CHAPTER IV
Analysis and Interpretation

The present chapter deals with the analysis and interpretation of the main effects and interactional effects of factors such as Intelligence, Cognitive Style and Writing Skills by the technique of analysis of variance. Analysis of variance is one of the most powerful tools of statistical analysis. It enables us to analyse the total variation of one data into various sources or causes of variation. It gives the overall picture about the nature of variance.

According to Ferguson (1971), “The analysis of variance is a technique for dividing the variation observed in the data into different parts, each part assignable to known source, cause or factor. By this technique the relative magnitude of variation resulting from different sources may be assessed; and it may also be ascertained whether a particular part of variation is greater than expectation under null hypothesis.”

The data obtained in the present study was analysed to determine the main effects of instructional strategies, Intelligence and cognitive-style and their interactional effects. To analyse and interpret the scores thus obtained, a three-way analysis of variance (3x2x2) was employed which served to examine the main and interactional effects of the three independent variables – namely, Instructional Methods (Grammar based and Communication Based Methods); Intelligence (Above average and Below average) and cognitive style (field Independent, Field-Dependent) in developing higher level writing skills in English.

<table>
<thead>
<tr>
<th>Value label</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Method 1 Grammar</td>
<td>50</td>
</tr>
<tr>
<td>2 Communication</td>
<td>54</td>
</tr>
<tr>
<td>3 Control</td>
<td>50</td>
</tr>
<tr>
<td>Intelligence 1 Above Average</td>
<td>103</td>
</tr>
<tr>
<td>2 Below Average</td>
<td>51</td>
</tr>
<tr>
<td>Cognitive 1 Field Dependent</td>
<td>89</td>
</tr>
<tr>
<td>2 Field Independent</td>
<td>65</td>
</tr>
</tbody>
</table>
Table 4.2
Summary of ANOVA (3x2x2) Involving instructional methods, cognitive style and Intelligence on writing skill test score.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Method</td>
<td>3244.905</td>
<td>2</td>
<td>1622.452</td>
<td>128.002</td>
<td>0.0001</td>
</tr>
<tr>
<td>Intelligence</td>
<td>343.738</td>
<td>1</td>
<td>343.738</td>
<td>27.119</td>
<td>0.0001</td>
</tr>
<tr>
<td>Cognitive Style</td>
<td>9.667</td>
<td>1</td>
<td>9.667</td>
<td>0.763</td>
<td>0.384</td>
</tr>
<tr>
<td>Instructional Method X Intelligence</td>
<td>106.599</td>
<td>2</td>
<td>53.299</td>
<td>4.205</td>
<td>0.017</td>
</tr>
<tr>
<td>Instructional Method X Cognitive Style</td>
<td>29.990</td>
<td>2</td>
<td>14.995</td>
<td>1.183</td>
<td>0.309</td>
</tr>
<tr>
<td>Intelligence X Cognitive Style</td>
<td>4.030</td>
<td>1</td>
<td>4.030</td>
<td>0.318</td>
<td>0.574</td>
</tr>
<tr>
<td>Instructional Method X Intelligence X Cognitive Style</td>
<td>0.811</td>
<td>2</td>
<td>0.406</td>
<td>0.032</td>
<td>0.969</td>
</tr>
<tr>
<td>Error</td>
<td>1799.877</td>
<td>142</td>
<td>12.675</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1 Effect of Instructional Methods in developing Higher level writing skills in English

F-ratio due to the effect of Instructional Methods in writing skill test score among high school students have been found to be statistically significant (p<.0001); for writing test score with $F = 128.002$, df=(2,142) (vide table 4.2). These results indicate that the two instructional methods, namely Grammar Based Method and Communication Based Method generated significant differences in terms of developing writing skills. In other words, the Instructional Methods employed affected significantly the students’ writing skills.

On obtaining significant F-values, significance of differences between the means of two treatment groups were calculated.
Table 4.3
Means, standard deviations on writing skill
Test scores obtained by Grammar Based Method, Communication Based Method and traditional method.

