### LIST OF TABLES

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Typology of life word</td>
<td>19</td>
</tr>
<tr>
<td>1.2</td>
<td>Means of Rating of Importance of Factors to the Creative Scientist and Rank orders of the Research Group and of a Non-Research Group</td>
<td>66</td>
</tr>
<tr>
<td>1.3</td>
<td>The Factors of Majumdar's (1973) Test of Scientific creativity</td>
<td>68</td>
</tr>
<tr>
<td>1.4</td>
<td>The Factors of Didar Singh Tests (1979) of scientific creativity</td>
<td>70</td>
</tr>
<tr>
<td>1.5</td>
<td>Studied conducted for Deliberate Development of creative Thinking of School children Using Different Interventions and their percentage success</td>
<td>79</td>
</tr>
<tr>
<td>2.1</td>
<td>Number of Items on the body of preliminary draft of scientific scale</td>
<td>138</td>
</tr>
<tr>
<td>2.2</td>
<td>Number of participating students at pre-try out of preliminary draft of scientific attitude scale</td>
<td>139</td>
</tr>
<tr>
<td>2.3</td>
<td>Sample for Item Analysis of Scientific Attitude</td>
<td>140</td>
</tr>
<tr>
<td>2.4</td>
<td>Items of less than 0.2 Discriminating power</td>
<td>141</td>
</tr>
<tr>
<td>2.5</td>
<td>The students participating in the sample to find reliability and validity of scientific attitude scale</td>
<td>143</td>
</tr>
<tr>
<td>2.6</td>
<td>Validity Coefficient of four factors of Scientific Attitude scale</td>
<td>144</td>
</tr>
<tr>
<td>2.7</td>
<td>Distribution of Secondary school students Selected from different secondary school in Jhansi Division of Uttar Pradesh for testing suitability of test activities</td>
<td>147</td>
</tr>
<tr>
<td>2.8</td>
<td>Grade-wise Distribution of secondary students for collection of source-material for development of Tests of scientific creative thinking</td>
<td>151</td>
</tr>
<tr>
<td>2.9</td>
<td>Distribution of Secondary school students randomly selected from different secondary schools in Jhansi division of Hamirpur, Jalaun, Banda Lalitpur and Jhansi in Uttar Pradesh (Boys=216, Girls=154 Total=370) for item Analysis.</td>
<td>164</td>
</tr>
<tr>
<td>2.10</td>
<td>Means and Standard Deviations of high Scoring Group (HSG) and Low scoring Group (LSG) of secondary school students along with t-ratios on the Dimension of Fluency (Word Fluency Activity)</td>
<td>170</td>
</tr>
<tr>
<td>2.11</td>
<td>Means and standard Deviations of High scoring groups (H.S.G.) and Low scoring Group (LSG) of secondary students along with t-ratios on the Dimension of flexibility (Word Fluency Activity).</td>
<td>170</td>
</tr>
</tbody>
</table>
2.12 Means and Standard Deviations of High Scoring Group (HSG) and Low scoring Group (LSG) of Secondary Students along with t-ratios on the Dimension of Originality (Word Fluency)  

2.13 Means and Standard Deviations of High Scoring Group (HSG) and Low scoring Group (LSG) of Higher Secondary students along with t-ratios for the summated score (Words Fluency)  

2.14 Means and standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary students along with t-ratios on the Dimension of Fluency (Ideational Activity)  

2.15 Means and Standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary Students along with t-ratios on the Dimension of flexibility. (Ideational Activity)  

2.16 Mean and standard Deviations of High Scoring Deviations of Higher scoring group (HSG) and LOW Scoring group (LSG) of higher secondary students along with t-ratios on the Dimension of Originality (Ideational activity)  

2.17 Means and Standard Deviations of high Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary school students along with t-ratios for the summated score of (Ideational fluency)  

2.18 Means standard deviations of high scoring group (HSG) and Low scoring group (LSG) of Secondary students along with t-ratios on the Dimensions of Fluency (Expressive Fluency)  

