# CHAPTER VI

RESTROSPECT AND PROSPECTS

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CHAPTER VI

RESTROSPECT AND PROSPECTS

6.1 **Introduction**

It has been described earlier that the present research problem is multi-dimensional. There are four independent variables viz. institutional climate, area, sex and caste of the pupils which are incorporated at two levels each. Therefore $2 \times 2 \times 2 \times 2$ factorial design has been invoked to study the main effects and interaction between/among these variables. The dependent variable is the creativity scores obtained by administering the Passi's Test of Creativity.

The following independent variables are operating at two levels:

1. Institutional climate at two levels:
   (i) Open Climate
   (ii) Closed Climate

2. Area of the pupils:
   (i) Rural area
   (ii) Urban area

3. Sex of the pupils:
   (i) Boys
   (ii) Girls

4. Caste of the pupils:
   (i) B.C.
   (ii) Non B.C.
The following tools are used by the investigator for the study.

(i) Passi’s Test of Creativity.

(ii) Institutional Climate Description Statements by Anjani Mehta.

(iii) Information Sheet (Data Sheet) for collecting information regarding pupils.

Sample:

The sample is drawn from secondary school of Kaira district of Gujarat state. In order to have representative sample, the schools were listed talukawise and areawise. 10 talukas are selected for the sample. From each taluka, 4 schools are selected each from rural and urban areas total coming to 80 schools, 40 rural and 40 urban. From each school, 12 students, 3 B.C. boys, 3 Non B.C. boys and 3 B.C. girls, 3 Non B.C. girls are selected are the basis of their academic achievement. Thus the sample selected randomly comes to 80 schools, 40 rural and 40 urban. 960 students randomly from each standard, totaling 2880 students from standards VIII, IX and X.

6.2 Conclusion

ANOVA Result

After obtaining necessary data they were analyzed by employing ANOVA technique and they were
followed up by Newman-Keul's Sequential Range Test for finding out significance for their actual differences in means.

A quick look into the summary of F-ratios would help understanding the net outputs of research. (The table has been given in Chapter V as table 5.3)

The following main effects would be summarized.
1. Institutional Climate
2. Area
3. Sex
4. Caste
5. Interactions

1 Institutional Climate

The following null hypotheses was tested by F ratio.

H0: There was no significant mean difference between the pupils of open and closed climate schools in respect of the whole creativity scores.

The hypothesis was not acceptable, as the F-ratio due to climate was 87.68 which was highly significant at .01 level. Hence it was concluded that the scores on creativity were significantly different for the pupils of open and closed climate schools.
The means for open and closed climate schools were 26.01 and 19.73 and the difference was found to be 6.28 in favour of open climate schools as shown in table 5.4.

Hence it was concluded that the pupils of open climate schools were better in creativity than those of closed climate schools.

(2) Area

The following null hypothesis was examined:

$H_0$: There was no significant mean difference between the pupils of rural and urban area in respect of the creativity scores.

The hypothesis was not acceptable as the F-ratio due to area was 39.87 which was highly significant at .01 level. Hence it was concluded that the scores on creativity were significantly different for the pupils of rural and urban areas.

The means for urban and rural areas were 24.99 and 20.75 thus yielding 4.24 as difference which was significant at .01 level in favour of urban area as shown in table 5.4.
Hence it was concluded that the pupils of urban area achieved better than those of the rural area.

(3) Sex

The following null hypothesis was examined.

Ho: There was no significant mean difference between the boys and girls in respect of the creativity scores.

The hypothesis was not acceptable as the F-ratio 13.27 was highly significant at .01 level. Therefore it was concluded that the scores on creativity were significantly different for boys and girls.

The means for boys and girls were 24.09 and 21.65 yielding a difference of 2.44 which was significant in favour of boys. It was concluded that boys achieved better than girls on creativity test as shown in table 5.4.

(4) Caste

The following null hypothesis was tested.

Ho: There was no significant mean difference between the pupils of B.C.
and N.B.C. in respect of creativity scores.

The null hypothesis was not acceptable as the F-ratio due to caste was 19.71 which was highly significant at .01 level.

It was concluded that the scores on creativity was significantly different for pupils of B.C. and N.B.C.

The means for B.C. and N.B.C. pupils were 21.38 and 24.36 thus yielding 2.98 in favour of N.B.C. pupils as shown in table 5.4.

Hence it was concluded further that the N.B.C. pupils achieved better scores than B.C. pupils.

(5) Interactive Effects

Out of many interactive effects only one was found significant at required level.

The following hypothesis was examined:

For BxD (Area x Caste) interaction.

Ho : There was no significant interaction between the independent variables of area and caste in the production of creativity scores.
The hypothesis was not acceptable as the F-ratio 4.41 which was significant at .05 level.

