abroad
- Studies conducted in India

2.1) Studies Conducted Abroad

Ward and William (1969) studied the relationship between creativity and environment in nursery school children. Creativity and environment richness interacted significantly in their effect on ideational problem (Ideational fluency refers to frequency with which ideas come to one’s mind after a question is put).

Naist (1967), Hadden and Ltlin (1968), Barkelusin (1970) found that that the type of school or institution in which the child is studying and the intellectual climate prevailing there, it have been shown to be directly related to child’s creativity level. Among the factors in educational environment which appear to have a direct bearing in the development of individual’s creativity, is the role of motivation, incentive and rewards seem to be very important as reported by Cartledge and Kauser (1963), William (1982), Chung (1968), Kugan and Morgan (1969), Ward et. al. (1970), Hutchinson (1971) and Johnson (1973).
In school, within school environment the role of teacher is of prime importance. When behaviour of the teacher make a difference in child’s behaviour, their problem solving capacity, social contribution and creativity in students gets expressed. Conscientious and well mannered teachers’ often create autonomy in the children and vicious cycle in the class room. Socially inducing behaviour is likely to accelerate the creative environment. The remedy surely does not lie in school counselling but in a change spirit in the educational system and in society at large (Barron, 1969). External evaluation when associated with power produces negative polarities in the child and becomes the chief restrictor of individual creativity. For inculcation of creativity in school many experiments by quite a sizeable number of investigators have shown that the role of incentives and rewards is quite important (Cartridge and Kauser 1963, Williams 1965, Chung 1968, Kogan and Morgan 1969, Ward et. al. 1970, Elkind 1970, Turknelt 1979, Johason 1973). Perception of teacher’s behavior by students was found to be related to creativity in students.

Mari (1971)-

Designed a study with a view to compare modern American with traditional Arab rural 8th grade students in the creative ability 60 American (30M, 30F) 8th grade students from 60 Arab (30M, 30F) in rural areas were the subjects. Torrance Test of creative thinking was used to measure creativity.

It was found that American subjects differed from one another significantly more than Arab subjects. This difference was explained in terms of difference between modern society where individuals encouraged and traditional society where group orientation is encouraged and individual punished.

Creativity can be studied in many ways all rewarding in various degrees. New dimensions are always found and added to the ones known before.

Arieti (1976)-

Said there are many issues which are not completely settled. Significantly among them is the scientific creativity of science students. Lack of insufficient study motivated researchers to take problem for further research.
Bowers, John (1969) –

States that scholastic achievement too is a cognitive variable which can be measured in terms of scores obtained in scholastic examinations or on some standardised tests of achievements. Researchers have conducted significant investigations on relationships between scholastic achievements in various subjects as well as between academic streams and creativity which have yielded, by and large, three kinds of relationships, namely, positive, negative, and zero. Scholastic achievement has also been studied as predictor variable for determining extent of creativity.

Bowers, John (1969)–

Examined the interaction affects of creativity and I.Q. on ninth grade achievement, focussing in the conceptualization of Torrance who hypothesized that achievement is predicted by better I.Q. than by creativity below an I.Q. threshold. Three creative factor scores were estimated and were each multiplied by I.Q. to define three moderated or interactive predictor variables.

With a view to study the prediction of adult creative achievement among high school seniors, Torrance (1961) administered his Tests of Creative Thinking, Education Achievement tests and a 5 item questionnaire involving nomination of creative peers to 69 high school seniors (mean I.Q. 121). Seven years later the group was followed up and a Creative Academic checklist was filled in on 46 of the 69 original Ss. Correlations between the predictors and the criterion variables are compared. The flexibility and originality scores of the Torrance Tests were the best predictors with fluency, elaboration and originality of scores of the Torrance I.Q. scores, Educational Achievement tests scores and peer Questionnaire following in that order.

Copley (1967)–

Studied mean academic achievement of the four groups in descending order as: Hc-Hi = 69.9%, Lc-Hi = 63.5%, Hc-Li = 56.6% and Lc-Li = 51.9%; and reported the possibility if discriminating between the high and low academic achievers on the basis of creativity after partalling out the effects of I.Q.

Studied the inter-correlation among creativity, intelligence and scholastic achievement of the disadvantaged children. The correlations between I.Q. and creativity ranged from 0.18 to 0.31. Torrance tests of Creative Thinking acted as a suppressor variable in the study thereby increasing the relationship between I.Q. and achievement.

**Torrance (1959)**

Examined the relationship between creativity and scholastic achievements of 4th and 6th graders and reported coefficients of correlations ranging between 0.37 and 0.53. Further, he obtained coefficients of correlation ranging between 0.23 and 0.49 when intelligence was partialled out. Torrance (1962) also studied relationship between creativity and reading skip as well as arithmetic skill and reported coefficients of correlation to be extent of 0.48 and 0.28 respectively.

**Gatzels and Jackson (1959, 1962)**

Reported insignificant relationship in the scholastic attainments of their subjects despite a difference of 23 points in mean I.Q. of Hc and Hi groups.

Cropley (1967) studied academic achievement of the four groups in descending order as: Hc-Hi = 69.9%, Lc-Hi = 63.5%, Hc-Li = 56.6% and Lc-Li = 51.9% and reported the possibility of discriminating the high and low academic achievers on the basis of creativity after partialling out effects of I.Q.

**Thomas and Chess (1977)**

Also studied temperament and environment. One sample consisted of white middle class families with high educational status and the other was of Puerto Rican working class families. They found several differences. Among those were:

- Parents of middle class children were more likely to report behaviour problems before the age of nine and the children had sleep problems. This may be because children start preschool between the ages of three and four. Puerto Rican children
under the age of five showed rare signs of sleep problems, however, sleep problems became more common at the age of six.

- Middle class parents also placed great stress on the child’s early development, believing that problems in early ages were indicative of later problems in psychological development, whereas Puerto Rican parents felt their children would outgrow any problems.

- At the age of nine, the report of new problems dropped for middle class children but they rose in Puerto Rican children, possibly due to the demands of school.


In the study, focuses on familial and school correlates of creativity of standard 9th students. The objectives of the study were -1. To examine whether differences in anxiety and achievement value of these students would account for significant differences in their creativity levels. 2. To see whether male students would be different from female students with levels of creativity. It was found that anxiety and achievement values of students did not affect the verbal, non-verbal or total creativity.

