A STUDY OF SCIENTIFIC CREATIVITY AMONG XI GRADE STUDENTS IN RELATION TO INTELLIGENCE, PERSONALITY AND STUDY HABITS

At every moment life keeps on changing. Today inspite of all the scientific and technological advancement, which mankind has exhibited from its initial stone age, to its present space age, he has always attempted to contribute in to explore and develop its knowledge aspect to that level which ensures him a better and well adjusted human life. But still, humans are not capable of predicting or manipulating their near future to that extent which can ensure better and improved human life to him. Thus, it becomes necessary to develop their knowledge to that extent, which can not only affect psychological but also physiological aspect of any individual so that, it may adopt and adjust into changing situations of life efficiently. From all the developmental stages of individual, adolescence is considered as the most stressful and strenuous period of life-time of an individual, where he is affected by numerous psychological, physiological and sociological changes which demands for the development of more advanced psychological abilities in any individual to survive.

Apart of all the preliminary psychological capabilities like intelligence, advances personality traits, reasoning capability, abstract thinking, numerical reasoning etc the most important psychological trait which can be helpful in developing and manipulating any problematic situations of life to the adjustable, favourable situation can be, Scientific Creativity, which effects considerably both on the intelligo as well as the cognito aspect of any individual. Scientific creativity can be defined as a resultant process of social transaction which aims for the development or modification of a novel, socially accepted idea or article which atleast satisfy the need of adjustment of individual or group of people at some point of time following known and described scientific procedure to attain knowledge or adjustment. Other preliminary psychological traits like intelligence, personality, reasoning and specific psychological traits which helps in to create favourable and better adjusted situations in life, certain factors like fluency in thinking and implying possible solutions to the problem, flexibility which covers various dimensions of life, originality aspect of the proposed solution and inquisitive nature to inquire, or to know more and more about
problematic situation in search of appropriate solution remains constant in all creative endeavours.

Thus, it becomes necessary to search in for more and more knowledge about identifying and nurturing creative talent, personality correlates, their affecting variables etc. in developing scientific potential of any individual and implementing it in different spheres of life more efficiently. Thus, the researcher attempted to conduct a research to explore preliminary psychological factors like Intelligence, Personality and Study Habits which majorly affects every dimension of adolescent students’ life. The study was designed to study differential impact of specified dimensions of scientific creativity i.e. Fluency, Flexibility, Originality and Inquisitiveness of both male and female adolescent students of XI grade. The research findings presented in the research attempts to explore and answer some of the important questions which not only enables an individual to deal up with the changing situations of life in their adolescent but also provides them a firm and determined capability to cope up with every changing and unfavourable condition of life. In present research, an attempt has been made to study scientific creativity among XI grade students in relation to Intelligence, Personality and Study Habits.

**Objectives of Study:**

Following are the objectives* of the present study:

1) To study the relationship between Scientific Creativity and Intelligence among XI grade students.

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**Note:** The objectives were studied with reference to Male and female students separately.

1. Scientific Creativity was tested on 4 factors namely, Fluency, Flexibility, Originality and Inquisitiveness separately as adopted in the Test of Scientific Creativity (TSC) by Misra, K.S. (1986).
2. Intelligence was tested on below average, average and above average I.Q. of students as measured by Verbal Intelligence test (VIT) developed by Ojha, R.K. and Raychaudhary.
3. Personality was tested on 16 factors namely A,B,C,E,F,G,H,I,L,M,N,O,Q₁,Q₂, Q₃ and Q₄ separately on the norm of below average, average and above average personality factor of students estimated by the 16 PF test-adopted test by Kapoor, S.D.
4. Study Habit was tested for below average, average and above average study habit of the students tested by Study Habit Inventory (SHI-MS) by Mukhopadhyaya, M and Sanaswal, D.N.
2) To study the relationship between Scientific Creativity and Personality among XI grade students.

3) To study the relationship between Scientific Creativity and Study Habits among XI grade students.

4) To compare the Scientific Creativity of students of XI grade having above average, average and below average Intelligence.

5) To compare the Scientific Creativity of students of XI grade having above average, average and below average Personality factor.

6) To compare the Scientific Creativity of students of XI grade having above average, average and below average Study Habits.

7) To find out the extent to which Intelligence, Personality and Study Habits contributes to the prediction of Scientific Creativity of students of XI grade.

**Hypotheses:**

Keeping the objectives in view following hypotheses** have been framed and tested:

1) There is no significant relationship between Scientific Creativity and Intelligence among XI grade students.

2) There is no significant relationship between Scientific Creativity and Personality among XI grade students.

3) There is no significant relationship between Scientific Creativity and Study Habits among XI grade students.

4) There is no significant difference in Scientific Creativity of XI grade students having above average, average and below average Intelligence.

5) There is no significant difference in Scientific Creativity of XI grade students having above average, average and below average Personality factor.