It was concluded that there was a significant interaction between the area and the caste of the pupils. They interacted significantly in producing creativity scores.

(i) Urban area and N.B.C. together interacted to produce the highest creativity scores while rural area and B.C. caste interacted for the lowest scores.

(ii) Urban area and B.C. interacted to produce creativity score which was below the highest score. This revealed that urban area was more potent factor than caste in the production of creativity score.

6.3 Result of components of variance analysis

The components of variance was calculated to assess the contribution of independent variables in creativity score.

The following table shows the components in percentage.
<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Weightage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Climate A</td>
<td>56.73</td>
<td>43.21</td>
</tr>
<tr>
<td>2.</td>
<td>Area B</td>
<td>35.06</td>
<td>26.70</td>
</tr>
<tr>
<td>3.</td>
<td>Sex C</td>
<td>14.56</td>
<td>11.09</td>
</tr>
<tr>
<td>4.</td>
<td>Caste D</td>
<td>20.43</td>
<td>15.56</td>
</tr>
<tr>
<td>5.</td>
<td>Interaction</td>
<td>4.52</td>
<td>3.44</td>
</tr>
</tbody>
</table>

Table 6.1 shows that climate played a major role in predicting the creativity score. It contributed 43.21% of the total variance.

Area of the pupils played a second role in predicting creativity score. It contributed 26.70% of the total variance.

Caste played a third role in predicting the creativity scores. It contributed 15.56% of the total variance.

Sex played a fourth role. It contributed only 11.09% of the total variance.

Area and caste interaction contributed only 3.44% of the total variance.

It was concluded that among the variances, the climate, the area and the caste were the main predictors of the creativity scores.
The above discussion was regarding the testing of null hypotheses related to the whole creativity score.

6.4 Indepth studies of the performance of the subtests of creativity

The investigator carried out indepth studies regarding the six subtests of creativity test.

The main and interactive hypotheses for subtests one to six of creativity were tested. The following were the conclusions:

(1) Institutional Climate and scores of the subtests

The following null hypothesis was examined.

Ho: There was no significant mean differences between the pupils of open and closed climate schools in respect of subtests 1 to 6 of creativity test.

Referring to table 6.2 the following conclusions were derived:

(i) All the F-ratios due to various subtests were significant and some were having high inflated F-ratio which showed that climate was a prominent factor of creativity.

(ii) The lowest F-ratio belonged to subtest 4 while the highest to subtest-2. The F-ratios of
subtest 1, 3, 5 and 6 were also highly significant.

The following relationship was derived. The difficulty encountered in test performances has been given in ascending order:

\[ 4 < 3 < 1 < 5 < 6 < 2 \]

The following observations were derived from the above relationship.

(i) The subtest-4 was the easiest.

(ii) The subtest-2 was the hardest.

(2) **Area and Scores of the subtests**

The following null hypothesis was examined.

\[ H_0 : \text{There was no significant mean differences between the pupils of rural and urban areas of Kaira district in respect of subtests 1 to 6 of creativity test.} \]

For ready reference, the following table is repeated in table 6.2. Formally, it is 5.9 in the fifth chapter.
### TABLE 6.2

Consolidated statement of only significant ratios for creativity subtest of Passi - from 1 to 6 subtest only

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable</th>
<th>Hypotheses</th>
<th>Significant F-ratios for six subtests of creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>1.</td>
<td>Climate A</td>
<td>Open Vs.Closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$A_1 - A_2 = 0$</td>
<td>67.26</td>
</tr>
<tr>
<td>2.</td>
<td>Area B</td>
<td>Urban Vs.Rural</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$B_1 - B_2 = 0$</td>
<td>9.49</td>
</tr>
<tr>
<td>3.</td>
<td>Sex C</td>
<td>Boys Vs.Girls</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$C_1 - C_2 = 0$</td>
<td>3.21</td>
</tr>
<tr>
<td>4.</td>
<td>Caste D</td>
<td>B.C. Vs.N.B.C.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$D_1 - D_2 = 0$</td>
<td>59.32</td>
</tr>
</tbody>
</table>

#### Interactive Hos

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>A X B</td>
<td></td>
<td>28.67</td>
<td></td>
<td></td>
<td>8.25</td>
<td></td>
<td>185.24</td>
</tr>
<tr>
<td>6.</td>
<td>A X C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>A X D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>B X C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>B X D</td>
<td></td>
<td>22.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>C X D</td>
<td></td>
<td>25.38</td>
<td>35.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>A X B X C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>A X B X D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>A X C X D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>B X C X D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Hos described</th>
<th>4+2</th>
<th>4+0</th>
<th>4+2</th>
<th>4+0</th>
<th>4+5</th>
<th>4+1</th>
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</thead>
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<tr>
<td>in each</td>
<td>=6</td>
<td>=4</td>
<td>=6</td>
<td>=4</td>
<td>=9</td>
<td>=5</td>
</tr>
</tbody>
</table>

Underlined ratios in main effects shows non significant ratios.
Referring to table 6.2, the following conclusions were arrived at:

It is observed that all F-ratios due to area were highly significant.

