Chapter 4
Analysis of the Data

4.0 Introduction

The previous chapter dealt with the research procedure, the description of the tools, the analysis of student responses to tasks in the preliminary study, i.e. Phase I, II, and III, which helped in arriving at the specific thinking skills and dispositions to be focused on for teaching thinking. In this chapter, we will discuss the procedure adopted in evaluating and analyzing the constructed responses to various tasks in the Pre-intervention, the Intervention Process, Assignment, and the Post-intervention followed by a comprehensive analysis of the data. The analysis is done in Layers (See Fig. 4.1 (a) and (b)). A Layer refers to the group of related tasks in the Pre-intervention, Assignment and Post-Intervention. At the end of each Layer, a summary of findings from the data in the respective Layer will be provided.

4.1 Data utilized for analysis

Out of the 35 students who participated in the intervention process from three schools A (11 students), B (12 students), C (12 students), 5 students’ data was not considered because of their low attendance due to health and personal problems. Consequently, the data of 30 students was taken for analysis.

As explained in Chapter 3, Phase II and Phase III (Pre-intervention assessment) led the study to the Intervention Process, Assignment, and Post-Intervention. Phases I to III are part of the Preliminary study and the Main study consisted of the Intervention Process, Assignment, and Post-Intervention. The findings from the phases in the preliminary study helped in ascertaining

i) the thinking skills and dispositions that should be taken up for the intervention; and

ii) the linguistic abilities of the students.

Based on the thinking and language abilities thus ascertained through the Pre-intervention assessment, 14 lessons (see table 3.5 in chapter 3) were designed and
taught focusing on various skills and dispositions. The intervention process comprises 32 tasks and 63 items. Since analyzing the data of responses to 32 tasks of 30 students was unmanageable, it was decided that an Assignment could be conducted. The tasks in the Assignment were designed in such a way that they covered the skills and dispositions taught in the Intervention, and thus formed the representative samples of student learning processes in the intervention.

Thus, after the intervention process, an Assignment containing 10 tasks (See table 3.6 for the skills covered in the Intervention and Assignment) was given to the students to understand students’ learning processes in the intervention. The students were allowed to refer to the lessons in the intervention to write responses to the tasks.

After the responses were collected, the students were given time for one week to revise the lessons taught to them for the purpose of the Post-intervention assessment. Then, the students were given tasks for the Post-Intervention assessment and their responses were collected and sorted for analysis.

On the whole, the students’ responses to the following tasks were utilized to document their abilities related to thinking and language.

<table>
<thead>
<tr>
<th>Type of Assessment</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention Assessment</td>
<td>• Task 1(A), 2(A), 3(A), 4(A)</td>
</tr>
<tr>
<td></td>
<td>• Task 1(B), 2(B), 3(B), 4(B)</td>
</tr>
<tr>
<td></td>
<td>• Tasks 1 to 10</td>
</tr>
<tr>
<td></td>
<td>• Task 1(A), 2(A), 3(A), 4(A)</td>
</tr>
<tr>
<td></td>
<td>• Task 1(B), 2(B), 3(B), 4(B)</td>
</tr>
</tbody>
</table>

**Data utilized for Analysis**

4.2 Procedure for data analysis

In the following sections, the procedure used for analyzing the data will be described. Besides, the procedural decisions made at various phases of the data analysis will also be discussed.

With respect to the type of analysis, it was decided that a comprehensive qualitative analysis of the data needs to be carried out. The justification comes from
the fact that there are no precise and reliable quantitative tools to capture thinking skills and dispositions. Further, the study explores the feasibility of teaching thinking as a distinct component, where a comprehensive coverage of the skills and dispositions was necessary. The skills and dispositions were sequenced in such a way that cumulative learning is possible. In other words, the performance of the students in Lesson 1 informed the preparation of Lesson 2, and in turn Lesson 3, and so on. Therefore, given the exploratory nature of the study in which a wide variety of skills and dispositions are involved, it was contemplated that documenting qualitative changes could be more informative.

Therefore, a separate set of rubrics was developed for each type of task in the Pre-intervention assessment, the Assignment, and the Post-intervention assessment. This was necessitated by the fact that the tasks assess various kinds of thinking skills such as critical, creative, problem solving, and decision making, and dispositions too. In each rubric, specific criteria and descriptors were developed. Based on the descriptors under the criteria, the students' responses were analyzed. Their responses were allotted the criterion that matches their ability. In this way, the number of participants meeting a certain criterion in the Pre-intervention, Assignment, and Post-intervention were totalled and juxtaposed for easy comparison. However, the analysis of the data from the Assignment was presented in separate tables wherever the criteria in the rubrics for the Assignment tasks were not the same as the criteria in the rubrics for the Pre-Intervention and Post-Intervention tasks.

As far as metacognitive thinking is considered, Tasks 1(B), 2(B), 3(B), and 4(B) in the Pre-intervention and Post-intervention assessments are questions that assess metacognitive thinking involved in the performances of Task 1(A), 2(A), 3(A), and 4(A) respectively.

In order to analyze students' metacognitive development, all the metacognitive questions were considered as a single task, i.e., tasks 1(B), 2(B), 3(B), and 4(B) are considered to be one task.

Guided by the research questions, the data was analyzed under two dimensions, viz., thinking and language. Figure 4.1 (a) gives an overview of the
procedure used for analysis of the data related to thinking whereas fig. 4.1 (b) describes the analysis related to language abilities.

**Fig. 4.1 (a) Procedure for data analysis (Thinking)**

Therefore, the analysis was done in five layers. Layers 1 to 5 are related to thinking skills and dispositions and Layers 6 to 10 present the analysis of language abilities. Therefore, language errors will be analyzed in the layers 6 to 10 only. Further, an important point needs to be noted is that all the excerpts of the students' responses provided in this chapter are the grammatically uncorrected versions.