6) There is no significant difference in Scientific Creativity of XI grade students having above average, average and below average study habits factor.

**Note:** **Hypotheses will be tested in reference to Male and Female students separately.**
7) Intelligence, Personality and Study Habits do not contribute significantly to the prediction of Scientific Creativity of XI grade Students.

**Definition of the Terms Used:**

**Scientific Creativity:** Scientific Creativity is a multi-dimensional attribute differentially distributed among people and include chiefly the factors of fluency, flexibility, originality and inquisitiveness.

**Intelligence:** Intelligence refers to the whole class of cognitive behaviours which reflect an individual’s capacity to solve problems with insight, to adapt himself to new situations, to think abstractly and to profit from his experiences.

**Personality:** Personality is that which permits a prediction of what a person will do in a given situation.

**Study Habits:** Study habits are ‘the adopted way’ and manner from which a student plans his private readings, after classroom learning so as to attain mastery of the subject.

**Delimitations of the study:**

Keeping various aspect of study in view the study was delimited on following points:

1) The study is limited only to the psychological factors which are previously described in the research.

2) The study is delimited to XI grade students of Uttar Pradesh (U.P.) board only.

3) The study is delimited to XI grade students of science stream (PCB group) only.

4) The study is delimited to hindi medium students of XI grade.

**Method of the Study:**

Descriptive survey research method is used to conduct the study in which
causal comparative-correlational method is implied to compare and to find correlation in between the variables included in the study. With the help of different statistical techniques correlation and differential effect of dependent variable i.e. Scientific Creativity is objected to find in with internally categorized independent variables viz. Intelligence, Personality and Study Habits, separately for male and female students of XI grade.

**Population and Sample:**

Population of the study comprises of all students enrolled in XI grade, Uttar Pradesh (U.P.) board. Sample selection included random selection of equal number of schools from all the three regions of Uttar Pradesh i.e. Eastern region, Central Region and Western region. Random selection of schools was conducted to collect data from hindi medium students enrolled there. Researcher selected schools from Allahabad and Varanasi as Eastern region of Uttar Pradesh from where 218 students (110 males and 108 females) were selected as sample. As central region total of 202 students (104 males and 98 females) were selected as sample from Lucknow and Sitapur districts, whereas, 197 students (101 male and 96 females) from Bareilly and Sahjahanpur were selected as sample students from Western region of Uttar Pradesh. Thus, by random selection of students from the hindi medium schools of Uttar Pradesh, a sufficiently large (617 students; 315 males, 302 females) number of students was considered as the representative sample of the study, which can be summarized as follow:

**Table-1**

<table>
<thead>
<tr>
<th>Region</th>
<th>Students from District</th>
<th>Males</th>
<th>Females</th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Region</td>
<td>Allahabad, Varanasi.</td>
<td>110</td>
<td>108</td>
<td>218</td>
</tr>
<tr>
<td>Central Region</td>
<td>Lucknow, Sitapur.</td>
<td>104</td>
<td>98</td>
<td>202</td>
</tr>
<tr>
<td>Western Region</td>
<td>Bareilly, Sahjahanpur.</td>
<td>101</td>
<td>96</td>
<td>197</td>
</tr>
<tr>
<td>Total</td>
<td>3x2 districts</td>
<td>315</td>
<td>302</td>
<td>617</td>
</tr>
</tbody>
</table>
Tool Used:

The study constituted variable like Scientific Creativity as its dependent variable and variable of Intelligence, Personality and Study Habits as its independent variables. Well accepted and face valid tools were included and cross-checked for their reliability and validity, in the study to evaluate the psychological level of the sample students included in the study. Test of Scientific Creativity (TSC) developed by K.S.Misra was used to measure scientific creativity of students of XI grade. Test of Verbal Intelligence (VIT) prepared by R.K.Ojha and K.RayChowdhury was used to measure Intelligence of students of XI grade. Personality was measured with the help of 16 Personality factor (16-PF) questionnaire (Form-A; Hindi version) adopted by S.D.Kapoor, which was originally constructed by Cattell. Study Habits of adolescent students was estimated by the Study Habit Inventory (SHI-MS) developed by M.Mukhopadhyay and D.N.Sansanwal.

Statistics Used:

As per requirement of the study different statistical techniques were used to estimate inference from the data collected for the study. Primarily Microsoft-Excel, Stata Graphic and SPSS was been used to treat data acquired by sample selection. These were used to compute various statistical techniques like mean, standard deviation, Product Moment Co-efficient correlation, step-wise multiple regression etc. as per need of the study.