**Orieux James Amox (1989)** -

Univ. of Alberta (Canada) studied correlation of creative ability and performance in high school students. The study revealed that both creative ability and performance were significantly related to intellectual ability and academic achievement at moderate to low levels. The co-relational analysis between I.Q and creativity and achievement and creativity resulted in overall low and non-significant correlation. Multivariable analysis of variance conducted to evaluate gender effect for all measures revealed that females significantly differed from males. Females obtain higher mean scores on two achievement measures.

**Bissett, Derin layne (1996)** -

University of Texas, investigated the relation of creativity and achievement of performance of middle school students in solving real world science problems.
The results showed both creativity and achievement are indicators of success in group problem solving. Effect design of problem solving activities enables students to demonstrate high performance as they solve real world problems.

**Purkey and Novak (1996)** –

Developed a framework for looking at how schools can become “invitational” by focusing on five elements — places, policies, programs, processes, and people.

**Makeba Jones, Susan Yonezawa, Hugh Mehan, Larry McClure (1999)**-

States that the concept of “school climate” has been defined in a wide variety of ways in the education research literature over the last thirty years. It has been equated with “the ecology of the school,” “a safe and healthy school setting,” “classroom participation structures,” a “caring school environment,” and the “culture of the school.” In recent years, school “climate” has been equated with “personalization.” More specifically, this involves making impersonal secondary schools more personalized for students by transforming the learning environment through reduced class size, theme-based curricula, and newly developed advisory programs. A synthesis of this wide range of studies produces the following findings:

- Efforts to improve schools must address and change educators’ beliefs, values and attitudes. However, these elements of the “culture of the school” cannot be addressed in isolation. Robust educational change requires educators to simultaneously attend to the power of existing technical considerations such as school schedules, school size, course sequences, curriculum and instruction as well as the political relations between the school, the broader community, state and federal policies.

- Unsafe, deteriorated, and overcrowded schools threaten the chances that students will develop social values of integrity, discipline, and civic mindedness and allow little enthusiasm for life-long learning. Overcrowding reduces students’ ability to pay attention and achieve academically.
• Addressing overcrowding by putting students on year-round, multi-track schedules with fewer days of school does little to solve the problem. Students who attend year-round schools suffer interrupted and lost instructional time; limited access to advanced courses and specialized programs; ill-timed breaks and correspondingly limited access to extracurricular activities and enrichment programs. These factors coalesce to contribute to students’ poorer academic performance in schools with unhealthy school climates.

• Modifying the structure of teacher student interaction to include small group discussions, individualized instruction, and multiple ways of displaying knowledge encourages students, especially those from linguistic and cultural minority backgrounds, to participate more actively in classroom lessons and thereby improves their learning.

• Linking the technical, cultural and political dimensions of school improvement involves treating issues of shared governance and professional development in conjunction with changes in teachers’ beliefs, teaching practices and curricula. This multidimensional approach helps ensure that reforms will be broadly supported by staff, parents and community members.

• A relationship between personalization and academic outcomes has been found when students’ perceptions of attempts to personalize schools by reducing class and school size have been elicited. On average, the more students report a high level of personalization, the more likely they are to score better on the California Standards Tests (CST) English language arts examination, have higher weighted grade point averages, and an increased probability that they are “on-track” relative to (a)-(g) requirements for high school completion. However, innovations such as advisory periods seem to have a negative correlation with students’ academic achievement. This finding suggests that educator-student relationships matter more than formal structures to improve school climate.

Su Ping Hung & Hsueh-Chin, Chen,(1999) –

The present study aims to explore how the social context influences creativity of students from family to school. Participants were 1200 high school students selected from
ten high schools in Taiwan, including senior high schools and vocational schools. Variety of measurements was used to test the creative potential and creative experiences of high school students. Descriptive statistics, hypothesis tests of differences and hierarchical regression were adopted in analyzing data. The main results were:

i. Educational degree of parents is positive correlated with creative potential and daily creative experience of high school students. It was surprised that the children, whose mothers with higher educational degree, perform better on creative potential and creative experience. Besides, family income also modestly correlated with daily creative experience. Furthermore, the more culture resources the family offered the more daily creative experience their children will have.

ii. Family climate is positively correlated with high student’s creative potential and creative experience.

iii. School with opening climate, positive peer relationship, teacher support and divergent teaching style all positively correlated with divergent daily creative experience.

iv. Finally, the results of hierarchical regression analysis show that family climate affect one’s daily creative experience more than school climate. Especially when family members love to design, evolved in innovation, with sensitivity of humour and generate good ideas can predict one’s daily creative experience. Based on the results, several suggestions for educational administrations, schools, teachers and future research were offered.

**Phi Delta Kappan (2000)** –

The study states that a positive school climate exists when all students feel comfortable, wanted, valued, accepted, and secure in an environment where they can interact with caring people they trust. A positive school climate affects everyone associated with the school: students, staff, parents, and the community. It is the belief system or culture that underlies the day-to-day operation of a school. Collectively and individually, a positive school climate can have a major impact on the success of all students in the school. Research has consistently shown a link between positive school climate
climate and other important measurements of school success, which includes academic achievement, high morale, staff productivity, effective management. This research has also identified 11 key factors (eight specific and three general) that contribute to creating a positive school climate. The 8 specific factors were:

**Continuous academic and social growth:**

- Respect: students and staff have high self-esteem and are considerate of others.
- Trust: a sense that people can be counted on
- High morale: students and staff feel good about being there.
- Cohesiveness: a sense of belonging
- Opportunities for input: being able to contribute ideas and participate.
- Renewal: openness to change and improvement.
- Caring: students and staff feel that others are concerned about them.

And the three general factors were:

i. Program curriculum, activities, and policies.


iii. Resources materials, and school facilities.

**HEATHER L. VOGEL AND APRIL L. COLLINS (2002)-**

This study investigates the effect of test anxiety on academic performance. It was believed that students with high test anxiety as well as those students with low test anxiety will have lower academic performance. Therefore, those students with moderate levels of test anxiety will perform the best. Two Psychology 101 classes were given identical quizzes. One class took a pop quiz while the other class took a planned quiz. The participants then completed test anxiety surveys. The quiz grades were then compared to the survey scores in order to determine if high and low anxiety groups perform lower than moderate anxiety groups. No difference was found on whether pop quizzes produce more anxiety than planned quizzes. There was also no difference in quiz
grades between the two groups. Therefore, academic performance was not found to be related to test anxiety.