2.19 Means and standard Deviations of High scoring group (HSG) and Low scoring Group (LSG) of Secondary students along with t-ratios on the dimension of flexibility (Expressive fluency activity)  

2.20 Means and standard Deviations of high scoring group (HSG) and Low scoring Group (LSG) of secondary students along with t-ratios on the dimension of originality (Expressive fluency activity)  

2.21 Means and Standard Deviations of high scoring Group (HSG) and Low Scoring Group (LSG) of secondary students along with t-Ratios for the summated score of scientific creative thinking (Expressive fluency Activity).  

2.22 Means and Standard Deviations of high scoring group (HSG) and Low Scoring Group (LSG) of secondary students along with t-Ratios for dimension of fluency (Associational fluency activity)  

2.23 Means and standard Deviation of high scoring group (HSG) and low scoring group (LSG) of secondary students along with t-ratios for dimension of flexibility (Associational fluency activity)  

2.24 Means and Standard deviations of high scoring group (HSG) and low scoring group (LSG) of secondary students along with t-Ratios for dimension of originality. (Associational Fluency Activity)
2.25 Means and standard Deviations of high scoring group (HSG) and Low scoring group (LSG) of secondary students along with t-Ratios for the summated score of Scientific creative thinking (Associational Fluency Activity) 183

2.26 Means and Standard deviations of high scoring group (HSG) and low scoring group (LSG) of secondary students along with t-Ratios for the dimension of fluency of scientific creative thinking (Symbolic Flexibility Activity) 185

2.27 Means and Standard deviations of high scoring group (HSG) and Low scoring group (LSG) of higher secondary students along with t-Ratios for the dimension of flexibility of scientific creative thinking (Symbolic Flexibility Activity) 186

2.28 Means and standard Deviation of high scoring Group (HSG) and Low scoring Group (LSG) of secondary students along with t-Ratios for the dimension of originality of Scientific creativity thinking (Symbolic flexibility Activity) 187

2.29 Means and standard Deviation of high Scoring groups (HSG) and Low scoring Group (LSG) of secondary students along with t-Ratios for the total scientific creative thinking (Symbolic Flexibility Activity) 187

2.30 Means and Standard Deviations of high scoring group (HSG) and Low Scoring Group (LSG) of secondary students along with t-Ratios for the Dimension of Fluency (Figural Adoptive Flexibility Activity) 189

2.31 Means and standard Deviation of high Scoring group (HSG) and Low scoring Group (LSG) of secondary students along with t-Ratios on the Dimention of Flexibility (Figural Adaptive Flexibility activity) 190

2.32 Means and Standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of secondary students along with t-Ratios on the dimension of originality (Figural Adoptive Flexibility Activity) 191

2.33 Means and Standard Deviations of high Scoring group (HSG) and Low scoring Group (LSG) of secondary students along with t-Ratios for the summated score (Figural Adoptive Flexibility Activity) 191

2.34 Means and standard Deviation of high scoring group (HSG) and Low scoring group (LSG) of secondary students along with t-Ratios for the dimension of fluency (Sponteneous Flexibility Activity) 193

2.35 Means and standard Deviations of high scoring group (HSG) and Low scoring Group (LSG) of secondary students along with t-Ratios for the dimension of flexibility (Sponteneous flexibility Activity) 194

2.36 Means and Standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary Students along with t-Ratios on the Dimension of Originality (Sponteneous flexibility Activity) 195
2.37 Means and Standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary students alongwith t-Ratios on the total scientific creative thinking score (Spontaneus Flexibility Activity) 195

2.38 Means and Standard Deviations of high scoring group (HSG) and Low scoring group (LSG) of secondary students along with t-ratios on the Dimentions of fluency (Originality activity) 197

2.39 Means and Standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary school students along with t-Ratios on the dimension of flexibility (Originality Activity) 198