Findings:

1) To study the relationship between Scientific Creativity and Intelligence among XI grade students.

i.) The ‘fluency’ factor of scientific creativity is insignificantly correlated to Intelligence of male and female students of XI grade.

ii.) The ‘flexibility’ factor of scientific creativity is negatively correlated to Intelligence of male students of XI grade.

iii.) The ‘originality’ factor of scientific creativity is negatively correlated to Intelligence of female students of XI grade.

iv.) The ‘inquisitiveness’ factor of scientific creativity is insignificantly
correlated to Intelligence of male and female students of XI grade.

v.) Overall scientific creativity is significantly correlated to Intelligence of male students of XI grade.

vi.) Overall scientific creativity is negatively correlated to Intelligence of female students of XI grade.

2) To study the relationship between Scientific Creativity and Personality among XI grade students.

i.) The ‘fluency’ factor of scientific creativity is negatively correlated with Factor- A, C, F, H, N, Q₂ and Q₃ of personality in male students of XI grade.

ii.) The ‘fluency’ factor of scientific creativity is positively correlated with Factor L (Trusting vs. Suspicous) of personality in male students of XI grade.

iii.) The ‘fluency’ factor of scientific creativity is insignificantly correlated with factor- B, E, G, I, M, O, Q₁ and Q₄ of personality in male students of XI grade.

iv.) The ‘fluency’ factor of scientific creativity is negatively correlated with Factor- A,F, H, and Q₂ of personality in female students of XI grade.

v.) The ‘fluency’ factor of scientific creativity is positively correlated with Factor E, G, I, L and M of personality in female students of XI grade.

vi.) The ‘fluency’ factor of scientific creativity is insignificantly correlated with personality factor- B, C, N, O, Q₁, Q₃ and Q₄ of female students of XI grade.

vii.) The ‘flexibility’ factor of scientific creativity is positively correlated with Factor B, G and I of personality in male students of XI grade.

viii.) The ‘flexibility’ factor of scientific creativity is insignificantly correlated with factor- A, C, E, F, H, L, M, N, O, Q₁, Q₂, Q₃ and Q₄ of personality in male students of XI grade.

ix.) The ‘flexibility’ factor of scientific creativity is positively correlated with Factor F, I, N, Q₁ and Q₃ of personality in female students of XI grade.

x.) The ‘flexibility’ factor of scientific creativity is insignificantly
correlated with personality factor- A,B, C, E, G, H, L, M, O, Q_2 and Q_4 of female students of XI grade.

xi.) *The ‘originality’* factor of scientific creativity is negatively correlated with Factor- H, M, O and Q_4 of personality in male students of XI grade.

xii.) *The ‘originality’* factor of scientific creativity is positively correlated with Factor I and Q_4 of personality in male students of XI grade.

xiii.) *The ‘originality’* factor of scientific creativity is insignificantly correlated with factor- A,B, C, E, F, G, L, N, Q_2 and Q_3 of personality in male students of XI grade.

xiv.) *The ‘originality’* factor of scientific creativity is negatively correlated with Factor- B, H, I, L, M, Q_1 and Q_4 of personality in female students of XI grade.

xv.) *The ‘originality’* factor of scientific creativity is insignificantly correlated with personality factor- A, C, E, F, G, N, O, Q_2 and Q_3 of female students of XI grade.

xvi.) *The ‘inquisitiveness’* factor of scientific creativity is negatively correlated with Factor- C and F of personality in male students of XI grade.

xvii.) *The ‘inquisitiveness’* factor of scientific creativity is positively correlated with Factor A, B, E, O and Q_3 of personality in male students of XI grade.

xviii.) *The ‘inquisitiveness’* factor of scientific creativity is insignificantly correlated with factor- G, H, I, L, M, N, Q_1, Q_2 and Q_4 of personality in male students of XI grade.

xix.) *The ‘inquisitiveness’* factor or scientific creativity is negatively correlated with Factor- F (Sober vs. Happy-go-lucky) of personality in female students of XI grade.

xx.) *The ‘inquisitiveness’* factor of scientific creativity is positively correlated with Factor A, C, E, G, L, O, Q_1 and Q_3 of personality in female students of XI grade.

xxi.) *The ‘inquisitiveness’* factor of scientific creativity is insignificantly correlated with personality factor- B, H, I, M, N, Q_2 and Q_4 of female students of XI grade.
xxii.) Overall scientific creativity is negatively correlated with Factor- C and I of personality in male students of XI grade.

xxiii.) Overall scientific creativity is positively correlated with Factor B, F, G, M Q1, Q2, Q3 and Q4 of personality in male students of XI grade.

xxiv.) Overall scientific creativity is insignificantly correlated with factor- A, E, H, L, N, and O of personality in male students of XI grade.

xxv.) Overall scientific creativity is negatively correlated with Factor- A, C, L and Q4 of personality in female students of XI grade.

xxvi.) Overall scientific creativity is positively correlated with Factor E and M of personality in female students of XI grade.

xxvii.) Overall scientific creativity is insignificantly correlated with personality factor- B, F, G, H, I, N, O, Q1, Q2 and Q3 of female students of XI grade.