In the study of a scientific creativity test for secondary school students in International Journal of Science Education 2002 -

This study describes the development of a test of scientific creativity for use with secondary school students. The results indicated that the scientific creativity of secondary school students increases with increase in age, and science ability is a necessary but not sufficient condition for scientific creativity. Further work is also suggested.


This paper describes a study of the influence of the Cognitive Acceleration through Science Education (CASE) programme on the scientific creativity of secondary school students. The results indicated that the CASE programme did promote the overall development of scientific creativity of secondary school students, although the effects on different aspects of scientific creativity varied. As expected from previous work on delayed effects of CASE on academic achievement, the results indicated that the effects on creativity were not necessarily immediate, but tended to be long-lasting.

LI Mingzhen, SONG Naiqing, PANG Kun (2004)-

Based on a survey on 1620 students in primary school and secondary school, by adopting Eysenck Personality Questionnaire (EPQ), The findings were:

i. There is significant difference between emotionality characteristics of temperament and mathematics academic achievement of the subjects at primary 5, junior secondary 2 and senior secondary 2.

ii. There is significant difference between internal-external directivity characteristics of temperament and mathematics academic achievement at primary 5 and junior secondary 2 ,while there is no significant difference between internal-external directivity characteristics of temperament and mathematics academic achievement at senior secondary 2.

iii. There is significant difference between temperament types and mathematics academic achievement of the subjects from the three grades. Superior
temperament, which benefit learning mathematics, are sanguine, sanguine-phlegmatic and shlematic; While inferior temperament types, which don’t benefit learning mathematics, are choleric, melancholic and choleric-melancholic with the rising of grade, temperament types of benefiting learning mathematics converts from external directivity emotion balance to balance of internal-external directivity emotion stability. While temperament of no benefiting learning mathematics converts from internal directivity emotion balance to balance of internal-external directivity emotion instability.

iv. In mathematics education, students’ temperament difference, which affects learning mathematics, should be recognised. Mathematics teachers should find out the best teaching ways forms and methods which are suitable for student’s temperament type, so that the students with different temperament types can gain better mathematics academic achievement.

Koraly Pérez-Edgar and Nathan A. Fox (2005) –

This article focuses on the attempt to link early appearing temperamental traits to the later emergence of psychopathology, particularly in the form of anxiety disorders. The discussion defines and characterizes the current understanding of temperament and anxiety as separate constructs; reviews the evidence to date linking temperament and anxiety; and explores the environmental, cognitive, and neural mechanisms that have been suggested as potential mediators for this effect.

The article also highlights the strength of bringing together converging data from multiple sources and levels of analysis.

Anxiety and anxiety disorders can have a large affect on the daily functioning of an individual, colouring interactions with both the environment and personal assessments of internal states. The affect can be particularly damaging if anxiety first emerges in childhood and adolescence because this has been linked to increases in both the severity and longevity of the disorder.

The study states, since the 1980s, research has been examining the role of temperament in education. In particular, academic achievement and school adjustment were among the first variables to be examined. Subsequently, several studies have documented associations between temperament and either academic achievement or school adjustment. However, no review of this literature has been conducted to obtain a clear understanding of the findings of existing research and the issues associated with them. Thus, the purpose of this article is to review the literature relating temperament to academic achievement and school adjustment. This review examined three areas in the study of temperament (a) the definition of temperament, (b) the measurement of temperament, and (c) the results of the reviewed studies. All the reviewed studies found significant correlations between children’s temperaments and school adjustment as well as between temperament and academic achievement. Detailed descriptions of the characteristics of the reviewed studies are provided. Considerations for future research directions are also discussed.

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Mohamed, Ahmed (2006) Previous research on the scientific creativity of children has been limited. The most salient limitations of previous literature have been: (a) narrowness of theoretical frameworks, (b) limitedness in using a variety of science process skills, (c) ignorance of the gender differences in scientific creativity, and (d) ignorance of elementary school students. The purpose of this study was to develop and validate the Scientific Creativity Test for fifth-grade students to identify scientific creativity in those students. A related purpose was to investigate the gender differences in scientific creativity.

The Scientific Creativity Test consisted of three subtests: Problems and Solutions, Grouping of Flowers, and Design an Experiment. The test was administered to 138 fifth-grade students from six different elementary schools. The reliability analysis showed that the Scientific Creativity Test had a .89 coefficient as a consistency of scores. The concurrent validity analysis indicated that the Scientific Creativity Test had medium
correlations with Teachers' Ratings of students' Scientific Ability \( (r = .42) \), Science Content Knowledge \( (r = .42) \), and Scientific Creativity \( (r = .51) \). The inter-rater reliability of the three items rated by two independent raters \([1C \ (\text{designing a construction about a solution}), 2D \ (\text{drawing a diagram about the relationships among the groups of flowers}), \ \text{and} \ 3B \ (\text{drawing an experiment to develop a solution for the environmental problem})]\), using the Consensual Assessment Technique showed medium to high correlations.

The General Linear Modelling (GLM) Repeated Measures Two-Way Analysis of Variance indicated no overall significant differences between males and females. An interaction effect, however, was found. Females performed better than males in Subtest II (Grouping of Flowers) and slightly better in Subtest III (Design an Experiment). The analysis using the independent-samples t test indicated no significant differences between females and males in the scientific creativity test except in four items: 2A (grouping flowers) Fluency, 2A Flexibility, 2A Originality, and 2A Complexity. These differences were in favor of females. The findings present support of the psychometric properties of the Scientific Creativity Test in the identification of scientific creativity in children.

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**Charyton, Christine and Snelbecker, Glenn E. (2007)** –

The purpose of this research was to investigate similarities and differences in general, artistic, and scientific creativity between engineering versus music students, as 2 groups respectively representing scientific and artistic domains. Results indicated that musicians scored higher in general and artistic creativity, with no significant differences in scientific creativity. Participants had higher levels of creativity, compared with normative data from previous studies. Gender, age, and specialization within major yielded no significant differences.

**Weihua Niu (2007) -**
Individual and environmental influences on Chinese student creativity. Primarily using self-report questionnaires and psychometrics tests in a sample of 357 Chinese high school students examines how both individual and environmental factors can independently predict student creativity as measured by three different methods, including two product-oriented measures (story completion and collage making), two divergent thinking measures (circle task and picture completion), and one self-report inventory on divergent thinking attitudes. Two different types of theoretical models—the cognitive approach and confluence approach—are compared and contrasted. Based on previous research, this study uses the confluence approach to investigate the influences of individual (i.e. intelligence, personality, motivation, thinking styles and knowledge) and environmental (i.e. school and family environment) factors on creativity.