The Layers refer to the developmental changes from the Pre-Intervention to the Post-Intervention through the Assignment. In others words, the tasks in the Assignment are analyzed to account for the improvement or otherwise of the thinking and language abilities of the students. For instance, Layer 1 includes analysis of the data from Task 1(A) in Pre- and Post-Intervention assessments. To trace the developmental changes between the two assessments, the data from tasks 3, 4, 8 in the Assignment was utilized to account for the learning processes of students.
Similarly, for Layers 2, 3, 4, and 5, tasks 5, 4 & 6, 9, and 10 in Assignment were utilized respectively to trace improvement from the Pre-Intervention stage to the Post-Intervention stage. The decision to use the data from the Assignment was made to observe the learning processes involved rather than just focus on the product of their learning.

Likewise, to trace the language learning processes, the responses to the Assignment tasks were taken, as shown in 4.1(b).

It should be noted that the assignment tasks taken for tracing the learning processes in the tasks in Layers 1 to 5 are different from the assignment tasks in Layers 6 to 10. For instance, to trace the developmental changes from the Pre-intervention assessment to the Post-intervention assessment with regard to task 1(A) in Layer 1, Assignment tasks 3, 4, and 8 are analyzed. This was done because the thinking skills involved in Task 1(A) in the Pre-Intervention and Post-Intervention are same as those in tasks 3, 4, and 8 in the Assignment. But, in Layer 6, which involves Task 1(A) in Pre-intervention and Post-intervention, students’ responses to only the Assignment task 4 was analyzed to understand their learning processes with reference to language abilities. This was done because task 3 in the Assignment was designed to capture their ability to categorize the information whereas task 8 in the Assignment
was created to understand whether they would be able to develop their own criteria. In task 3, students had to arrange words into given categories and in task 8, they had to write four criteria for buying a house. Thus, it is evident that tasks 3 and 8 do not have considerable language use to assess learning processes. But, in the case of task 4 the students have to understand the passage, pick up the key phrases that express the gist, and create category labels on their own. Hence, only task 4 was analyzed in Layer 6 to trace the language development processes.

Similarly, in Layer 3, which comprises task 3(A) in the Pre-intervention and the Post-intervention, students’ responses to tasks 4 and 6 in the Assignment were analyzed since these tasks have common thinking skills. However, in the case of Layer 8, only tasks 2 and 6 in the Assignment were analyzed because in task 2 of the Assignment, the students had the opportunity to use the connectives and and but whereas in task 4 in the Assignment, there was no possibility to trace these connectives.

Finally, with regard to the presentation of the analysis, each Layer begins with a short description of the tasks involved in that Layer followed by (a) table(s) that show(s) the number of participants whose responses met various criteria in the Pre-Intervention, Assignment, and Post-Intervention. However, the data analysis of the Assignment will be presented in separate tables wherever the criteria in the rubrics are not the same as those in the tasks in Pre-Intervention and Post-Intervention.

Then, the analysis of that layer will be categorized based on the criteria in the rubric. Under each criterion, the developmental changes in terms of thinking and language abilities from the Pre-Intervention to the Post-Intervention will be presented. Justification for the changes will be traced to the respective tasks in the Assignment. At the end of each layer, there will be a summary of the analysis of the data related to the respective layer.

It should be noted that the following labels will be used to refer to the tools and tasks in the study.
4.3 Analysis of Data – Thinking skills and dispositions

4.3.1 Layer 1 - Thinking

Layer 1 contains the analysis of the data from Task I(A) in PRI and Task I(A) in POI. To account for the development in the thinking abilities, tasks 3, 4, and 8 of ASN were analyzed. Task I(A) in PRI and POI is a Graphic Organizer Task, which requires students to perform three skills—

- Ability to organize the information
- Ability to categorize the information
- Ability to use an appropriate graphic organizer

Lessons 1 to 6 in the intervention process were designed to teach the above skills, and tasks 3, 4, and 8 of ASN were given to the students to analyze their learning processes with regard to those skills.

Task 3 requires students to perform the skill of categorizing whereas Task 4 assesses students’ ability to identify similarities and differences, organize the information using a graphic organizer, and present the information clearly. Task 8 assesses students’ ability to develop criteria. The justification for choosing tasks 3, 4, and 8 of ASN comes from the fact that they capture the thinking abilities which can also be found in Task I(A) of PRI and POI.
In what follows, the analysis of thinking abilities in layer 1 is presented. It includes the number of participants or students who met various criteria for task 1(A) in PRI and POI, and tasks 3, 4, and 8 of ASN.

<table>
<thead>
<tr>
<th>Criteria for Task 1(A) - Thinking</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention (PRI)</td>
</tr>
<tr>
<td>Organization &amp; Completeness</td>
<td></td>
</tr>
<tr>
<td>- Evidence of good organization of information in clear and explicit categories; Easy to understand; Presents Complete information (OC3)</td>
<td>1</td>
</tr>
<tr>
<td>- Evidence of some organization information in categories clear and implicit irrelevantly; a little difficult to understand; Presents incomplete information (OC2)</td>
<td>22</td>
</tr>
<tr>
<td>- Absence or little organization of information and absence of categories; very difficult to understand; Presents very minimal information (OC1)</td>
<td>7</td>
</tr>
<tr>
<td>Presentation</td>
<td></td>
</tr>
<tr>
<td>- Use of relevant diagram: Clear and neat (P 3)</td>
<td>3</td>
</tr>
<tr>
<td>- Use of a less appropriate diagram: Slightly inappropriate placement of information (P 2)</td>
<td>10</td>
</tr>
<tr>
<td>- Absence of a diagram: Unclear and inappropriate placement of information (P 1)</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 4.2 Layer 1 (Thinking)–Task 1(A) Graphic organizer