The F-ratio of subtest one was 9.47 which is the lowest while that of subtest six is 185.26 which was the highest. The following relationship was established regarding the difficulty level of the subtests as encountered by the pupils.

\[1 < 2 < 5 < 4 < 3 < 6\]

The above relationship offered the following observations:

(i) Subtest one was the easiest because of its low F-ratio.

(ii) Subtest six was the hardest because of its high value of F-ratio.

The 6th test i.e. the Block Test was not well understood by the rural pupils as compared to the urban areas.

Thus, area is a determining factor or creativity performance. Thus, it is a predictor of creativity.
Sex and scores of subtests

The following null hypothesis was examined.

Ho: There was no significant mean differences between the boys and girls of Kaira district in respect of subtest 1 to 6 of creativity test.

Referring to table 6.2, the following conclusions were derived:

(i) It is observed that the three F-ratios are below the critical level at .01 level. Hence they were not significant. These ratios are for subtest-4 (F=0.05), subtest-6 (F=3.07), subtest-1 (F=3.21).

The greatest difference in creativity scores was noticed in subtest 5 in which the F-ratio was 196.72 which was the highest.

In case of non-significant F-ratio, the null hypotheses for subtests 4, 6, and 1 were accepted and it was concluded that the achievements in subtests 4, 6 and 1 of the creativity test were found to be nearly homogenous. The differences were not found to be statistically significant. Hence it was concluded that boys and girls of Kaira district did equally well in these three subtest of creativity.
The other subtests 2, 3 and 5 had high significant F-ratio, which was the null hypotheses of these subtests were not accepted. It was concluded that the boys did well in all these 3 tests as compared to girls.

The lowest F-ratio due to sex was recorded by subtest-4 and it was 0.05 while the highest F-ratio was recorded by subtest-5 and it was 196.72. The following relationship was established.

\[ 4 < 6 < 1 < 2 < 3 < 5 \]

The following observations were derived from the above relationship.

(i) Subtest 4, 6 and 1 were the easiest for both the sex.
(ii) The fifth subtest was the hardest. The Persistency Test was not well understood by the girls.

Thus sex was the weaker predictor of creativity test.

(4) Caste and scores of subtests

The following null hypothesis was examined:

Ho : There was no significance mean differences between the pupils of B.C. and N.B.C. castes of Kaira district in respect of subtest 1 to 6 of creativity test.
Referring to table 6.2, the following conclusions were derived:

(i) The F-ratio for subtest-3 is 1.24 which was not significant. Hence the null hypothesis on subtest-3 was not tenable. Hence it was accepted and it was concluded that the B.C. and N.B.C. pupils did not show any significant deviation of the subtest-3 scores. They were held to be homogenous with regard to subtest-3 scores.

(ii) From table 6.2, the lowest significant F-ratio due to caste was 18.89 with regard to subtest-4 while the highest one was 189.46 for the subtest-2. This showed that there was the greatest difference of subtest-2 scores of the B.C. and N.B.C. pupils. The difference of scores was highly significant at .01 level.

(iii) Looking to the F-ratio of other subtests-1 and 5, they were 59.32 and 74.83 respectively, both being highly significant at .01 level. Hence the null hypotheses were not acceptable. Hence it was concluded that their subtest means were not homogenous and they had significant difference between them. Hence it could be said that caste as a variable was a predictor of creativity scores, with an exception of subtest-3.
Thus the following relationship was established.

$$3 < 4 < 1 < 5 < 6 < 2$$

The following observations were derived from the above relationship:

(i) F-ratio due to caste with reference to subtest-3 was not significant. Hence the means of B.C. and N.B.C. were held to be homogenous.

(ii) The F-ratio due to caste with regard to subtest-2 was the highest and therefore it was found to be most difficult to the pupils of N.B.C.

(iii) The lowest F-ratio from the significant F-ratio was 18.89 of subtest-4 which seemed easier to the pupils of B.C. and N.B.C.

Thus caste was a mild predictor of creativity.

(5) Interactive Effects

The prominent interactions in this section would be described.

(i) There were two interactions which were significant for subtest-1. They were BD and CD.

(ii) There was no significant interaction for subtest-2.
(iii) There were two significant interactions of subtest-3. They were AB and CD.

(iv) There was no significant interaction of subtest-4.