2.40 Means and standard Deviation of High Scoring Group(HSG) and Low Scoring Group (LSG) of Secondary school students along with t-Ratios on the dimention of originality (Originality Activity). 199

2.41 Means and Standard Deviations of High Scoring Group (HSG) and Low scoring Group (LSG) of Secondary school students alongwith t-Ratios on the total Scientific creative thinking score (Originality Activity) 199

2.42 Means and standard Deviations of High Scoring group (HSG) and low scoring group (LSG) of secondary school students along with t-ratios on dimension of fluency (Semantic Elaboration Activity.) 201

2.43 Means and standard Deviations of high Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary school students along with t-ratios on dimension of flexibility (Semantic Elaboration Activity) 202

2.44 Means and standard Deviations of High Scoring Group (HSG) and Low scoring group (LSG) of secondary school students along with t-ratios dimension of originality (Semantic Elaboration Activity) 203

2.45 Means and standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of secondary school students along with t-Ratios of Total summated divergent scientific creative thinking (Semantic Elaboration) 203

2.46 Means and standard Deviations of High scoring Group (HSG) and low scoring group (LSG) of secondary school students along with t-ratios on dimension of fluency (Symbolic Elaboration Activity) 205

2.47 Means and Standard Deviations of high scoring group (HSG) and Low scoring Group (LSG) of secondary School students along with t-ratios on dimension of Flexibility (Symbolic Elaboration Activity) 206
2.48 Means and standard Deviations of High Scoring Group (HSG) and Low scoring group (LSG) of secondary school students along with t-ratios dimension of originality (Symbolic Elaboration Activity) 207

2.49 Mean and standard Deviations of High Scoring Group (HSG) and Low Scoring Group (LSG) of Secondary school student along with t-Ratios of Total Summated Divergent Scientific creative thinking (Symbolic Elaboration Activity) 207

2.50 Means and Standard Deviations of high scoring Groups (HSG) and Low Scoring Group (LSG) of secondary school students along with t-ratios (Semantic Redefinition Activity) 210

2.51 Means and standard Deviations of high scoring group (HSG) and Low scoring group (LSG) of secondary school students along with t-ratios (Figural Redefinition Activity) N=170 211

2.52 Means and standard Deviations of High Scoring groups (HSG) and Low scoring Groups (LSG) of secondary school students along with t-ratios (conceptual Correlates Activity) N=170 213

2.53 Means and standard Deviations of high Scoring group (HSG) and low scoring groups (LSG) of Secondary school students along with t-ratios (Location of Central Idea Activity)N=170 214

2.54 Means and standard Deviations of high scoring group (HSG) and low scoring group (LSG) of secondary school students along with t-ratios (Numerical Application activity) N=170 216

2.55 Means and standard deviations of high scoring groups (HSG) and low scoring groups (LSG) of secondary school students along with t-ratios (concept of grouping activity) N=170 217

2.56 Means and standard Deviations of high Scoring groups (HSG) and low scoring groups (LSG) of Secondary school students along with t-ratios (similarites Activity)N=170 219

2.57 Means and standard deviations of high scoring groups (HSG) and low scoring groups (LSG) of secondary school students along with t-ratios (General reasoning Activity) N=170 220

2.58 Means and standard deviations of high scoring groups (HSG) and low scoring groups (LSG) of secondary school students along with t-ratios (Perceptual For sight activity)N=170 222

2.59 Means and standard deviations of high scoring groups (HSG) and Low scoring group(LSG) of secondary school students along with t-ratios (Conceptual for sight Activity) N=170 224
Means and standard Deviations of high scoring groups (HSG) and low scoring groups (LSG) of secondary school students along with t-ratios (Symbolic Pattern Activity) N=170

Means and standard Deviations of high scoring groups (HSG) and low scoring groups (LSG) of secondary school students along with t-ratios (Verbal comprehension Activity) N=170

Means and standard deviations of high scoring groups (HSG) and low scoring group (LSG) of secondary school students along with t-ratios (Sensitivity of Problems Activity) N=170

Means and standard deviations of high scoring groups (HSG) and Low scoring groups (LSG) of secondary school students along with t-ratios (Logical Evaluation Activity) N=170

Means and standard deviations of high scoring groups (HSG) and Low scoring groups (LSG) of secondary school students along with t-ratios (Number Association Activity) N=170

School wise Distribution of 150 students selectee for Estimating Reliability and validity of Tests of scientific creative thinking out of five Districts of Uttar Pradesh.