<table>
<thead>
<tr>
<th>Criteria for Task 3 (ASN)</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Categorizing</td>
<td></td>
</tr>
<tr>
<td>- Evidence of classifying the words under the given categories completely and accurately; understanding overlapping nature of the given categories—at least one word: (C3)</td>
<td>2</td>
</tr>
<tr>
<td>- Evidence of classifying the words under the given categories partly and slightly inaccurately but no evidence of understanding overlapping nature of the given categories (C2)</td>
<td>23</td>
</tr>
<tr>
<td>- No or little evidence of classifying the words under the given categories highly inaccurately: (C1)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4.2.1 Layer 1 (Thinking)– Assignment Task 3
Criteria for Task 4 (ASN) | Number of Participants
---|---
**Similarities and Differences**
- Evidence of identification of similarities and differences (SD3) | 16
- Unclear evidence of identification of similarities and differences (SD2) | 8
- No evidence of identification of similarities and differences (SD1) | 6

**Organization**
- Evidence of good organization of information in clear and explicit categories: Easy to understand; Presents all the information (O3) | 16
- Evidence of some organization of information in categories clear and implicit irrelevantly; Slightly difficult to understand; Presents some information (O2) | 8
- Absence of or little organization of information and absence of categories; Difficult to understand; Presents less information (O1) | 6

**Presentation**
- Use of relevant diagram; Clear and neat (P3) | 19
- Use of a less appropriate diagram; Slightly inappropriate placement of information (P2) | 5
- Absence of use of a diagram; Unclear and inappropriate placement of information (P1) | 6

Table 4.2.2 Layer 1 (Thinking) – Assignment Task 4

Criteria for Task 8 (ASN) | Number of Participants
---|---
**Develop Criteria**
- Explicit evidence of relevant criteria (DC3) | 19
- Unclear evidence of the use of slightly irrelevant criteria (DC2) | 8
- Little or no evidence of any relevant criteria (DC1) | 3

Table 4.2.3 Layer 1 (Thinking) – Assignment Task 8

In the above tables,
- Table 4.2 presents the analysis of students' responses to PRI and POI based on two criteria: Organization & Completeness, and Presentation. The number of participants whose responses met respective criteria in PRI and POI are also given.
- Table 4.2.1., 4.2.2., and 4.2.3 set out the analysis of the students' responses to Task 3, 4, and 8 respectively in ASN. The number of participants under respective criteria reveals their learning processes in the intervention.
A glance at Table 4.2 reveals that out of 30 students, 22 students in PRI demonstrated some organization of information in unclear categories whereas in POI, 26 students were able to organize the information under clear categories. Similarly, the quality of presentation of the graphic organizer has also improved—23 out of 30 students drew a neat diagram in POI as against 10 students in P2 and 17 students in P1 categories. Clearly, significant gain can be witnessed with regard to both organization and presentation. In what follows, a deeper analysis is presented.

In the following, the analysis of the data collected from Task 1(A) in PRI, and POI will be presented under two headings that formed the basis for the analysis: *Organization and Categorization,* and *Presentation.* Though it appears that presenting the diagram is not related to thinking skills, estimation of the required number of categories to be put in the diagram within the space available demands visual thinking. Therefore, presentation is also taken as a criterion in the analysis of task 1(A) in PRI and POI.

Under each criterion, the changes in students’ thinking abilities from PRI to POI are described. Such changes will also be accounted for through the analysis of tasks 3, 4, and 8 of ASN.

1) Organization and Categorization

**Pre-Intervention**

In the responses to task 1(A) in PRI, a predominant pattern was that there was some kind of organization of the information in the task. Use of point-form was adopted by most of the students. Instances of such use can be found in S8 and S9.

**Appendix S7/1** (See Table 4.1 for labels)
(i) the Arctic is a large of the earth around.....
(ii) This region includes the Arctic ocean, Greenland, Iceland
(iii) the northern parts of three continents: North America, Europe, and Asia

**Appendix S8/1**
* The Arctic region includes arctic ocean, green land, ...............  
* Northern parts of three continents.......

221
* Many of the inhabitants are Eskimos, people native to the region. .......

In task 1(A) of PR¹, the students were given a diagram in which they were to fill the diagram with the gist of the information given. They were also allowed to use any diagram of their choice other than the given one. But, most of the students did not use the given diagram and when asked why they were not able to use the diagram, some of them mentioned that they could not insert the gist in a diagram. The reason for such difficulty could be using a few and appropriate key words and phrases that capture the essence of the passage. This can be inferred when we observe the complete sentences written instead of words and phrases:

Appendix S6/1
(1) The arctic is a large region of the earth around the North Pole.
(2) This region includes the arctic ocean, Greenland, Iceland, thousands of smaller islands.

Appendix S27/1
1) Arctic is a North America, Europe, and Asia.
2) Many of the inhabitants are Eskimos, people native to the region.
1) ARCTIC is wildlife in the Arctic includes wolves, Polar bears, foxes, many birds, caribou, lemmings, voles, walrus, and arctic hares.

A few students wrote the information in paragraphs as in the case of S12 and S15:

Appendix S12/1
The Arctic is a large region of the earth around the North Pole. This region includes the Arctic ocean, Greenland, Iceland, thousands of smaller islands around the continent of Arctic region. The continents around the Arctic regions are North America, Europe and Asia. Many of the inhabitants are Eskimos people native region. The wildlife of Arctic region are wolves, polar bears, foxes......

Appendix S15/1
(2) Wildlife in the Arctic includes wolves, polar, bears, Foxes many birds caribou, lemmings voles, walrus and arctic hares. The most common Arctic fish is the chair. The Arctic climate is harsh Temperatures can Reach ......