3) To study the relationship between Scientific Creativity and Study Habits among XI grade students.

i.) The ‘fluency’ factor of scientific creativity is significantly correlated to study habits of male students of XI grade.

ii.) The ‘fluency’ factor of scientific creativity is insignificantly correlated to study habits of female students of XI grade.

iii.) The ‘flexibility’ factor of scientific creativity is insignificantly correlated to study habits of male students of XI grade.

iv.) The ‘flexibility’ factor of scientific creativity is significantly correlated to study habits of female students of XI grade.

v.) The ‘originality’ factor of scientific creativity is insignificantly correlated to study habits of male students of XI grade.

vi.) The ‘originality’ factor of scientific creativity is negatively correlated to study habits of female students of XI grade.

vii.) The ‘inquisitiveness’ factor of scientific creativity is insignificantly correlated to study habits of male and female students of XI grade.

viii.) Overall scientific creativity is significantly correlated to study habits of male and female students of XI grade.
4) To compare the Scientific Creativity of students of XI grade having above average, average and below average Intelligence.

i.) As compared to male students with below average intelligence, male students with average and above average intelligence are found to be more fluent in scientific creativity in their XI grade.

ii.) As compared to male students with average intelligence, male students with above average intelligence are found to be more fluent in scientific creativity in their XI grade.

iii.) Female students of XI grade with above average, average and below average intelligence do not differ from one another on fluency factor of scientific creativity.

iv.) Male students of XI grade with above average, average and below average intelligence do not differ from one another on flexibility factor of scientific creativity.

v.) As compared to female students with below average intelligence, female students with average and above average intelligence are found to be more flexible in scientific creativity in their XI grade.

vi.) As compared to female students with average intelligence, female students with above average intelligence are found to be more flexible in scientific creativity in their XI grade.

vii.) Male students of XI grade with above average, average and below average intelligence do not differ from one another on originality factor of scientific creativity.

viii.) Female students of XI grade with above average, average and below average intelligence do not differ from one another on originality factor of scientific creativity.

ix.) Male students of XI grade with above average, average and below average intelligence do not differ from one another on inquisitiveness factor of scientific creativity.

x.) As compared to female students with below average intelligence, female students with average and above average intelligence are found to be more inquisitive in scientific creativity in their XI grade.
xi.) As compared to female students with average intelligence, female students with above average intelligence are found to be more inquisitive in scientific creativity in their XI grade.

xii.) As compared to male students with below average intelligence, male students with average and above average intelligence are found to be more scientifically creative in their XI grade.

xiii.) As compared to male students with average intelligence, male students with above average intelligence are found to be more scientifically creative in their XI grade.

xiv.) Female students with above average, average and below average intelligence do not differ from one another on overall factor of scientific creativity in their XI grade.

5) To compare the Scientific Creativity of students of XI grade having above average, average and below average Personality factor.

i.) Male students belonging to above average, average and below average personality factors A, C, F, G, H, I, L, N, O, Q₁ and Q₂ do not differ from one another on fluency factor of scientific creativity.

ii.) Male students belonging to above average and average group on personality factor B (Less Intelligent vs. More Intelligent); Factor E(Humble vs. Assertive); Factor M (Practical vs. Imaginative) Factor Q₃ (Undisciplined Self Conflict vs. Controlled) and Factor Q₄ (Relaxed vs. Tense) do not differ from one another on fluency factor of scientific creativity.

iii.) Male students belonging to average and below average group on personality factor B (Less Intelligent vs. More Intelligent); Factor E(Humble vs. Assertive) and Factor M (Practical vs. Imaginative) do not differ from one another on fluency factor of scientific creativity.

iv.) Male students with low scores on Factor M (Practical vs. Imaginative) are more fluent than their above average counterparts on this personality factor.

v.) Male students with average scores on Factor Q₃ (Undisciplined Self Conflict vs. Controlled) are more fluent than their above average counterparts on this personality factor.
vi.) Male students with average scores on **Factor Q₃** (Undisciplined Self Conflict vs. Controlled) are more fluent than their below average counterparts on this personality factor.

vii.) Male students with below average scores on **Factor Q₄** (Relaxed vs. Tense) are more fluent than their above average counterparts on this personality factor.

viii.) Male students with below average scores on **Factor Q₄** (Relaxed vs. Tense) are more fluent than their average counterparts on this personality factor.

ix.) Male students belonging to above average, average and below average personality factors A, C, E, F, G, I, L, M, N, O, Q₁, Q₃ and Q₄ do not differ from one another on flexibility factor of scientific creativity.

x.) Male students belonging to average and below average group on personality **Factor B** (Less Intelligent vs. More Intelligent); **Factor H** (Shy vs. Venturesome) and **Factor Q₂** (Group Dependent vs. Self-Sufficient) do not differ from one another on flexibility factor of scientific creativity.

xi.) Male students with average scores on **Factor H** (Shy vs. Venturesome) are more flexible than their above average counterparts on this personality factor.