The results have confirmed the major hypothesis that both individual and environmental factors play decisive roles in Chinese student creativity. Implications of these findings are discussed. This paper also calls for a serious consideration of research on environmental influence on creativity and various mechanisms of this influence.

Endya, B. Stewart, (2008)-

The research examining the correlates of academic achievement is immense. In particular, scores of studies have examined individual- and family-level variables that influence student achievement. This research examined the extent to which individual-level and school structural variables predict academic achievement among a sample of 10th grade African American students abstracted from the National Educational Longitudinal Study (NELS) database. The results suggest that individual-level predictors, such as student effort, parent-child discussion, and associations with positive peers, play a substantial role in increasing students' achievement. Further, the results also suggest that school climate, in particular the sense of school cohesion felt by students, teachers, and administrators, is important to successful student outcomes. Given these findings, the author suggests that an ecological approach which encompasses individual-, family-, and school-level variables be considered when examining predictors of academic achievement. Also, policy and interventions aimed at improving academic achievement
need to take into consideration the impact of individual-level and school structural factors on students and their ability to succeed.

**Ergin Omer and Aktamis Hilal (2008) –**

The aim of this study was to investigate the effects of teaching scientific process skills education to students to promote their scientific creativity, attitudes towards science, and achievements in science. As a result of the research, it was determined that the scientific process skills education increased the students’ achievements and scientific creativities, however, no meaningful progress was made on their attitudes towards science when compared to the teacher-centred method.

**Kozina Ana, Rozman Mojca, Dr. Perse Tina Vrsnik, Leban Tina Rutar, (2008)-**

In this study, the school climate has proven to have a strong impact on the student achievement. The present study deals with a discrepancy between principals and teachers perception of a school climate in Slovenia TIMSS Advanced data. The goal of the present study is to establish why principals and teachers perceive the school climate differently, which are the specific school climate characteristics that are evaluated differently by them and whose evaluation of the school climate is a better predictor of student achievement. The results of discriminate analysis show significant differences between teachers and principals evaluations of the school climate.

The characteristics that significantly differentiate between them are: the teachers understanding of school's curricular goals and support for teachers professional development. To put the differences in a new perspective, a newly developed School Climate Scale (STS) was added to the student’s questionnaire on a national level.

It measures four factors of the school climate: relations - students; relations-teachers, relations - school and formal organization. All three evaluations, students, teachers and principals, are tested as predictors of maths and physics achievement. All evaluations are important predictors of maths and physics achievement with principals’ evaluations being the strongest one.
Results also show that a positive school climate is related to high student achievement when evaluated by teachers and principals and on the contrary with low student achievement when evaluated by students.

**Family Stress and Child's Temper Extremes Contribute To Anxiety And Depression In Children, Science Daily (2008)**

States that small children who grow up in a family where the mother has psychological distress, the family is exposed to stress or is lacking social support, are at higher risk of developing anxious and depressive symptoms in early adolescence. Girls are more vulnerable than boys, and very timid or short-tempered children are more vulnerable than others to develop emotional problems.

**Charyton Christine, Hutchison Shannon, Snow Lindsay, Rahman A. Rahman, Elliot John O (2009) –**

In this study the concept of positive psychology was discussed. Positive psychology explores how optimism can lead to health, happiness, and creativity. However, questions remain as to how affective states influence creativity. Results indicated that both positive and negative effect, usual self-reported happiness ratings, and pessimism contributed to a creative personality in college students. Demographic characteristics such as gender, age, and class level were also factors. Males, younger students, and higher academic level college students displayed more creative personality characteristics. Findings suggest that both positive and negative attributes influence creativity.

**Ishien Lia, Esther Onagab, Pao-Sheng Shenc & Hua-Huei Chioua (2009)**-

Based on data collected from 211 elementary school children in central Taiwan over four years, the role of temperament in science achievement was examined with multivariate analysis of covariance (MANCOVA) with repeated measures design.

The results revealed that the students’ science achievement is stable over time. The task orientation characteristics (i.e., distractibility, hyperactivity, and persistence) identified by previous research as important in mathematics and reading achievement are
not consistent with the findings of this study that although the impacts of distractibility and persistence are significant, the simple effect of activity level on science achievement was not significant. However, the interaction effect of activity level and persistence is significant. Also, the tendency of approach/withdraw has significant impact on science achievement.

Lee Jihyun and Shute, Valerie J. (2009) –

This paper identifies three non-cognitive domains relevant for academic achievement in K-12 student engagement, behavioural learning strategies, and school climate. The paper also documents empirical findings that show relationships between these three non-cognitive domains and academic achievement, especially in the areas of reading and mathematics.


The purpose of the study was to investigate whether Exemplary, Recognized and Acceptable schools differ in their school climates, as measured by the 10 dimensions of the Organizational Health Inventory. Significant differences were found on all 10 dimensions of the Organizational Health Inventory, with Exemplary schools outperforming Acceptable schools. No statistical significance was found between Exemplary and Recognized schools. Statistical significance was found, with Recognized schools outperforming Acceptable schools on the Organizational Health dimensions of Goal focus and Adaptation. The findings of this study suggest that students achieve higher scores on standardized tests in schools with healthy learning environments.

Fayegh Yousefi, Mansor Abu Talib, Mariani Bte Mansor, Rumaya Bte Juhari, Marof Redzuan (2010) –

The purpose of this study was to determine the relationship between test anxiety and academic achievement among adolescents in Sanandaj, Iran. The results comprised of 400 students (200 boys 200 girls) in the age group of 15-19 years old that were randomly selected from nine high schools in Sanandaj, Iran. A self administered
questionnaire was used for data collection which includes a Test Anxiety Inventory (TAI), (Abbolghasemi, 1988), Grade Point Average (GPA) score and personal information.

Results shows that there is a significant correlation (r= -0.23, p=.000) between test anxiety and academic achievement among adolescents. In addition, there is a significant difference (t= 5.47, p=.000) of academic achievement between male and female adolescents whereby female score higher in their academic achievement. It is recommended that academic achievement and mental health be improved in school settings with support strategies such as educational guidance, counselling and psychotherapy or other psycho-educational program such as teaching life skill.


The objective of this research is to examine if a relationship exists between creativity and academic achievement and if the relationship differs between males and females. Two research questions are examined in this paper:

i. What is the relationship between different aspects of creativity and academic achievement?

ii. Is there any significant gender differences regarding the relationship between different aspects of creativity and academic achievement?