However, some of the students were able to use the diagram—S30, S29, S28, S26, S25, etc. Even so, there was no explicit mention of the categories under which the points could be classified in the case of S16, who wrote as mentioned below.
Appendix S16/1
1. North America
2. Europe
3. Asia

Only one of the students, S9, was able to organize the information in clear and distinct categories:

Appendix S9/1
Birds
1) voles
2) walrus
3) lemmings
4) caribou
5) arctic hares

As we have seen in the above excerpts of the students' responses, students' inability to organize, categorize, and present the information using a diagram guided the study in designing Lessons 1 to 6, which involved the teaching of the thinking skills mentioned above. To analyze the learning processes in Lessons 1 to 6 in the intervention, tasks 3, 4, and 8 were given to the students as part of ASN. The analysis of the responses to these tasks is presented hereunder.

Task 3 of ASN

In task 3 of ASN, a set of words was given to the students for arranging them into given categories. This task was aimed at assessing how much the students learnt with regard to the skill of categorizing, which had been taught in Lessons 4 and 5.

As we have seen, the performance of the students in Task 1(A) of POI in which 26 out of 30 were able to organize the information into distinct categories. They learnt to classify the given information into distinct categories in intervention Lessons 4 and 5, which reflected in their performance of task 3 of ASN. The analysis of the responses to task 3 is presented hereunder.

In task 3 of ASN (See Appendix 4), the students were given 20 words to be classified under four categories—clothes, light, food, and shelter. To a large extent,
most of the students classified the words into the given categories. Even so, the
problem occurred majorly with two words: grass and leaves, which could fit into more
than one category, i.e., grass and leaves under categories of food and shelter. Many of
the students such as S1, S18, S19, etc. could not understand the overlapping nature of
the items for which reason they were included under criterion C2 in Table 4.2.1—23
out of 30 students. The reason for this might be that in Lesson 5, there were no words
that could fit into more than one category and there was little discussion concerning
their overlapping nature. Since grass seemed to be controversial for the students, some
of them omitted mentioning the word itself. However, 2 students, S9 and S12, listed
grass under two categories:

Appendix S9/7

<table>
<thead>
<tr>
<th>FOOD</th>
<th>SHELTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruit</td>
<td>Apartment</td>
</tr>
<tr>
<td>......</td>
<td>.........</td>
</tr>
<tr>
<td>Grass</td>
<td>Grass</td>
</tr>
</tbody>
</table>

Appendix S12/5

<table>
<thead>
<tr>
<th>FOOD</th>
<th>SHELTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruit</td>
<td>Apartment</td>
</tr>
<tr>
<td>......</td>
<td>.........</td>
</tr>
<tr>
<td>Grass</td>
<td>Grass</td>
</tr>
</tbody>
</table>

Task 4 of ASN

In task 4 of ASN, students were given information of two fruit, bananas and
pineapples, and were asked to present the information in the given graphic organizer.
The skills required to perform this task were covered in Lesson 2 and 3 (Identifying
similarities and differences; Lesson 4 and 5 (Categorizing); and Lesson 6
(Representing)).

The students were successful to a large extent in identifying similarities and
differences. Though some of the students used unsuitable categories as in the case of
S29, many students (for example S9) created categories to organize the information.

Appendix S9/7

carry, washing, climates
Called
it is called the perfect fruit
size
small

In both examples mentioned above, there is clear evidence that they are trying to create categories for organizing the information. But in the case of S29, though a category labeled *called* was created, it is not appropriate. Nonetheless, it is obvious that the student (S29) also created the category labeled *size*.

Further evidence of creation of categories comes from S12 and S29:

**Appendix S12/6**
Parts
Three parts doesn’t have parts

**Appendix S29/6**
use
it is good for muscles.

This development related to the creation of categories can be traced to Lesson 1, where the researcher gave a strategy to the students to identify the properties/characteristics of objects, ideas, etc. The strategy labeled SCUMPS that would expand as Size, Colour, Use, Material, Parts, and Shape was well utilized by some of the students. This creation of the category *use*, as in the case of S29, forms a strong evidence of students’ learning of the skill of categorizing.

Another pattern found in some students’ responses was that they seemed to have presumed about some information that was not given in the task input. Based on the information given about one kind of fruit, the students assumed about another kind of fruit. The following examples would help understand this pattern:

**Appendix S20/6**
Canot give good muscles
Appendix S22/5

Pineapples is not excellent breakfast food.
Pineapples are not good for muscles.

In the case of S22, the student wrote that pineapples were not excellent breakfast food and not good for muscles, which were not given in the reading passage in the task. Similarly, S20 wrote that pineapples cannot give good muscles. In the passage, it was only mentioned that bananas can give good muscles and they are excellent breakfast food. But, it was not given that pineapples are not good for muscles and not excellent breakfast food. The students assumed this based on the information about bananas. Though students cannot infer this, their ability to extrapolate based on the given information indicates improvement in their learning processes.

Task 8 of ASN

The students in task 8 of ASN had to write words that express their criteria for buying a house. In table 4.2, we have seen that 26 out of 30 students were able to develop categories to organize the information in Task 1(A) of POI. Further, we have also observed that in Task 4 of ASN, students were able to develop criteria based on which the information was arranged. The development of this ability could be traced to Lesson 11 (Developing Criteria), where the students and the researcher had a discussion of the importance of developing criteria in making decisions.

In Task 8 of ASN, the students had to write words that express their criteria for buying a house. As it is obvious from table 4.2.3, 19 out of 30 students were able to develop relevant criteria. However, irrelevant criteria were also produced by students such as S4:

Appendix S4/9

(1) house address (to mean house address)
(2) ....
(3) house rent (to mean house rent)

On the whole, it may be inferred that the students might have learnt to organize the information into categories and present it neatly from Lessons 1 to 6 and tasks 3, 4.
and 8 of ASN. Nevertheless, they still have to be taught to understand the overlapping nature of the categories. However, further improvement was noticed in their responses to task 1(A) in POI.