<table>
<thead>
<tr>
<th>Method</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar Based Method</td>
<td>4.24</td>
<td>2.677</td>
</tr>
<tr>
<td>Communication Based Method</td>
<td>12.98</td>
<td>5.754</td>
</tr>
<tr>
<td>Control</td>
<td>1.06</td>
<td>2.316</td>
</tr>
</tbody>
</table>

As shown in table 4.3 the mean gain score of the sample is 4.24, 12.98, 1.06 taught through Grammar Based Method, Communication Based Method and traditional method (control) respectively.

Table 4.4
Mean difference of grammar Vs Control and Communication Vs Control Method

<table>
<thead>
<tr>
<th>Instructions</th>
<th>Mean difference</th>
<th>Std. Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar Vs control</td>
<td>3.18*</td>
<td>0.712</td>
<td>0.0001</td>
</tr>
<tr>
<td>Communication Vs control</td>
<td>11.92*</td>
<td>0.699</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

* The mean difference is significant (p<.0001).

The significant difference is found between the means of the scores of students taught through Grammar and Traditional method. The Mean difference came out to be 3.18 which shows that Grammar Based Method in developing writing skill is better than Traditional method of teaching writing skills. Similarly, significant difference is found between communication and Traditional method in developing writing skills among high school students. The Mean difference shows that Communication Based Method is better than traditional method in developing writing skills in English.
Table 4.5
Mean difference of communication Vs Grammar method

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Vs Grammar</td>
<td>8.74*</td>
<td>0.699</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

There is significant difference in scores of the students taught through Communication and Grammar Based Methods and Mean difference is 8.74 which shows that Communication Based Method in developing higher level writing skills among high school students is better than Grammar Based Method.

The following inferences may be drawn from the stated results:

a) The independent variable of Instructional Methods has a significant effect in developing higher level writing skills in English as measured by the writing skill test.

b) Communication Based Method is more effective as compared to Grammar Based Method, as far as higher-level writing skills in English is concerned.

With in the limits imposed by sampling of 9th standard students of two schools (G.M.S.S. School, Sector 37 and Sector 22), the statistically significant main effect of instructional methodology indicates that Communication Based Method may be added profitably to the list of tools that may be used for improving students’ higher-level writing skills in English.

These results are in coherence with the study of Zhag (2007) who found that “Online discussion forums” did not improve students’ performance in reading, grammar, or vocabulary, but could influence students’ writing skills and provoke critical thinking in Face-to-Face discussions. This study also found that instructor interventions has an impact on students’ attitude towards promoting critical thinking. Gamaroff (2001), feels that basic interpersonal conversational skills are
a foundation for the Cognitive-academic language skills required for academic success. Most people think that reading proficiency and language proficiency are the same thing, but this is not always the case, as oral language and written language call on different skills.

4.2 Effect of cognitive style in developing writing skills in English

Results indicated non-significant main effect of cognitive style on writing skill test score with $F=0.763$, $df=(1,142)$. The non-significant F-ratios indicates that cognitive style of the learner does not affect in developing writing skills among high school students. However, Mean comparisons of the two groups as entered in Table 4.6 revealed that there is difference between Field dependent subjects and field Independent subjects (Field Dependent, Mean = 6.34 and Field Independent, Mean = 6.18).

<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Dependent</td>
<td>6.34</td>
<td>6.230</td>
<td>89</td>
</tr>
<tr>
<td>Field Independent</td>
<td>6.18</td>
<td>6.787</td>
<td>65</td>
</tr>
</tbody>
</table>

Evidently, the Mean differences between the two groups were not large enough to be statistically significant. It may be inferred that neither field-independent nor field-dependents showed any marked advantage over their counterparts, as regards in developing writing skills in English. Therefore, hypothesis 2- “There will be significant difference in writing skills in English in groups made on the basis of Cognitive Style” – does not stand tenable. Study done by Bal(1992) indicated that instructional strategies of guided discovery and expository teaching interact significantly with field-independence-dependence Cognitive Style of learner as far as acquisition of higher level writing skills in English.
4.3 Effect of Intelligence in developing writing skills in English

Results indicated significant main effect of Intelligence on writing skill test score with, \( F=.763, df=(1,142) \). The significant F-ratios indicated that Intelligence of the subject does have a significant effect in developing writing skills among high school students.