Participants (N=153; male=105 and female=48) completed creativity test. Cumulative grade point average (CGPA) was used to select the participants. Creativity was measured using the Khatena- Torrance Creative Perception Inventory (KTCPI).

The Pearson correlation analysis indicated that aspects of creativity are related to academic achievement for both males and females.

Kathleen Moritz Rudasill, Kathleen Cranley Gallagher, and Jamie M. White (2010) –

The purpose of this study was to examine the interplay of children’s temperamental attention and activity (assessed when children were 4-and-a-half years old) and classroom emotional support as they relate to children’s academic achievement
in third grade. Particular focus was placed on the moderating role of classroom emotional support on the relationship between temperament (attention and activity level) and academic achievement. Regression analyses indicated that children’s attention and activity level were associated with children’s third grade reading and mathematics achievement, and classroom emotional support was associated with children’s third grade reading and mathematics achievement. In addition, classroom emotional support moderated the relation between children’s attention and reading and mathematics achievement, such that attention mattered most for reading and mathematics achievement for children in classrooms with lower emotional support. Findings point to the importance of understanding how children’s temperament and classroom emotional support may work together to promote or inhibit children’s academic achievement.

2.2) Studies Conducted In India

Bagga (1973) has reported a negative relationship between science subjects and composite verbal and non-verbal creativity.

Gupta, (1977) states that ideational productivity refers to production of different and unique ideas on a particular issue which is a sign of creativity. Creative subjects gave more responses in a rich than poor environment while uncreative subjects showed no overall effects for environment causes more specifically the mean level of verbal creativity was found to be significantly higher in need fulfilling type of institutional climate as need unfulfilling and laissez-faire institution had significantly higher mean non-verbal creativity level than their counterparts in the need fulfilling type of institution. Pupils with average and low level of creativity were likely to improve upon their creativity level in schools with laissez-faire type of institutional climate under teachers with democratic classroom verbal behaviour whereas pupils with high verbal creativity were found to improve in laissez-faire schools under authoritative teachers.

Acharyulu, S.T.V.G (1978)-

Studied the relationship among creative thinking, intelligence and school achievement. The major aim of the study was to clarify the nature of relationship in creative thinking, intelligence and school environment and especially to test for
interactional effects of intelligence and creativity upon achievement in different school subjects. The major findings were:

i. There were no sex differences in intelligence, figural creativity and achievement in Telugu, general science and social studies.

ii. Significant sex difference in verbal creativity and achievement in English and mathematics were found in favour of girls.

iii. Further correlation between verbal TCT (Torgan Test of Creative Thinking) and school environment were as high as those between intelligence and school achievement.

**Awasthy (1979)-**

Demonstrated significantly higher performance in fluency and flexibility components as well as in non-verbal creativity of science students were reported to be significantly superior to science (Jarilal, 1981). Srivastava and Jhan (1977) as well as Srivastava (1978) obtained significantly superiority of science over arts and commerce students.

**Kaur (1980)-**

Reported that Science students were significantly higher than home science in verbal creativity, however commerce students significantly excelled science and home science students in verbal creativity.

Badrinath and Narayan Satya (1979) did not get any relationship between creativity and scholastic achievement.

**Jhang (1979)-**

Carried out a study of personality correlates of creative children of 15 plus studying science students.

The objectives of the study were:

i. To develop tests of scientific creative at the higher secondary level.
ii. To explain scientific creative behaviour in terms of specific constellation of certain personality correlates.

iii. To see whether creativity could be better understood with the cognitopersonological context.

iv. To compare the personality traits of creative science pupils with non-creative science students.

v. And to compare and contrast personality correlates of highly creative and highly creative and highly intelligent science pupils.

The main findings of the study were -

i. Scientific creativity was normally distributed.

ii. The urban students were superior to the semi urban in scientific creativity.

iii. There was significant contribution of scientific creativity to the variance in factor B (Concrete thinking versus Abstract thinking)

iv. Creative students were significantly better in abstract thinking, self sufficiency and intelligence and were more adventurous, relaxed, controlled and doubting.

v. There was no significant difference in the achievement of the high creative and the high of intelligent groups.

Shukla, J. P. (1980)-

Studied the relationship of conservation with scientific creativity and reported that all the indices of correlation between fluency, flexibility, originality and global scores in scientific creativity and conservation in mass, weight and volume of solid and liquid have been found significant. All indices of correlation between fluency, flexibility originality and global scores in scientific creativity and conservation in mass, weight and volume of solid have been invariably estimated consistently higher than their corresponding coefficients of liquid, except in cases of relationship between flexibility scores in scientific creativity and conservation in mass and weight.

Vijaylakshmi, J. (1980)-
Studied Academic achievement and SES as predictors of creative talent. The major objective of study was to find out the extent to which academic achievement and SES served as predictors of creative talent. The findings of the study were -

i. There was a significant difference between high creative and low creative in academic achievement.

ii. There was a significant difference between high creative and low creative in SES.

iii. The average academic achievement of high creative was more than the average achievement of low creative.

iv. SES had a facilitation effect on creative ability of pupil.

Joshi, S. (1981)-

Studied verbal creativity in Marathi language in relation to achievement in Marathi and environmental factors of students as well as teaching in high schools.

The main objectives of the study were -

i. To construct and standardized a battery of test of creativity in Marathi language and to judge total creativity.

ii. To study correlation between total creativity scores and essay performance and total creativity scores and environment.

iii. To find out whether students of urban areas were more creative than students of rural areas.

iv. To judge the effect of environment on creativity.

The main findings of investigation were -

i. The results of urban areas deviated from those of rural areas in some variables.

ii. In urban areas, high achievers were high creative.

iii. For rural areas, there was low relationship between the achievement scores and the creativity scores.

iv. The factors supporting creativity were power of artistic or literary expression, and ability to structure and acquired expression skill.

Studied the effect of children’s perception of home and school on their scientific creativity. The main objectives of the study were -

i. To find out the affect of home and school environment on the development of scientific creativity.

ii. To find out the extent to which home environment was related to scientific creativity.

iii. To find out how school environment influence scientific creativity.

iv. To find out how various aspects of home environment (permissiveness, control, rejection, nurturance, reward, punishment, conformity, projectiveness, deprivation of privilege and social isolation and school environment, creative stimulation, cognitive encouragement, acceptance, permissiveness, rejection and control contributed to the prediction of creative behaviour in science.

v. To find out whether children with high and low scientific creativity differed in their perception of home and school environment.