Means, Standard Deviations, t-Ratios and Split half Reliability Coefficients of divergent Test of scientific creative thinking (N=150)

Means standard Deviations t-Ratios and split-Half Reliability Coefficient of non-divergent Test of scientific creative thinking (N=150)

Means, standard Deviations, t-ratios and Test-Retest Reliability Coefficients for the Dimensions of Fluency, flexibility, originality and Total Scientific Creative thinking on divergent Test Activities obtained on Administrations (N=150)

Means, standard Deviations, t-Ratios and test-Retest Reliability Coefficients for the scientific creative thinking on Non-Divergent test Activities obtained, on two Administrations (N=150)

Means, standard Deviations, t-ratios and coefficients of Correlation for Fluency, Flexibility Originality and total scientific creative thinking scores on Divergent test of scientific creative thinking (N=150)

Zero order Inter correlations among Item, Test Activity, divergent and Total Scientific creative thinking for word Fluency Activity (N=150)

Zero order Inter correlations among Item, Test activity, divergent and total Scientific creative thinking for Ideational Fluency Activity (N=150)

Zero order correlations among Item, Test Activity, divergent and total scientific creative thinking for expressional Fluency Activity (N=150)
2.74 Zero order correlations among Item test activity divergent and total Scientific creative thinking for Associational Fluency Activity (N=150) 251

2.75 Zero order Inter correlations among Item, test Activity, divergent and total scientific creative thinking for symbolic Relation Activity N=150 252

2.76 Zero order Inter correlations among Item, test Activity, divergent and total scientific creative thinking for Figural Adoptive Flexibility Activity N=150 252

2.77 Zero order Correlations among item, activity, divergent and total Scientific Creative thinking for spontaneous Flexibility activity N=150 253

2.78 Zero order correlations among Item, Activity, divergent and total scientific creative thinking for originality N=150 253

2.79 Zero order Correlation among Item, Activity, divergent and Scientific creative thinking for Semantic Elaboration Activity N=150 254

2.80 Zero Order Correlations among Item, Activity, divergent and Scientific creative thinking for symbolic Elaboration N=150 254

2.81 Zero order Inter Correlations among all activities of divergent scientific creativity test N=150 256

2.82 Zero order Inter correlations among fluency Flexibility, originality, divergent and Total Scientific creative thinking (N=150) 258

2.83 Zero order Inter Correlation among Item, test activity, non-divergent and total scientific creative thinking for Semantic Redifinition Activity N=150 260

2.84 Zero order Inter Correlations among Item, test activity, non-divergent and Total Scientific creative thinking for Figural Redefinition Activity N=150 260

2.85 Zero order Inter correlations among Item, test activity, non-divergent and total scientific creative thinking for Education of Conceptual Correlates Activity N=150 261

2.86 Zero order Inter correlations among Item, test activity, non-divergent and total Scientific creative thinking for Location of Central Ideas Activity (NMU) N=150 262

2.87 Zero order Inter correlation among Item, Test Activity Non-Divergent and total Scientific creative thinking for Numerical application N=150 262

2.88 Zero order Inter Correlations among Item test Activity Non-Divergent and Total Scientific Creative thinking for concept of Grouping Activity N=150 263
2.89 Zero order Inter Correlations among Item, test activity Non-divergent and Total Scientific Creative thinking for similarities Activity (CMT) 263

2.90 Zero order Inter correlation among Item, test Activity, non-divergent and Total scientific thinking for General Reasoning Activity (CMS) N=150 264