Although F furnishes a comprehensive and overall test of significance of the differences between Means of two groups (Above Average and Below Average) it failed to tell which Mean differ significantly. To determine which group is better, Mean and standard Deviation were found out. The Means and Standard Deviations are entered in table 4.7

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>7.15</td>
<td>6.862</td>
</tr>
<tr>
<td>Below average</td>
<td>4.51</td>
<td>5.147</td>
</tr>
</tbody>
</table>

Inspection of the mean scores (vide table 4.7) shows that Above Average students scored higher mean score, Mean=7.15 than Below Average Students with Mean equal to 4.51. So as indicated by the direction of the Means (ref. table 4.7) Above average group acquired more and performed better on the test of writing skills in English than below average group.

The following inferences may be drawn from the stated results:

i) The effect of Intelligence is consistently significant in developing writing skills in English among high school students as measured by test scores.

ii) Above average group performed better when compared to that of below average group in developing writing skills.
As the results showed that higher the Intelligence of the subject, better is his performance on test of writing skills, hypothesis 3- “There will be significant differences in writing skills in English in groups made on the basis of intelligence”- stands accepted.

Since Intelligence itself is viewed as an inventive capacity and as a system of logical structures (Piaget 1971), these results suggested that higher-level writing, being a complex process involving many skills of thinking, organizing and structuring sentences and paragraphs is facilitated by high Intelligence level in a learner. Since the test score of Above Average group was higher than that of the Below average group, it may be said that the former group had a greater frequency of correct responses in selection-type items and produced compositions of better quality with fewer errors in response to supply type items also.

Higher level writing skills involve not only the expression of ideas but also producing, arranging and reorganizing ideas, developing paragraph organization, indicating the connection and interrelationship of ideas, choosing and using the most effective forms of expression, checking and improving it seems that higher intelligence, that is related to better problem solving ability, was in the case of the present study instrumental in producing better mean scores on the measure of acquisition for the Above Average subjects as compared to Below Average subjects. A noteworthy finding of this research is that the variable of Intelligence is a good predicator in developing higher-level writing skills in English with in the 9th standard students. A study done by Muncie (2002), indicated, limited vocabulary is a major obstacle to students’ learning to write in a Foreign language. He concluded that vocabulary learning is very important to the development of ESL writing and that ESL writing instructors need to recognize and encourage vocabulary learning.

4.4 Interactional Effect of Instructional Methods and Intelligence in Developing Writing Skills in English

Significant main effects were found for the variables of Instructional Methods and Intelligence. The analysis of variance indicated significant
interaction of Instructional Methods and Intelligence with $F=4.205$, $df=(2,142)$ (vide table 4.2). This indicated that interaction of Intelligence and Instructional Methods does contribute significant variance towards developing higher-level writing skills in English. Therefore, hypothesis 4 – “There will be significant difference due to interaction of Instructional Methods X Intelligence in developing writing skills in English” – is accepted.

**Table 4.8**

*Means and standard deviations of test scores for Instructional Methods (Grammar Based Method and Communication Based Method) by Intelligence (Above Average, Below Average)*

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>Grammar Based Method (Treatment 1)</th>
<th>Communication Based Method (Treatment 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Above average</td>
<td>Below average</td>
</tr>
<tr>
<td>Above average</td>
<td>5.18</td>
<td>2.41</td>
</tr>
<tr>
<td>Below average</td>
<td>2.518</td>
<td>1.970</td>
</tr>
</tbody>
</table>

Table 4.8 shows that mean for treatment condition 2 (Communication Based Method) x Intelligence interaction, for Above Average students reveals a trend similar to that observed for Above Average students in treatment condition 1 (Grammar Based Method). The performance of Above Average students was best in treatment condition 2 (Communication Based Method) as compared to the Above Average students in treatment. Condition 1 (Grammar Based Method). Moreover, the performance of Above Average students in both treatment conditions (1 and 2) is better than Below Average Students.
Table 4.9
Mean and Standard deviation of Grammar Above Average and communication Above Average

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. error mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammar Above average</td>
<td>33</td>
<td>5.18</td>
<td>2.518</td>
<td>0.438</td>
</tr>
<tr>
<td>Communication Above average</td>
<td>34</td>
<td>15.09</td>
<td>5.418</td>
<td>0.929</td>
</tr>
</tbody>
</table>

Therefore, teaching through Communication Based Method resulted in higher mean performance on test score as compared to Grammar Based Method of developing writing skill among high school students.