xii.) Male students with below average scores on **Factor H** (Shy vs. Venturesome) are more flexible than their above average counterparts on this personality factor.

xiii.) Male students with average scores on **Factor B** (Less Intelligent vs. More Intelligent) are more flexible than their above average counterparts on this personality factor.

xiv.) Male students with average scores on **Factor Q₂** (Group Dependent vs. Self-Sufficient) are more flexible than their above average counterparts on this personality factor.

xv.) Male students with below average scores on **Factor Q₂** (Group Dependent vs. Self-Sufficient) are more flexible than their average counterparts on this personality factor.

xvi.) Male students belonging to above average, average and below average personality factors B, E, H, I, L, M, O, Q₁, Q₃ and Q₄ do not differ from one another on originality factor of scientific creativity.
Male students belonging to average and below average group on personality Factor A (Schizothymia vs. Cyclothymia); Factor C (Affected by feelings vs. emotionallystable); Factor F (Sober vs. Happy-go-lucky); Factor G (Expeditious vs. Conscientious); Factor N (Forthright vs. Shrewd) and Factor Q₂ (Group Dependent vs. Self-Sufficient) do not differ from one another on originality factor of scientific creativity.

Male students with above average scores on Factor A (Schizothymia vs. Cyclothymia) are more original than their below average counterparts on this personality factor.

Male students with above average scores on Factor C (Affected by feelings vs. emotionallystable) are more original than their average counterparts on this personality factor.

Male students with above average scores on Factor C (Affected by feelings vs. emotionallystable) are more original than their below average counterparts on this personality factor.

Male students with average scores on Factor F (Sober vs. Happy-go-lucky) are more original than their above average counterparts on this personality factor.

Male students with below average scores on Factor F (Sober vs. Happy-go-lucky) are more original than their average counterparts on this personality factor.

Male students with below average scores on Factor G (Expeditious vs. Conscientious) are more original than their above average counterparts on this personality factor.

Male students with average scores on Factor N (Forthright vs. Shrewd) are more original than their above average counterparts on this personality factor.

Male students with below average scores on Factor N (Forthright vs. Shrewd) are more original than their above average counterparts on this personality factor.

Male students with average scores on Q₂ (Group Dependent vs. Self-Sufficient) are more original than their above average counterparts on this personality factor.
xxvii.) Male students with below average scores on Q_2 (Group Dependent vs. Self-Sufficient) are more original than their above average counterparts on this personality factor.

xxviii.) Male students belonging to above average, average and below average personality factors B, C, E, F, H, I, M, N, O, Q_1, Q_2, Q_3 and Q_4 do not differ from one another on inquisitive factor of scientific creativity.

xxix.) Male students belonging to above average and average group on personality Factor A (Schizothymia vs. Cyclothymia); Factor G (Expedient vs. Conscientious) and Factor L (Trusting vs. Suspicious) do not differ from one another on inquisitive factor of scientific creativity.

xxx.) Male students with below average scores on Factor A (Schizothymia vs. Cyclothymia) are more inquisitive than their above average counterparts on this personality factor.

xxxi.) Male students with average scores on Factor G (Expedient vs. Conscientious) are more inquisitive than their below average counterparts on this personality factor.

xxxii.) Male students with above average scores on Factor L (Trusting vs. Suspicious) are more inquisitive than their below average counterparts on this personality factor.

xxxiii.) Male students belonging to average and below average group on personality Factor A (Schizothymia vs. Cyclothymia) and Factor L (Trusting vs. Suspicious) do not differ from one another on inquisitive factor of scientific creativity.

xxxiv.) Male students belonging to above average, average and below average personality factors C, E, F, G, H, I, L, N, O, Q_1, Q_3 and Q_4 do not differ from one another on overall factor of scientific creativity.

xxxv.) Male students belonging to above average and average group on personality Factor A (Schizothymia vs. Cyclothymia); Factor M (Practical vs. Imaginative) and Factor Q_2 (Group Dependent vs. Self-Sufficient) do not differ from one another on overall factor of scientific creativity.

xxxvi.) Male students belonging to average and below average group on personality Factor A (Schizothymia vs. Cyclothymia); Factor B (Less
Intelligent vs. More Intelligent) and **Factor Q**₂ (Group Dependent vs. Self-Sufficient) do not differ from one another on overall factor of scientific creativity.

xxxvii.) Male students with below average scores on **Factor A** (Schizothymia vs. Cyclothymia) are more scientifically creative than their above average counterparts on this personality factor.

xxxviii.) Male students with above average scores on **Factor B** (Less Intelligent vs. More Intelligent) are more scientifically creative than their below average counterparts on this personality factor.

xxxix.) Male students with below average scores on **Factor M** (Practical vs. Imaginative) are more scientifically creative than their above average counterparts on this personality factor.

xl.) Male students with above average scores on **Factor Q**₂ (Group Dependent vs. Self-Sufficient) are more scientifically creative than their below average counterparts on this personality factor.