2.91 Zero order Inter correlations among Item, test Activity, Non-divergent and Total Scientific creative thinking for perceptual for Sight Activity (CFI) N=150 264

2.92 Zero order Inter correlation and among Item, test Activity, non-Divergent and total scientific creative thinking for conceptual Forsight Activity (CMI) N=150 265

2.93 Zero order Inter correlations among Item, test Activity non-divergent and total scientific creative thinking for symbolic, Pattern Activity (CSS) N=150 265

2.94 Zero order Inter Correlation among Item test Activity, non-divergent and total scientific creative thinking for verbal comprehension activity (CMU) N=150 266

2.95 Zero order Inter correlations among Item, test Activity non-divergent and composite scientific creative thinking for sensitivity of Problems activity 266

2.96 Zero order Inter correlations among Item, test Activity non-divergent and total scientific creative thinking for logical evaluation Activity (EMR) N=150 267

2.97 Zero-order Inter correlations among Item, test Activity, non-divergent and total scientific creative thinking for Number association Activity (MSI) N=150 267

2.98 Zero order Inter Correlations among all activities of non-divergent Scientific Creative thinking Test N=150 271

2.99 Coefficients of correlation of scores of scientific creative thinking with those obtained by Singh's (1979) Scientific thinking Jalota's test of general Ability, Agarwal's Scientific Aptitude test and Achievement in Science 273

2.100 Biserial Coefficients of correlation alongwith their standard Error for testing the Hypothesis that r between Estimates between Dimensions of Divergent scientific creative thinking and Teacher's Rating N=150 277

3.1 Controls Employed in the Experiment 283

3.2 Description of the control and experimental Groups of Various variables. 286
3.3 Distribution of Experimental Lessons

3.4 Reliability coefficient for three measures of divergent Scientific creativity Derived from divergent Scientific reality Test

4.1 Factors of Scientific Attitude and their codes on scoring

4.2 Means, standard deviations and t-values (Two tailed)-Between Pre-test and Post-test Scientific Attitude scores for experimental Group 'A' N=30

4.3 Means, standard Deviations and t-values (Two tailed) between Pre-test and post test scientific attitude scores for control group 'B' N=30

4.4 Summary of sum of squares of covariate (SS,) sum of squares of criterion COMS (SS,) Adjusted variance (MS, or V,) and Regression Coefficient (b) (N=60) y.x y.x

4.5 Summary of mean scores of covariate (M,) mean scores of criterion variable gained COMSA (H,). Adjusted mean scores of Criterion Variable y H,x, and t-ratio of Experimental and control groups y.x (N=30)

4.6 Summary of sum of squares of covariate initial DBS(SS,) sum of squares of criterion gained DBS(SS,) sum of squares of adjusted criterion (SS,) Adjusted variance (MS, or V,) and coefficient of regression (b) y.x y.x

4.7 Summary of mean scores of Co-variate (M,) mean scores of criterion variable DBS(M,). Adjusted mean scores of criterion variable (M,) standard error of Adjusted means difference (SE, MDy.x) and t-ratios of Experimental and control groups (N=30)

4.8 Summary of sum of squares of covariate initial DBA(SS,), sum of squares of criterion gained DBA (SS,) sum of Adjusted criterion (SS,) Adjusted variance (MS, or V,) and coefficient of regression (b) y.x y.x

4.9 Summary of mean scores of Co-Variate (M,) mean scores of criterion variable (M,), Adjusted mean scores of criterion variable gained DBA (M,), standard error of Adjusted means difference y.x (SE, MDy.x) control groups (N=30)

4.10 Summary of sum of squares of covariate initial DBA(SS,), sum of squares of criterion gained DBA (SS,) sum of Adjusted criterion (SS,) Adjusted variance (MS, or V,) and Coefficient of regression (b) y.x y.x

4.11 Summary of mean scores of Co-variate (M,) mean scores of criterion variable (M,). Adjusted mean scores of criterion variable BCE (M,) standard error of Adjusted mean difference (SE, MDY, x) and t-ratio of experimental and control groups.
4.12 Summary of sum of squares of co-variate initial BOM (SS_x^), sum of squares of criterion variable gained BOM(SS_y), sum of adjusted criterion (SS_y.x) or V_y.x, and coefficient of regression (b)  

4.13 Summary of means scores of co-variate (M_x) means scores of criterion variable gained BOM (M_y), adjusted mean scores of criterion variable BOM (M_y.x), standard error of adjusted mean difference (SE_My.x), and t-ratio of experimental and control groups.  