The following inferences may be drawn from the trends visible in mean comparisons reported in table 4.9:

i) Within each treatment condition, i.e. Grammar Based Method and Communication Based Method, Above Average students’ acquisition of higher-level writing skills in English is better than that of Below Average Students.

ii) On inter-treatment comparisons, Above Average students in Communication Based Method outperformed their counterparts in Grammar Based Method.

The absence of empirical confirmation for theoretically predicted interactional effects of Instructional Method X Intelligence is rather intriguing. Results indicated that Above Average Students under three treatment conditions scored higher Means and performed better than other group. It suggests that Above Average Students are capable of producing higher means on measure of score, irrespective of the teaching method employed to teach higher level writing skills in English. This suggests that Above Average students themselves are such a powerful predictor of acquisition that it barely interacts with or is influenced by methodology of teaching.
Some of researches carried out in this field have highlighted the effect of communication based method in developing writing skills.

Gabrielatos (2002) denoted that language accuracy, although important, cannot alone lead to efficient writing which needs writing skills to be developed well. According to him in most cases, learners have problems both in language and writing skills.

Holmes (2004) mentions, "Teachers have trapped the students within the sentence and respond to the piece of writing as item checkers not as real readers. As he suggests, we need to develop a more top-down and student-centered approach to the teaching of writing.

Daftar (2006) in his study found that students with Field independent Cognitive style were found to score significantly higher than the field dependent students. However, the study did not suggest any interactional effect of teaching model and Cognitive style on student achievement.

4.5 Interactional Effect of Instructional Methods and Cognitive Style in Developing Higher Level Writing Skills in English

A statistically non-significant interaction of Instructional Method (Grammar Based Method, Communication Based Method) and cognitive style of the learner in developing writing skills was obtained by three way analysis of variance, with F=1.183, df=(2,142). (Table 4.2). The non-significant F-values shows that interaction of Instructional Methods and Cognitive Style does not contribute significant variance in developing higher level writing skills in English. Thus hypothesis 5 – “There will be significant difference due to interaction of Instructional Methods X cognitive style in developing writing skills” – is not accepted.

4.6 Interactional Effect of Intelligence by Cognitive Style in Developing Higher Level Writing Skills in English

Results indicate non-significant interactional effects of Intelligence and Cognitive Style, with F=0.318, df=(1,142). (Table 4.2). The non-significant F-value
shows that interaction of Intelligence and Cognitive style does not contribute significant variance in developing higher level writing skills in English. Thus hypothesis 6 – “There will be significant difference of Intelligence X cognitive style in developing writing skills in English” – is not accepted.

A study on English language by Bohlman and Pretorious (2002) reported that poor English Language Students: regularly miss vital clues in a text; exhibit low vocabulary levels, especially of low frequency words, which are the building blocks of arguments.

4.7 Second order Interactional Effects of Instructional Methods X Cognitive Style and Intelligence in Developing Higher Level Writing Skills in English

F-ratio for interactional effect of instructional methods, Intelligence levels and Cognitive Style are non-significant with F=0.032, df=(2,142). (ref table 4.2). The F ratio being less than one could not reach any acceptable level of significance and thus show that Instructional Methods of Grammar Based and Communication Based Methods, Above Average and Below Average of Intelligence and field independent – dependent cognitive style do not interact significantly, as far as developing higher level writing skills in English is concerned. Hence Hypothesis 7 – “There will be significant difference due to interaction of Instructional Methods X Intelligence X cognitive style in developing writing skills in English” is not accepted.

In a press release (2006), it was given that Bilingualism is and will remain a corner stone of our education system. We need to ensure that our students have a good grounding in both in their mother tongues and English. Chakarbarti (2007) also affirms, the four components of English- reading, writing, speaking and listing are rarely concentrated upon in equal measure and this in turn leads to an inconsistency in the learning process.