xli.) Female students belonging to above average, average and below average personality factors B, C, E, F, G, H, I, M, N, O, Q₂, Q₃ and Q₄ do not differ from one another on fluency factor of scientific creativity.

xlii.) Female students belonging to average and below average group on personality **Factor A** (Schizothymia vs. Cyclothymia); **Factor L** (Trusting vs. Suspicious) and **Factor Q**₁ (Conservative vs. Experimenting) do not differ from one another on fluency factor of scientific creativity.

xliii.) Female students with above average scores on **Factor L** (Trusting vs. Suspicious) are more fluent than their average counterparts on this personality factor.

xliv.) Female students with above average scores on **Factor Q**₁ (Conservative vs. Experimenting) are more fluent than their average counterparts on this personality factor.

xlv.) Female students with above average scores on **Factor Q**₁ (Conservative vs. Experimenting) are more fluent than their below average counterparts on this personality factor.

xlvi.) Female students belonging to above average, average and below average personality factors A, B, F, G, H, L, M, N, O, Q₂, Q₃ and Q₄ do
not differ from one another on flexibility factor of scientific creativity.

xlii.) Female students belonging to above average and average group on personality **Factor C** (Affected by feelings vs. emotionally stable); **Factor I** (Tough minded vs. Tender minded) and **Factor Q₁** (Conservative vs. Experimenting) do not differ from one another on flexibility factor of scientific creativity.

xl) Female students belonging to average and below average group on personality **Factor E** (Humble vs. Assertive); **Factor I** (Tough minded vs. Tender minded) and **Factor Q₁** (Conservative vs. Experimenting) do not differ from one another on originality factor of scientific creativity.

li.) Female students with above average scores on **Factor C** (Affected by feelings vs. emotionally stable) are more flexible than their below average counterparts on this personality factor.

lii.) Female students with above average scores on **Factor I** (Tough minded vs. Tender minded) are more flexible than their below average counterparts on this personality factor.

liii.) Female students with below average scores on **Factor Q₁** (Conservative vs. Experimenting) are more flexible than their above average counterparts on this personality factor.

l.) Female students with above average scores on **Factor F** (Sober vs. Happy-go-lucky) are more original than their above average counterparts on this personality factor.

li.) Female students with above average scores on **Factor Q₂** (Group Dependent vs. Self-Sufficient) are more original than their above average counterparts on this personality factor.

li.) Female students with average scores on **Factor Q₂** (Group Dependent vs. Self-Sufficient) are more original than their above average counterparts on this personality factor.

lvi.) Female students belonging to above average, average and below average personality factors A, B, C, E, G, H, I, L, M, N, O, Q₁, Q₃ and Q₄ do not differ from one another on originality factor of scientific creativity.
Dependent vs. Self-Sufficient) are more original than their below average counterparts on this personality factor.

lvi.) Female students belonging to above average, average and below average personality factors A, B, C, F, G, I, L, M, N, O, Q2, Q3 and Q4 do not differ from one another on inquisitiveness factor of scientific creativity.

lvii.) Female students belonging to above average and below average group on personality Factor E (Humble vs. Assertive); Factor H (Shy vs. Venturesome) and Factor Q1 (Conservative vs. Experimenting) do not differ from one another on inquisitiveness factor of scientific creativity.

lviii.) Female students belonging to above average and below average group on personality Factor E (Humble vs. Assertive) and Factor H (Shy vs. Venturesome) do not differ from one another on inquisitive factor of scientific creativity.

lix.) Female students belonging to average and below average group on personality Factor E (Humble vs. Assertive) and Factor H (Shy vs. Venturesome) do not differ from one another on inquisitive factor of scientific creativity.

lx.) Female students with above average scores on Factor E (Humble vs. Assertive) are more inquisitive than their average counterparts on this personality factor.

lxi.) Female students with average scores on Factor H (Shy vs. Venturesome) are more inquisitive than their above average counterparts on this personality factor.

lxii.) Female students with average scores on Factor Q1 (Conservative vs. Experimenting) are more inquisitive than their below average counterparts on this personality factor.

lxiii.) Female students belonging to above average, average and below average personality factors A, C, E, F, G, I, N, O, Q2, Q3 and Q4 do not differ from one another on overall factor of scientific creativity.

lxiv.) Female students belonging to average and below average group on personality Factor B (Less Intelligent vs. More Intelligent); Factor H (Shy vs. Venturesome); Factor L (Trusting vs. Suspicious); Factor M (Practical vs. Imaginative) and Factor Q1 (Conservative vs. Experimenting) do not differ from one another on inquisitive factor of scientific creativity.

lxv.) Female students belonging to above average and below average group
on personality Factor B (Less Intelligent vs. More Intelligent); Factor H (Shy vs. Venturesome) and Factor L (Trusting vs. Suspicious) do not differ from one another on overall factor of scientific creativity.