The major findings of study were-

i. Girls excelled boys in overall scientific creativity. Girls with high scientific creativity perceived more stimulation in their homes than girls with low scientific creativity. Boys with high scientific creativity perceived less social isolation in their home environment.

ii. Significant relationship existed between perceived school environment and originality among boys, perceived home environment and overall scientific creativity among girls and perceived home environment and inquisitiveness among boys.

iii. Relationships between various aspects of school environment and girls’ scientific creativity were not significant. For boys the relationship of creative stimulation and permissiveness were significant but negative.

iv. Girls perceiving high stimulation in home environment and normal in school environment obtained higher scores on overall scientific creativity and originality
aspect of it.

**Sharma, K. (1982) –**

Studied the factors related to creativity. The main objective of study was to explore relationship of creativity with certain background, psychological and organization factors of students of higher secondary schools of Delhi. The major findings were -

i. Boys were more creative as compared to girls.

ii. Scholastic achievement was found to be positively related to measures of creativity.

iii. Central schools students were found to be most creative, next in order were public, private aided and government schools respectively.

iv. Organization climate of school was not found to be related to creativity in students.

**Chaudhary, G.G. (1983) –**

Investigated into the trends of creative thinking ability of pupils of age group 11+ to 13+ in relation to some psycho socio-correlates. The major findings were -

i. There was no significant difference between mean creative thinking scores of male and female children of rural and urban areas.

ii. There was a marked difference between mean scores on test of children of three age groups.

iii. The higher the socio-economic status, the high was creative thinking ability of student, the higher the need-achievement, the higher creative thinking ability of students.

iv. The students with low anxiety had more creative thinking ability then the students with high anxiety.

**Patnaik, B.K (1986) –**
Analyzed scientific temper in his empirical study. He said that the main objective of teaching science should be to develop scientific temper, to raise scientific and technological competence to encourage creativity and to solve the problems relating to daily life, in and outside the schools. He said scientific temper is a particular bent of mind, imbued with the spirit science. He defined it “as the making of the basic methods, values and norms of science along with humanism as a process of thought and action.”

The objectives of the study were -

i. To establish scientific temper as a full-fledged concept.

ii. To transform the ideal type scientific temper into operational one for empirical testing.

iii. To find out whether formal science education promotes higher degree of scientific temper.

iv. To identify factors associated with scientific temper and to determine their contribution to it.

v. To examine empirically the nature of nature relationship between scientific temper and religious belief.

The major findings of the study were:

i. Students studying social sciences did significantly better on scientific temper than their counterparts studying natural and applied sciences.

ii. Scientific information showed a low but negative correlation with scientific temper.

iii. T.V. watching helped viewers substantially in acquiring more scientific information than in developing scientific temper.

iv. Length of urban living though did not seem to be strong correlate of scientific temper still it remained to be stronger than exposure to mass media ($r = 0.314$) high correlation with scientific temper ($r = 0.803$).

Raina, K. (1986) –
Studied psycho-social correlates of scientific creativity among high school students.

The objectives of study were-

i. To find out the relationship between scientific creativity and achievement in science for boys and girls.

ii. To find out the relationship between scientific creativity and achievement in science for students of different types of schools (government, private and missionary).

iii. To find out the difference between correlation coefficient of intelligence with different dimensions of scientific creativity for boys and girls groups.

iv. To study the effect of sex and type of school on scientific creativity among high school students.

v. To study the effect of socio-economic status (SES), sex, problem solving ability and achievement in science in scientific creativity of students of different schools.

The findings of study were-

i. Achievement motivation in science was significantly related scientific creativity.

ii. Problem solving ability was significantly related three components of scientific creativity viz. fluency, flexibility and originality.

iii. All the three components of scientific creativity were positively related to intelligence. Boys and girls differed on intelligence and fluency components of scientific creativity and girls had higher scores on these than the boys.

iv. Missionary school students were more creative than those of private and government schools.

v. And students of private schools were more creative than their counterparts studying in government schools. Students who had high problem solving ability in science were more creative in science than their peers with middle and low problem solving ability.

vi. The mean scientific creativity scores of high achievers in science was more than that of middle and low achievers further the middle achievers were more creative than the low achievers in sciences.
vii. Socio-economic status of students did not affect their scientific creativity.


Studied creativity of secondary school students in relation to classroom climate, achievement motivation and mental ability.

The objectives of study were -

i. To find out level of creativity of secondary school students of class 8th and class 9th.

ii. To study effect of classroom climate on creativity.

The major findings were -

i. The whole creativity level of students was low.

ii. There was dearth of originality amongst students. Students studying in class 9th had high originality as compared to students studying in class 8th.

iii. High classroom, high intelligence, legitimacy and productivity were found effective on creative level of students of class 8th and 9th. There was positive correlation between classroom climate 8th and creativity of students of class 9th.

Attempt was being made to explore the type of institution and creative potential of the students. Central school students were found to be most creative, next in order were public, private aided and government school respectively (Bhaskar 1987).

**Singh, H.L. (1988)**-

Studied scientific temper as a theoretical value frame. The objectives of the study were -

i. To develop the culture of science through inculcating scientific temper among the future citizens of India.

ii. To develop the concept of scientific temper as a theoretical value frame.

iii. To develop scientific temper and to develop scientific temper as a work situation.

In the study the major finding was scientific temper is an equitably shared culture among the teachers, depending upon their level of all round development of human beings in spite of hurdles caused.
**Datta, K.L. (1989)**-

Tries to find out the differences in scientific creativity among high school students.

The main objectives of study were -

i. To study the main effects of sex and school on the differences in the scientific creativity of high school students.

ii. To study the relationship between intelligence, academic achievement, socio-economic status and scientific creativity scores.

iii. To study the dominant factors in scientific creativity. In methodology the sample comprised 500 high school students selected from four districts of Jammu province.

   The tools were scientific creativity test, Group verbal test of intelligence by Joshi. Socio-economic status scale Questionnaire by S.Jalota et. al. and aggregate marks secured in previous examinations.

**Main findings were** -

i. The constructed test of scientific creativity proved to be reliable and valid.

ii. Sex differences did exist in scientific creativity.

iii. Scientific creativity was a normally distributed trait.

iv. Scientific creativity depended on intelligence, academic achievement and socio-economic status.

v. Dominant factors of scientific creativity were fluency, flexibility and originality in case of boys and girls.

vi. Fluency and flexibility as factors of creativity depended upon intelligence but were independent of academic achievement and socio-economic status.

vii. In both the sexes, scientific creativity was found to be independent of status but depend upon intelligence.