4.14 Factors of scientific creative thinking and their codes on scoring  

4.15 Means (m) and standard deviations (SD) of raw scientific creative thinking (N=60)  

4.16 Means (M) standard deviations (SD) and t-ratios (one tailed) between pre-test and post test scientific creative thinking scores for experimental group 'A' N=30  

4.17 Means (M) standard deviations (SD) and standard errors of mean (SE_My) and t-ratio (two tailed) between pre-test and post-test scientific creative thinking scores for control group (N=30)  

4.18 Summary of sum of squares of co-variate initial COMSC (SS_x); sum of squares of criterion gained COMSC (SS_y); adjusted criterion (MS_y.x) and coefficient of regression within groups (b)  

4.19 Summary of mean scores of co-variate (M_x) mean scores of criterion variable (M_y), adjusted mean scores of criterion variable gained COMSA (M_y.x), standard error of adjusted means difference (SE_My.x) and t-ratio of experimental and control groups.  

4.20 Summary of sum of squares of covariate initial TODS (SS_x); sum of squares of criterion gained TODS (SS_y), sum of adjusted criterion (SS_y.x) adjusted variance (MS_y.x) and coefficient of regression within groups (b)  

4.21 Summary of mean scores of co-variate (M_x) mean scores of criterion variable (M_y) adjusted mean scores of criterion variable gained TODS (M_y.x), standard error of adjusted mean difference (SE_My.x) and t-ratio of experimental and control groups.  

4.22 Summary of sum of squares of co-variate initial NODS (SS_x); sum of squares of criterion gained NODS (SS_y), sum of adjusted criterion (SS_y.x) adjusted variance (MS_y.x) and coefficient of regression within groups (b)  

4.23 Summary of mean scores of co-variate (M_x) mean scores of criterion variable (M_y) adjusted mean scores of criterion gained NODS (M_y.x), standard error of adjusted mean difference (SE_My.x) and t-ratio of experimental and control groups.
4.24 Summary of sum of squares of Co-variate initial FLUED (SSx); sum of squares of criterion gained FLUED (SSy); sum of Adjusted criterion (SSy.x) adjusted variance (MSy.x) and co-efficient of regression within groups (b) 340

4.25 Summary of mean scores of co-variate (Mx) mean scores of criterion variable (My) Adjusted mean scores of criterion gained-FLUED(My.x) standard error of Adjusted mean difference (SEMDy.x) and t-ratio of experimental and control groups. 341

4.26 Summary of sum of squares of Co-variate initial FLED (SSx); sum of squares of criterion gained FLED (SSy); sum of Adjusted criterion (SSy.x); Adjusted variance (MSy.x) and Coefficient of regression within groups (b) 342

4.27 Summary of mean scores of Co-variate(Mx) mean scores of criterion variable (My) Adjusted mean scores of criterion gained FLED(My.x) standard error of Adjusted mean difference (SEMDy.x) and t-ratio of experimental and control groups. 343

4.28 Summary of sum of squares of Co-variate initial ORID(SSx); sum of squares of criterion (SSy); Adjusted variance (MSy.x) and Coefficient of regression within groups (b) 344

4.29 Summary of mean scores of Co-variate (Mx) mean scores of criterion variable(My) Adjusted mean scores of criterion gained ORID(My.x) standard error of Adjusted mean difference (SEMDy.x) and t-ratio of experimental and control groups. 344