lxvi.) Female students belonging to above average and average group on personality Factor M (Practical vs. Imaginative) and Factor Q1 (Conservative vs. Experimenting) do not differ from one another on inquisitive factor of scientific creativity.

lxvii.) Female students with above average scores on Factor B (Less Intelligent vs. More Intelligent) are more scientifically creative than their average counterparts on this personality factor.

lxviii.) Female students with above average scores on Factor H (Shy vs. Venturesome) are more scientifically creative than their average counterparts on this personality factor.

lxix.) Female students with average scores on Factor L (Trusting vs. Suspicious) are more scientifically creative than their above average counterparts on this personality factor.

lxx.) Female students with below average scores on Factor M (Practical vs. Imaginative) are more scientifically creative than their above average counterparts on this personality factor.

lxxi.) Female students with below average scores on Factor Q1 (Conservative vs. Experimenting) are more scientifically creative than their above average counterparts on this personality factor.

6) To compare the Scientific Creativity of students of XI grade having above average, average and below average study habits.

i.) Male students with above average, average and below average study habits do not differ from one another on fluency factor of scientific creativity in their XI grade.

ii.) As compared to female students with average study habits, female students with above average and below average study habits are found to be more fluent in their XI grade.

iii.) As compared to female students with below average study habits,
female students with average study habits are found to be more fluent in scientific creativity in their XI grade.

iv.) Male students with above average, average and below average study habits do not differ from one another on flexibility factor of scientific creativity in their XI grade.

v.) Female students with above average, average and below average study habits do not differ from one another on flexibility factor of scientific creativity in their XI grade.

vi.) Male students with above average, average and below average study habits do not differ from one another on originality factor of scientific creativity in their XI grade.

vii.) Female students with above average, average and below average study habits do not differ from one another on originality factor of scientific creativity in their XI grade.

viii.) Male students with above average, average and below average study habits do not differ from one another on inquisitiveness factor of scientific creativity in their XI grade.

ix.) Female students with above average, average and below average study habits do not differ from one another on inquisitiveness factor of scientific creativity in their XI grade.

x.) As compared to male students with below average study habits, male students with average and above average study habits are found to be overall more scientifically creative in their XI grade.

xi.) As compared to male students with average study habits, male students with above average study habits are found to be more scientifically creative in their XI grade.

xii.) As compared to female students with below average study habits, female students with above average and average study habits are found to be more scientifically creative in their XI grade.

xiii.) As compared to female students with above average study habits, female students with average study habits are found to be more scientifically creative in their XI grade.

7) **To find out the extent to which Intelligence, Personality and Study Habits**
contributes to the prediction of Scientific Creativity of students of XI grade.

i.) Among male students of XI grade personality Factor A (Schizothymia vs. Cyclothymia), Factor H (Shy vs. Venturesome) and Factor O (Placid vs. Apprehensive) are the best predictors of ‘fluency’ factor of scientific creativity.

ii.) Among female students of XI grade personality Factor B (Less Intelligent vs. More Intelligent); Factor I (Tough minded vs. Tender minded) Factor Q₁ (Conservative vs. Experimenting) and Factor Q₂ (Group Dependent vs. Self-Sufficient) are the best predictors of ‘fluency’ factor of scientific creativity.

iii.) Among male students of XI grade personality Factor A (Schizothymia vs. Cyclothymia), Factor H (Shy vs. Venturesome) and Factor Q₂ (Group Dependent vs. Self-Sufficient) are the best predictors of ‘flexibility’ factor of scientific creativity.

iv.) Among female students of XI grade personality Factor F (Sober vs. Happy-go-lucky); Factor L (Trusting vs. Suspicious); Factor O (Placid vs. Apprehensive) and Factor Q₃ (Undisciplined Self Conflict vs. Controlled) are the best predictors of ‘flexibility’ factor of scientific creativity.

v.) Among male students of XI grade personality Factor B (Less Intelligent vs. More Intelligent); Factor C (Affected by feelings vs. Emotionally stable); Factor M (Practical vs. Imaginative) and Factor Q₁ (Conservative vs. Experimenting) are the best predictors of ‘originality’ factor of scientific creativity.

vi.) Among female students of XI grade personality Factor B (Less Intelligent vs. More Intelligent); Factor G ( Expedient vs. Conscientious) and Factor O (Placid vs. Apprehensive) are the best predictors of ‘originality’ factor of scientific creativity.

vii.) Among male students of XI grade personality Factor B (Less Intelligent vs. More Intelligent); Factor G (Expeditient vs. Conscientious) and Factor Q₃ (Undisciplined Self Conflict vs. Controlled) are the best predictors of ‘inquisitiveness’ factor of scientific creativity.