**Post-Intervention**

Learning in Lessons 1 to 6 also reflected in their responses to task 1(A) in POI, which involved filling the given information in a graphic organizer. An impressive improvement was the use of linguistic labels for each group of ideas/concepts. Another obvious change in the POI was the use of the diagram by most of the students, i.e., 23 students in the P3 criterion.

Some students (S2, S5, S9, S12, S21, S24, S29) were able to create more categories than what were required in the task performance. One such example is given below:

**Appendix S2/11**

Animals
...
Plants
...
Oceans
...
Nations
...
Scientists study
...

However, certain developmental irregularities were also noticed which are discussed hereunder:

Linguistics labels were used but some of them were not appropriate; and some groups of concepts ideas have an unsuitable constituent concept idea. Examples of such irregularities can be found in the following:
<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S12/10</td>
<td>Summer&lt;br&gt;below the equator&lt;br&gt;winter in Antarctica takes place</td>
</tr>
<tr>
<td>Appendix S13/12</td>
<td>Seasons&lt;br&gt;1. winter&lt;br&gt;2. summer&lt;br&gt;3. winds&lt;br&gt;4. snow</td>
</tr>
<tr>
<td>Appendix S20/10</td>
<td>Earthquakes&lt;br&gt;1) gravity&lt;br&gt;2) oceans&lt;br&gt;3) weather conditions</td>
</tr>
</tbody>
</table>

In the above examples, S13 mentioned snow under the heading seasons. Though this student was able to create a criterion, i.e., seasons, the constituents snow, winds are not seasons. Similar problem in the case of S20 is apparent that Earthquakes and weather conditions are not closely related.

To fill the information in the graphic organizer in task 1(A) of POI, it is essential that students need to identify key words and phrases that express the crux of the information. While most of the students were able to identify the key words and phrases, some students struggled with using words or phrases. These students, S8, S14, etc used sentences and sentence fragments:

**Appendix S8/11**
Condition
have a large research where the scientist study earthquakes oceans etc

**Appendix S14/11**
Sea birds
No animal life of its land. However, penguins, seals, whales, krill, and seabirds thrive in the ocean around the continent

Temperature
drop to 120 below zero; a person without cloths would freeze solid in just few minutes

Condition
have large research centers where scientist study earthquakes, gravity, oceans, and weather condition.
Some students such as S15 and S18 were able to group the words into categories but there was no explicit mention of the headings that showed clear and distinct categories, as mentioned below.

Appendix S15/11
1. Antartica
2. Place
3. Earth

Appendix S18, p.
1. South pole
2. North pole
3. Continent

2) Presentation

Pre-intervention

From table 4.2 it is quite clear that in PRI, 17 out of 30 students did not use any diagram to organize the information whereas 10 out of 30 students organized the information in bullet-point form.

The skill of presenting the given information in a diagram was taught in Lesson 6 (Representing) of the intervention. In this lesson, students were given passages for reading and were asked to fill in the graphic organizers with the gist. To understand the learning processes that took place in the intervention, responses to task 4 of ASN was analyzed, which revealed the following.

Task 4 of ASN

As for representing, in task 4 of ASN, most of the students, i.e., 19 out of 30, were able to use the diagram. They had the practice of drawing the elliptical circles in Lesson 6. Some of them (S11, S15, etc.) drew the diagram but not so clearly that it is slightly difficult to capture their improvement. Some of the students such as S23 were not able to write all the data in the diagram drawn by them, especially the content that should be written in the intersection region of the two elliptical circles. They
drew the ovals (graphic organizer) in such a way that they had kept less space in the intersection region. As a result of this, the words to be filled in that region had to be compressed within that small space.

Lesson 6 and task 4 of ASN gave the students good practice in creating an external representation of the information and a significant improvement was seen in task 1(A) of POI, which is described below.

Post-Intervention (POI)

Table 4.2 reveals that 23 out of 30 students used relevant diagram and drew it neatly and clearly. It is obvious that there is a predominant increase in the number of students who used an appropriate diagram or graphic organizer to represent the information.

In the above, we have looked at the detailed analysis of Layer 1, which includes task 1(A) of PRI and POI, and tasks 3, 4, and 8 of ASN. Now, a summary of the data analysis of the Layer is provided below.

Summary of Data Analysis – Layer 1 (Task 1(A) in PRI and POI)

1) Organization and Categorization

Pre-intervention

- Most of the students were not able to use the given diagram to organize the information whereas some of the students used bullets, numbers, etc., for such organization.

- Only 3 students were able to fill the gist of the passage in the given diagram but even those students were not able to categorize the information properly, and there was no explicit mention of category labels.

- Many of the students were not able to find out the key words that express the gist of the passage. They wrote full sentences instead of finding out the
phrases to be put in the graphic organizer. A few students wrote lengthy paragraphs. Hence, there was no proper categorization of the information.

**Tasks 3, 4, and 8 of ASN**

- In task 3, most of the students were able to classify the words into given categories. However, the students need practice in understanding the overlapping nature of the categories.
- In task 4, the students were successful in identifying similarities and differences. They were also able to create categories but with some inappropriate labels. This development could also be seen task 8 of ASN.
- Some of the students also used the information that is not given in the task input.

**Post-intervention**

- Almost all the students were able to identify the key words and phrases that express the gist of the passage.
- Most of the students developed criteria for organizing the information given.
- However, there were a few inappropriate category labels and unsuitable information under category labels.

2) **Presentation**

**Pre-intervention**

- Almost all the students did not use the given or any other diagram to organize the information.
- Many of them used bullet-point form for such organization.