**Irudayaraj, M. (1989) –**
Investigated the relationship between creativity and scholastic achievement in science of standard 10th students of Devkotta district.

The main finding of the study was -

There was no significant relationship between science achievement and creativity of high school students.

Chadha, N.K and Chandna, Sunanda. The 1990 –

Study deals with the correlation between creativity, intelligence and scholastic achievement. Annual marks of class 11th result were taken from the school records as a measure of scholastic achievement. Correlation and partial correlation were used for data analysis.

The findings of the study were-

i. Correlation was positive and significant between creativity and scholastic achievement.

ii. There was negative and significant correlation between creativity and scholastic achievement where effect of intelligence was partialled out.


Studied personality differentials of adolescents with scientific creativity in relation to environment. He tries to find out the determinants and correlates of scientific creativity among adolescents.

The main objectives were-

i. To study the difference between low and high scientific creative adolescents on various dimensions of creativity based on Guilford model.

ii. To study personality differences between low and high scientifically creative adolescents in terms of Cattell’s trait theory.

iii. To examine the perception of home environment (different dimensions) by and low and high scientific creative adolescents.
iv. To examine the perception of school environment (different dimension), by low and high scientifically creative adolescents.

Tools used were scientific creativity test (MSCT) developed by S, Majumdar, questionnaire to measure home and school environment.

Major findings were -

i. Lower scientific creativity (LSC) and higher scientific creativity (HSC) groups differed significantly on all the three parameters of structure of intellect model.

ii. The HSC group was found to be better than LSC group in these parameters. HSC adolescents differed markedly from LSC adolescents in terms of most of the personality traits. Both the groups differed significantly so far as perceived impact of home and school environment is concerned.

Dubey, K. K. (1992) –

Attempted to measure scientific temper and concluded that whereas all groups of students showed scientific temper. Significant differences were observed between male and female science teachers. It was about scientific temper and its measurement. Ph.D. Edu. Rani Durgarwati Vishwavidalaya. Whereas the measurement of scientific temper is a real problem, its development is regarded as one of the important goals of school science education. It attempts at the measurement of scientific temper.

Objectives were -

i. To develop a scale for measuring scientific temper along with its working definition and determination of its ingredients using factor analysis.

ii. To compare the incidence of scientific temper as judged by scores on the scientific temperament test among different groups of teachers and students such as male and female, urban and rural and science and non-science students as well as teachers.

In methodology, a two stage stratified sample method was adopted to select class 11th science and non-science students. It also included two groups of teachers, i.e. science and non-science teachers. The scientific temper scale devised the Likert Method of Summated ratings were used to collect the data.

Major findings were as follows:
i. All the groups of students and teachers manifested scientific temper. Significant differences in scientific temper were noticed.

ii. Male science teachers and male non-science teachers, female teachers and male teachers, rural girls and urban girls, urban boys and urban girls and finally male science students and female science students.

iii. The mathematical structure of tools and tasks as used in this study showed the existence of two factors namely curiosity and aversion to superstition.

**Kaur, Parvinder (1992) —**

Studied relationship among creativity, intelligence and academic achievement in different subject of 10th Graders.

**Main objectives are-**

i. To determine relationship of composite creativity and it’s dimension with intelligence and subject wise achievement of male and female students.

ii. To determine the common effect of intelligence, on relation between creativity and subject wise academic achievement of males and females.

iii. To study common effect of creativity on relation between intelligence and subject wise academic achievement of males and females.

**The main findings of study were -**

i. For males, intelligence was positively correlated with fluency, flexibility, originality and composite creativity.

ii. For males, fluency, flexibility, originality and composite creativity were positively related with achievement in social studies.

iii. For Females, as well as total sample fluency, flexibility, originality and composite creativity were positively and significantly related with achievement in each of subjects.

iv. For Females, when intelligence was partialled out

   a) Fluency was positively related with achievement in all the subjects except general science.
b) Flexibility was related with achievement in the three languages but not with other three subjects.

c) Originality as well as composite creativity was related with achievement in all 6 subjects.

**Singh, RadhaCharan (1992) –**

In his comparative study of scientific creativity, problem solving and risk taking in tribal and urban students. He aims to develop a test of scientific creativity and find out the relationship between scientific creativity, problem solving ability and risk taking behaviour of tribal and non-tribal students.

**The objectives of the study were:**

i. To develop test on scientific creativity, problem solving and risk taking behaviour for children in age group of 12+ residing in M.

ii. To investigate the differences between tribal and urban students with scientific creativity, problem solving ability and risk taking tendency.

iii. To investigate the sex differences with respect to scientific creativity, problem solving ability and risk taking tendency and to study factor structure for tribal students from urban students with respect to components of scientific creativity, problem solving ability (Greene’s classification and risk taking in these areas).

**The major findings of the study were**

Urban students were significantly better than tribal students in fluency, flexibility and originality. There was no sex difference with respect to scientific creativity.

There was a significant relationship between scientific creativity and risk taking, scientific creativity problem solving and problem solving-risk taking.

**Singh, Balwan (1998) –**

In his study of scientific temper in relation to personality and environment. PhD Edu. MDU.

**The objectives of the study were** -
i. To develop and standardized tool for measuring scientific temper.

ii. To investigate relationship between scientific temper and extroversion personality.

iii. To study the relationship between scientific temper and neuroticism personality.

iv. To investigate the relation between scientific temper and school environment dimensions.

v. To study the relation between scientific temper and home environment dimensions.

vi. To study the significance of difference if any, unscientific temper of rural and urban school students.

vii. To study the significant difference if any between various school environments dimensions of rural and urban students.

The following findings were established-

No significant difference exists between scientific temper of rural and urban students.

Dimensions of school environment viz. permissiveness, acceptance, control, cognitive encouragement and creative stimulation have positive relationship with scientific temper.

Rejection dimension of school environment have negative relation with scientific temper.

There was a significant difference in creative stimulation and acceptance dimensions of school environment between rural and urban students.


Studied scientific creative thinking in relation to achievement motivation and family relationship among the students of senior secondary schools. (Ph.D. Education MDU).