(v) There were five significant interactions of subtest-5 which were AB, AC, AD, BC and ABC. The significant ABC interaction confirmed the constancy of first order interactions of AB, AC and BC. This was a significant observation.

The subtest-5 is a Persistency test, wherein all the main effects played a significant role. The significant interactions in subtest-5 showed an interplay of performance among/between the factors.

6.5 Implications of the Study

Creativity is a complex process, outcome of which depends upon forces within the individual and outside. These forces can, however, be harnessed to increase vastly the range and depth of the creativity of the individual as well as organizations.

Two basic types of thinking or problem-solving activity have been identified. One may be called the convergent, the other divergent thinking or problem-solving.

The Indian education from primary to post-graduate level stresses convergent thinking. Divergent thinking
does not find any place in Indian education system. It has been stated earlier in first chapter about the school administers "Entrance" examination for the admission purpose. The school wants only top I.Q. pupils. They do not cater for creative boys and girls. For creativity to flower, different schools with creative teachers are needed. A democratic attitude in the institution is wanted for all its individuals. Divergent thinking comes into play whenever there is trial and error thinking. Further in divergent thinking operations we think in different directions, sometimes searching, sometimes seeking variety. The teacher requires the same method of solving the example which he has taught his pupils. In such circumstances, it is a foolhardy to talk of creativity.

The present study has isolated four factors - climate, caste, area and sex for the study of creativity in secondary schools of Kaira district. All secondary schools of Gujarat, with an isolatory exception, are dogmatic and custodial types of school. However, the study revealed that there were schools having open climate as well as closed climate. This does not mean that there are actual perceptible differences in the schools. The teachers and the pupils perceive whether the school is open climate school or vice versa.

It has been found that pupils studying and perceiving their schools as 'open' performed well in creativity test. This means the environment in open climate schools is
congenial for creativity or divergent thinking. It was also found off-handedly that those schools having top scores at Secondary School Certificate Examination or Higher Secondary School Certificate Examination had hardly creative pupils. They were regurgitators of the stuff pumped into their minds by their teachers.

Hence in order to have creative society, not only open climate schools are needed, but they should teach techniques for increasing or inducing creativity among their pupils and teachers.

The measurement of mental characteristics revealed up to this date that the B.C. pupils performed less on I.Q., reading ability and achievement tests, and here also in creativity they were not equal with their N.B.C. pupils. NBC pupils achieved better score than B.C. pupils. So it is hard that the school have to treat with individual differences for creativity training. Every opportunity must be sought and directed towards creativity training of the pupils. It is better to handle the experimental research in these areas.

As usual, the boys were found to be more creative than girls. The girls should be trained to dream, to imagine, to do things before they actually start household activities. They have ample mental ability to do creative activities, but they do not find any scope for flowering of creativity. A special syllabus for creativity should be formulated and it should be taught, in initial stages and thereafter a regular subject teaching of creativity be taken up. This will give a status to creativity training. The homes would also emulate the idea of the schools. In India
there were only two Nobel prize winners - C.V. Raman and R. Tagore. The Jews are known to be over achievers.

There is no evidence that Jews are genetically different from other whites. Yet per capita they have won 55 times the Nobel prizes won by French, 7 times the Germans and 16 times the Italians. The role of motivation is not to be underrated by the home and the school. It is also known that the expectations of persons we respect powerfully shape our behaviour. The research of Wallach and Kogan and others that scores on tests of creativity go up when subjects are exhorted to be creative by the experimenter.

A special teaching model should be evolved in lines with Israel's National System of education for creative pursuits and special schools for creativity teaching be organized on national scale. The present research indicated that our pupils were no less inclined to creative imagination but they lacked proper guidance and encouragement.

6.6 Emerging Issues of Research

The above recommendations cannot be generalized beyond the sample because the ANOVA model was of a fixed type. This research was an exploratory effort. Hence many researches should be carried out in this direction with manifold variables. Even the replicated studies are also suggested for different districts to prove the veracity of
the outcomes. In addition, the following problems are suggested for further research though the list is by no means exhaustive:

(1) An investigation into the relationship between the top achievers at Secondary School Certificate Examination level and their creativity in relation to environment and SES.

(2) To study the emergence, development and ultimate potential stage of creativity in pupils of Gujarat in the context of their age, sex, SES and parent's educational levels.

(3) An investigation into the efficacy of training modules of creativity for the pupils of primary and secondary schools of Gujarat.

(4) To construct and try out creativity problems and puzzles relating to the present academic syllabi of primary and secondary stages of the state of Gujarat.

(5) A case study of the creative pupils whose social environment are fairly different.

(6) An investigation into creativity of the pupils of primary schools of Kheda district in relation to home environment.