**Task 4 of ASN**

- Students were successful in drawing the elliptical circles and organizing the information in those circles.
- However, the intersection region of the two elliptical circles was drawn with a little space, and so they were not able to present the information clearly in that region.
Post-Intervention

- Except for one student, all the students were able to draw the diagram and present the information in that diagram.

4.3.2 Layer 2 - Thinking

This layer is related to the analysis of the data from Task 2(A) in PRI and POI. To account for the development in the thinking abilities, task 5 was analyzed. Task 2(A) in PRI and POI is a Critical Thinking task, which requires the students to perform three critical thinking skills:

- Identifying conclusions
- Identifying premises
- Identifying assumptions

In view of the fact that it is unlikely for the students to know the terms above, the task 2(A) in PRI was designed in such a way that their critical thinking skills were elicited through a real world task. Hence, the critical thinking terminology was not used in PRI and POI whereas in task 5 of ASN, the terms conclusion, premises and assumptions were used since they were taught to them in the intervention process in Lessons 7 and 8.

Lessons 6 and 7 in the intervention process were designed to teach the skills mentioned above. Task 5 of ASN was given to the students to analyze their learning processes with regard to those skills. Task 5 requires the students to perform the skills of identifying conclusions, premises, and assumptions. Since task 5 of ASN assesses the same skills that are covered in Lesson 6 and 7, the responses to task 5 form a representative sample of the students’ learning processes with respect to the skills above.

Given below, in table 4.3, is the analysis of students’ responses to task 2(A) in PRI and POI based on three criteria: Conclusions and Premises, Assumptions, and Other possibilities. It also includes the analysis of task 5 of ASN, the responses to which were also evaluated based on the same criteria. The number of participants whose responses met respective criteria in PRI, POI, and task 5 of ASN is also given.
Table 4.3 Layer 2 (Thinking)—Task 2(A) and Assignment Task 5

Table 4.3 clearly reveals that in PRI, more than one third of the students were not able to understand the task requirements and they were not able to identify the conclusions and premises; whereas in task 5 of ASN and in POI, they mentioned the conclusions and premises explicitly.

With respect to identifying assumptions, most of the students in PRI demonstrated their inability but as many as 23 students in the POI were able to identify relevant assumptions. While the students in the PRI were not aware of how to justify their answers, in the POI, almost every student was able to mention other possibilities in addition to justification.

In the following, the analysis of the data from Task 2(A) in PRI and Task 2(A) in POI will be presented under two headings: Conclusion and Premises, and
Assumptions and Other possibilities, which formed the basis for analysis. Under each criterion, the changes in students’ thinking abilities from PRI to POI will be described. Such changes will also be accounted for through the analysis of task 5 of ASN.

1) Conclusions and Premises

Pre-Intervention (PRI)

In task 2(A) in PRI, the students were given a situation in which students need to critically look at the conclusion made by Sanjay’s sister about Sanjay’s visit to the zoo. In the responses to this critical thinking task, it was very evident that most of the students were not able to understand the task requirements. They copied the sentences in the task input, i.e., reading text in the task. Students 2, 6, 15, 17, 18, 19, 23, 24, 28, and 30 could not respond relevantly to the task, instead, they copied the sentences from the reading text.

Among these students, S6 misread the task input and mentioned that both Sanjay and his sister went to the zoo. In fact, Sanjay was assumed to have gone to the zoo.

Appendix S6/2
Sanjay – 10 years old, Sanjay and sister went to the zoo on a Sunday. And the returned home in the evening at 5 p.m. He sister leg was wound. He told to his Mother and father about it. Sanjay what happened……

Appendix S15/2
The Sanjay a 10 years old boy s go to zoo it is very hard. This his siter tell the Sanjay is bad boy is leg would its easy some animals bitten him is very intresting

Appendix S19/3
Sanjay, a 10 year to go the zoo on a Sunday returned Home evening at 5 p.m. Sanjay’s sister saw a would in his leg the said sister said, “some anima in the Park must have bitten him.”

In the case of the following students, they copied or wrote irrelevant answers, which suggests that they are not aware of such kind of tasks that demand critical thinking. As a result, more than one third of the students were not able to identify the
conclusion in task 2(A). That they are not able to mention the conclusion explicitly was anticipated and was kept in mind in designing task 2(A) in PRI. So, implicit references to the conclusion were also looked for in the analysis. Consequently, 10 out of the 30 students met the criterion of showing *unclear evidence of identifying conclusions and premises*.

The students' performances with respect to task 2(A) in PRI indicated that the skills of argument need to be taught. Hence, Lesson 7 in the intervention was aimed at *identifying conclusions and premises*. To assess their learning processes, task 5 of ASN was given to the students. The responses to the task were collected and analyzed; and they are presented hereunder.

**Task 5 of ASN**

In ASN, task 5 was analyzed to understand and trace the improvement from PRI to POI with regard to the ability to identify conclusion and premises. The students were helped in Lesson 7 to identify conclusions and premises. Taking everyday examples, they were introduced to the *causal fallacy* (the logical flaw that a false cause is assumed to be the real cause for a consequence), one of the concepts in critical thinking.