viii.) Among female students of XI grade personality Factor B (Less Intelligent vs. More Intelligent); Factor G (Expeditient vs. Conscientious) and Factor Q₃ (Undisciplined Self Conflict vs. Controlled) are the best predictors of ‘inquisitiveness’ factor of scientific creativity.
Intelligent vs. More Intelligent); **Factor H** (Shy vs. Venturesome); **Factor Q_1** (Conservative vs. Experimenting) and **Factor Q_3** (Undisciplined Self Conflict vs. Controlled) are the best predictors of ‘inquisitiveness’ factor of scientific creativity.

ix.) Among male students of XI grade personality **Factor F** (Sober vs. Happy-go-lucky); **Factor N** (Forthright vs. Shrewd) and **Factor Q_2** (Group Dependent vs. Self-Sufficient) are the best predictors of overall scientific creativity.

x.) Among female students of XI grade personality **Factor B** (Less Intelligent vs. More Intelligent); **Factor L** (Trusting vs. Suspicious) and **Factor Q_1** (Conservative vs. Experimenting) are the best predictors of overall scientific creativity.

**Educational Implications:**

Some of the essential educational implications of the research conducted can be summarized as follow:

1. The theoretical explanation of research preliminarily focuses on proper explanation and differentiation of certain characters exhibited by scientifically creative students, by which they can be identified and differentiated from normal or problematic students.

2. Overall research findings indicates more or less similar finding for male and female students on differentiated aspects of fluency, flexibility, originality and inquisitiveness, which indicates specific similar pattern of psychological development in both male and female students.

3. Correlational analysis of Intelligence with scientific creativity indicates that overall scientific creativity is significantly correlated with intelligence of both male and female students of XI grade.

4. Intelligence factor of both male and female students was significantly found correlated with flexibility and originality factor for both male and female students, which indicates its specific correlation and presence to be a student scientifically creative.

5. Correlational analysis of Personality with scientific creativity indicates
that specific personality traits ensure scientific creativity in both male and female students. Personality traits like coping and manipulating themselves with sanctions imposed by society, overcoming pressures to develop in for a well rounded personality, divergence from gender-role norms, development to learn and accomplish on the difficult task, searching in for a better or advanced solution to the persistent problem etc can lead to the development of scientifically creative personality in both male and female individuals.

(6) Correlational and differential analysis of personality traits differentiates the development of specific personality traits like general intelligence, trusting, conservative nature, venturesomeness, practical attitude etc in both male and female students which can be altered by treatment they get from their parents, teachers and nearby people which can enhance creative talent into them.

(7) Correlational and differential analysis of study habits of male and female students indicates a specific relation in between development of scientific creativity and study habits which a students possess, which can be helpful in developing scientific potential in male and female students in their preliminary stages of life.

(8) The differential analysis of study habits and scientific creativity indicates that specific talents like fluency, flexibility, originality and inquisitiveness responsible for development of scientific potential, can be enhanced by inculcating or introducing specific study habits in both male and female students.

(9) Thesis thoroughly attempts to describe research educational implications in all the possible aspects which effect the development of a scientific creative individual on various aspects and also its implication in various fields like education, family, teachers, educational authorities and for guiding and counselling.

(10) Overall research findings lays its emphasis on the development of specific scientific talents in both male and female students to develop them in a scientific creative individuals, which do not implies gender discrimination or to the development of general creative capacity to any specific field only, but in each and every field of life.
Suggestions for further Studies:

Present study was conducted on the sample of XI grade adolescent students belonging to Uttar Pradesh region only. Further studies can conducted on a larger population further classified on basis of rural-urban, different socio-economic status they possess, on basis of their educational qualifications, home and school background they exhibits, students from different states etc. Besides these preliminary suggestions, advanced and detailed researches can be undertaken on the following norms:

(1) Predictor of scientific creativity among students studying in institutions with different administrative setups i.e. governmental institutions, aided-institutions, self-financed institutions etc.

(2) Present study comprises students of science stream. More generalised test and procedure can be adopted in further researches to evaluate students on boarder norms.

(3) Some determining factors such as, academic achievement, cultural aspect of students, their economical status, home environment etc. which are assumed as the major affecting factors of any educational process can also be considered in upcoming researches.

(4) In the present study, prediction of scientific creativity is limited to certain factors which effects creativity to a large extent, other domain specific studies can also be consider for research to explore and define broader aspects of scientific creativity.

(5) More advanced and differential statistical techniques can be adopted to explore relational and dimensional effects of various psychological variables of an individual which can be helpful in betterment of their lives.

(6) Intervening variables also affects any psychological variable to a large extent which can be included in the further studied to study their detail effects on major variables.

(7) Life is changing in number of aspect which demands in for more advanced and sophisticated researches to conduct. Research variables classified on more detailed classes and sub-classes can also be included.
in further researches to explore new and detailed dimensions of knowledge.

(8) Researches focused to study the relationship and development of physiological aspects along with their practical implications in day-to-day life can also be taken as the objective of upcoming researches.