The following were the objectives of the study-

i. To develop and standardized the tool to measure the scientific creative thinking or creativity.

ii. To study the relationship of scientific creative thinking and achievement motivation among Senior Secondary School students.

iii. To study the relationship between scientific creative thinking and family
relationship among Senior Secondary School students.

iv. To investigate the relationship of scientific creative thinking among the various dimension viz. acceptance, avoidance and concentration of family relationship among Senior Secondary School students.

v. To study the significance of difference in achievement motivation and family relationship among high creative students.

vi. To study the significance of difference in achievement motivation and family relationship among low creative Senior Secondary School students.

vii. To study the significance between low creative and high creative students with respect to achievement motivation.

viii. To study the significance in family relationship among low and high scientific creative thinking in Senior Secondary School students.

Conclusions:

i. The relationship between scientific creative thinking and achievement motivation was positive and negligible but statistically not significant.

ii. There was positive relationship between scientific creative thinking and family relationship. It was very negligible. No significant relationship between scientific creative thinking and family relationship of Senior Secondary School students were found.

iii. There was positive significant relationship between scientific creative thinking and acceptance dimension of family relationship. There was positive relationship between scientific creative and concentration dimension of family relationship which is not significant.

iv. The coefficient of correlation between scientific creative thinking and avoidance dimension of family relationship was negative but low. The relationship between them was significant.

v. There was significant difference between the means of achievement motivation and family relationship of high scientific creative thinking students of Senior Secondary
School students. The family relationship was more significant than achievement motivation.

vi. There was significant difference between achievement motivation and family relationship of low scientific creative thinking students of Senior Secondary School. The family relationship was more significant.

vii. There was no significant difference between the achievement motivation of high scientific creative thinking and low scientific creative thinking among science students of Senior Secondary School.

viii. There was no significant difference between family relationship of high scientific creative thinking and low scientific creative thinking science students of Senior Secondary School students.


Attempts to explore the effects of home environment, institutional climate and other demographic factors on creativity.

The concerned objectives of present study were-

To study the impact of institutional climate on creativity of high school people. So as to find differences in creative ability between high school boys and girls, null hypothesis were framed. Instrument used was the Gupta’s test of scientific creativity (1979), Joshi’s institutional climate inventory and from analysis of data, it was found that there was a significant difference in creative ability of students. It means boys and girls differed significantly in relation to their creative scores.

Ahmad, Jasmin (2011)-

A comparative Study of the Inculcation of Scientific Temperament at Senior Secondary and Undergraduate Level. One of the important objectives of science teaching is to inculcate scientific temperament among the learners. The results revealed that there exists no significant difference in the mean levels of scientific temperament of U.G. students of science and arts. The study reveals some lacuna in teaching-learning strategies of science, as science teaching and learning is not developing scientific attitude significantly in our students at U.G. Level.
A Co-relational Study of Scientific Attitude, Creativity and Scholastic Achievement of Secondary School Students.

The objectives of their study were:

i. To study creativity of the secondary school students.

ii. To study scholastic achievement of the secondary school students.

iii. To study correlation between creativity and scholastic achievement of the secondary school students.

iv. To compare scholastic achievement between urban and rural secondary school students.

v. To compare scholastic achievement between boys and girls of secondary school students.

Sample:

500 students studying in class IX were selected randomly from different secondary schools from seven districts of Vidarbha, that constituted the sample of the study.

In that, 250 students from urban area (125 boys & 125 girls) and 250 students from rural area (125 boys & 125 girls) have been studied.

Conclusions

i. There was no significant relation between creativity and scholastic achievement of secondary school students.

ii. There was no significant correlation between creativity of boys and girls.

iii. There was no significant difference between scholastic achievement of boys and girls.

4. The scholastic achievement of boys was better than that of girls.
5. The creativity of girls was comparatively more than that of boys.

**Discussion:**

The secondary students are found to possess average creativity. There is no distinction between the scholastic achievement of urban and rural students. The result states that, if opportunities are given to either sex, they can compete each other in any area. The scholastic achievement of boys is somewhat better as compared to that of girls. The possible reason for this might be the parental encouragement and favourable attitude towards the boys.

**Bhaskara Rao (1990)** –

A positive correlation was found among scientific attitude, creativity and scholastic achievement. Scientific attitude and Creativity were not necessarily related with Sex. The scientific attitude and creativity of boys and girls was average and there was hardly any difference in the level of scientific attitude and creativity possessed by them. This result states that, if opportunities are given to either sex, they can compete each other in any area.

**Suggestions:**

Various programs should be organized at school level to promote creativity among school students. The programs like science clubs, hobby clubs, exhibitions etc. should be organized to promote scientific attitude among school students. There is a need to include creative development as one of the major objectives of education.

**The findings of the study were:**

i. Low correlation was found between scientific attitude and creativity of secondary school students.

ii. No significant relation was found between creativity and scholastic achievement of secondary school students.

iii. The secondary school students were found to possess average level of scientific attitude and creativity.
iv. There was no significant correlation between creativity of boys and girls. There was no significant difference between scholastic achievement of boys and girls.

v. The urban students were creative as compared to rural students.

vi. No distinction was noticed between scholastic achievement of rural and urban students.

vii. The low correlation was found between creativity and scholastic achievement of rural students.

viii. The scholastic achievement of boys was better than that of girls.

ix. The creativity of girls was comparatively more than that of boys.

Meetic N.R, Chandra S (2012)-

The study was carried out with the objective, ‘to compare the scientific creativity of secondary level students (class eight) of Government and Private schools of Morena city of Madhya Pradesh State; who were studying Science subject The sample of the study was 120 students selected randomly from above said schools. The standardized ‘Verbal Test of Scientific Creativity’ (VTSC) test developed by Dr. V.P Sharma & Dr. J.P. Shukla was used for data collection. Researcher compared the scientific creativity of sample of boys and girls in the category of government and private schools.

The major findings of the study were-

i. There was no significant difference among boys and girls of government and private schools respectively

ii. There was significant difference found among boys of government and private schools. (3) No significant difference was seen among the girls of government and private schools as well as overall among boys and girls over their scientific creativity.

After reviewing the related literature, the researcher finds that there’s lack of researches in the field of scientific creativity and in scientific temperament in Indian context and the scientific creativity and scientific temperament are of great significance as they contributes in developing scientific thinking abilities and scientific
bent of mind in individuals which is very essential to develop rationality without it nation progress is a distant dream.

Therefore it’s desirable to get further knowledge of scientific creativity and scientific temperament of school students in relation to significant variables i.e. institutional climate, anxiety, academic achievement as it will help the educators, administrators, teachers, parents and students and also in achieving aim of education to realize and develop the potential and ultimately all round development of the students.