Except for 2 students, all the students were able to identify the conclusion and premises in the task. Some of the examples are given below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
</table>
| Appendix S9/8 | **Conclusion**: Viswanath met with an accident when he was coming home from work  
**Premises**: Viswanath saw a black cat when he was going to the office for work. |
| Appendix S10/5 | **Conclusion**: Viswanath saw a black cat when he was going to office for work yesterday. he met with an accident  
**Premises**: he had saw a black cat yesterday so that he met with an accident. |
| Appendix S11/8 | Conclusion: Viswanath met with an accident when he was combing from work.  
Premises: Viswanath saw a black cat when he was going to the office for work |
| Appendix S21/7 | Conclusion: I met with an accident when I was coming home from work.  
Premises: I saw a black cat when I was going to the office. |
| Appendix S25/9 | Conclusion: I met with an accident when I was coming home from work.  
Premises: I saw a black cat when I was going to the office for work yesterday morning. |
| Appendix S30/8 | Conclusion: I met with an accident when I was coming home from work.  
Premise: I saw a black cat when I was going to the office for work yesterday morning. |

It is quite evident that almost all the students were able to identify and explicitly mention the conclusion and premises of task 2(A). It might be inferred that the tasks in Lesson 7 helped the students learn to identify conclusions and premises. Similar improvement was noticed in the responses to task 2(A) in POI, which is analyzed in the following.

**Post-Intervention**

Task 2(A) in POI requires the students to think critically about the conclusion made by Sudheer's sister about Sudheer's injury on his head. With regard to conclusion, many of the students, in spite of training, could not mention it accurately. However, it should be noted that it did not deter them from identifying assumptions and other possibilities. Though most of them wrote inaccurate conclusions, their correct understanding of the conclusion can be seen in writing the assumptions and other possible causes. Thus, it can be said that they were able to identify the
conclusion but did not write it in the form of statements, which is why 14 out of 30 students in table 4.3 figured in C2 criterion, instead of C3, even though they mentioned the conclusions explicitly.

About premises, most of them were able to identify accurate premises, for which examples are given below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S16/11</td>
<td>Conclusion: When the Sudheer was returning home from school, a bike knocked him. He had an injury on his head. &lt;br&gt; Premises: Sudheer bet his sister</td>
</tr>
<tr>
<td>Appendix S18/9</td>
<td>Conclusion: After that, Sudheer went to school</td>
</tr>
<tr>
<td>Appendix S22/10</td>
<td>Sudheer went to school when he was returning home from school a bike came at a great speed and knocked him. He had an injury on his head. &lt;br&gt; Premise: Because sudheer fought with his sister in the morning and hit her on the head with a stick.</td>
</tr>
<tr>
<td>Appendix S26/11</td>
<td>Conclusion: Sudheer might with an accident &lt;br&gt; Premises: Sudheer hit her sister in the morning</td>
</tr>
<tr>
<td>Appendix S29/10</td>
<td>Conclusion: a bike came at a great speed and knocked him. &lt;br&gt; Premise: The morning and hit her on the head with stick.</td>
</tr>
</tbody>
</table>

In the above responses, it can be observed that the students mentioned that a bike hit Sudheer whereas in the task input it was given that he only met with an accident. Though finding out the conclusion was discussed in the intervention Lessons 7, and most of the students were successful in identifying the conclusion in task 5 in the ASN, some of the students in POI were unable to state the accurate conclusion. This indicates that they need further practice in this aspect. However, this did not deter them to spot the underlying assumptions and mention other possible causes.
2) Assumptions and Other Possibilities

Task 2(A) in PRI and POI requires the students to identify assumptions and other possible causes to justify their answers. The skill of identifying assumptions and other possible causes was dealt in Lesson 8 in the intervention. Further, task 5 was given to the students to assess their learning processes in the intervention. The following account presents the development that took place from PRI to POI.

Pre-Intervention

In task 2(A) in PRI, the students were expected to identify the underlying assumptions in the conclusion made by Sanjay's sister. As far as this task is concerned, two assumptions were expected from the students:

1. Sanjay went to the zoo
2. Animal biting is the only cause behind the wound

Among the two, while some of the students were able to identify one of the assumptions, 12 out of 30 students could not identify any assumption. It is interesting to note that all the students, except 2 students (S4, S29), did not spot the first assumption mentioned above. That is to say, most of the students assumed that Sanjay went to the zoo. In fact, he might not have gone to the zoo. They seem to be accepting, without any doubt, the statement of Sanjay who said that he went to the zoo. The following examples can substantiate this inference.

Appendix S4/2
Sanjay's sister is not right why sanjay is zoo no going. He is deferens plase going.

Appendix S29/2
Yes, Sanjay's sister is right becaues in the Park some animal have bitte him. No, we can not tell. Because he go to other place

Since the students were not aware of the concept of assumptions, we cannot expect them to explicitly state the assumptions underlying conclusions. So, implicit references to them were also looked for to eliminate the possible misinterpretation that they cannot find assumptions. Such implicit assumptions were traced by observing
other possible causes of the wound. Only a few students wrote only one other possible cause. Let us look at those possible causes expressed by various students.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S2/2</td>
<td>...Sanjay sister said some animal in the park mus have bittn him on insect is biting</td>
</tr>
<tr>
<td>Appendix S8/2</td>
<td>I think Sanjay’s sister is not Right. why because in zoo every animal in its compound and it cannot come outside than how an animal can bite Sanjay. I think he slipped anywhere and lies.</td>
</tr>
<tr>
<td>Appendix S10/2</td>
<td>Sanjay’s sister was not wrong because in zoo the animal will be in kay: Sanjay mait fell down and got wound in his leg.</td>
</tr>
<tr>
<td>Appendix S14/2</td>
<td>The Sanjay’s sister was wrong because in zoo every animal is in tie or closed. Sanjays was fell down but his siter was wrong.</td>
</tr>
<tr>
<td>Appendix S16/1</td>
<td>Sanjay not allowed in case that why Sanjay’s sister telling si wrojg. There have also security guards. I think his in way he fell down any ware.</td>
</tr>
</tbody>
</table>

As we have seen, most of the students mentioned slipping, falling down, etc as other possible causes for the wound. These other possibilities suggest that the students were able to spot the assumption in the conclusion made by Sanjay’s sister that an animal is the only cause for the wound was identified by these students. Absence of other possibilities in the students' responses indicates that their response is not justified.

The students’ performances with respect to task 2(A) indicated that the skills of argument need to be taught. Hence, Lesson 8 was aimed at identifying assumptions and other possibilities. To assess their learning processes, task 5 of ASN was given to the students. The responses to the task were analyzed and they are presented hereunder.
Task 5 of ASN

In task 5 of ASN, the students were to evaluate the line of reasoning by critically looking at the Viswanath’s conclusion that he met with an accident because he had seen a black cat that morning.

Most of the students were also able to spot the underlying assumptions. Explicit mention of the assumptions can be seen in the case of many students, some of whose responses are provided below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/6</td>
<td>Assumption: because of black cat he met with the accident</td>
</tr>
<tr>
<td>Appendix S5/8</td>
<td>Assumption: Because black cat met a accident</td>
</tr>
<tr>
<td>Appendix S7/6</td>
<td>Assumption: I met with an accident because He saw a black cat</td>
</tr>
<tr>
<td>Appendix S13/8</td>
<td>Assumption: Vishwanath saw a black cat before going to the office work and he met with an accident when he was coming home from work.</td>
</tr>
<tr>
<td>Appendix S16/8</td>
<td>Assumption: Vishwanath saw a black cat before going to the office work and he met with an accident when he was coming home from work.</td>
</tr>
<tr>
<td>Appendix S27/8</td>
<td>Assumption: because of black cat He met with the accident.</td>
</tr>
</tbody>
</table>

It should not be noted that there are problems with language as in the case of S13, S16 and others. For instance, S16 used the sentences from the given text but the student could not use the conjunction *because* to state the causal assumption explicitly. Even so, it can be understood that the student could not use the language that overtly expresses the causal link but was able to identify the assumption.
As for imagining the other possible causes for the accident, most of the students understood the concept of other possibilities and successfully wrote them in their responses. Some of the excerpts are given below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S4/8</td>
<td>Other possibilities:-&lt;br&gt;He might drank and drive.&lt;br&gt;He might of fear.&lt;br&gt;He might have an unlucky&lt;br&gt;He might have A car brakes are failed</td>
</tr>
<tr>
<td>Appendix S10/5</td>
<td>Other Possibilities:-&lt;br&gt;1) by walking the accident might (to mean that accident might have happened during walkin)&lt;br&gt;2) the held driver might drinking (to mean that the drive might be drunk)&lt;br&gt;3) he might be not driven fast (to mean that he drove fast)</td>
</tr>
<tr>
<td>Appendix S26/7</td>
<td>Other Possibilities:&lt;br&gt;1) They might have fails a breaks.&lt;br&gt;2) He might have Drink Drive.&lt;br&gt;3) He might have walk quickly&lt;br&gt;4) He might have cannot see the bike&lt;br&gt;5) He might have been giddy.</td>
</tr>
<tr>
<td>Appendix S28/6</td>
<td>Other Possibilities:&lt;br&gt;- he might have drunk and drive&lt;br&gt;- he might have did not see the road&lt;br&gt;- he might have break was Fail&lt;br&gt;- he might have did not see children</td>
</tr>
<tr>
<td>Appendix S30/8</td>
<td>Other possibilities:&lt;br&gt; I might have ran&lt;br&gt; I might have drink and walk&lt;br&gt; I might not see the vehicle</td>
</tr>
</tbody>
</table>
In the above excerpts, we can observe the errors related to language. Since this part of the chapter deals with the analysis of thinking abilities, language errors will be analyzed in the following sections (Layers 6 to 10) allotted exclusively.

The above examples demonstrate the improvement in identifying the assumptions and other possible causes. Similar improvement was also documented in POI.

**Post-Intervention**

A remarkable improvement was noticed in identifying the assumptions. Most of them were able to mention them explicitly, as in the following.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/9</td>
<td>Assumption: God has given Sudheer punishment because hit her sister</td>
</tr>
<tr>
<td>Appendix S5/11</td>
<td>Assumption(s): He (Sudheer) was (God has given punishment).</td>
</tr>
<tr>
<td>Appendix S11/12</td>
<td>Assumption ➔ Sudheer was stick taken and beating her sister that way Gods will be give the punishment.</td>
</tr>
<tr>
<td>Appendix S16/11</td>
<td>Assumption: Shudher met with an accident because in the morning he bet his sister.</td>
</tr>
<tr>
<td>Appendix S28/11</td>
<td>Assumption: Sudheer hit her sister god gave him punishment</td>
</tr>
</tbody>
</table>

Other possibilities hold the key in this critical thinking task since implicit references to the assumptions can be found. Besides, it also gives information about students’ understanding of the task requirement. Many of the students were successful in listing other possible causes for the accident.

**Appendix S9/13**
i) The Bike driver might be drunk and drive
ii) Sudher walk on the ro ad carelessly
iii) On the there might not have signals
iv) There roads are not good
v) They might be going in the night
vi) His sister sended the bike driver to hit him

Appendix S12/7
1. He might be not driven nicely
2. He might be drunk and he driven
3. Opposite vehicles might be not driven nicely
4. He might be in tension
5. He might be driven very fast
6. Opposite vehicles might be driven very fast
7. He acrossed the traffic rules.

Appendix S17/11
(1) Sudher might have the road is breakable
(2) he might have he drive speedly
(3) he might have he drank and drive
(4) he might have another vehicle driver is drank and drive
(5) he might have he did not how to driving

In the above, we have looked at the detailed analysis of Layer 2, which includes the analysis of task 2(A) in PRI and POI, and task 5 of ASN. Now, a summary of the data analysis of this Layer is provided below.

<table>
<thead>
<tr>
<th>Summary of data analysis—Layer 2 (Task 2(A) in PRI and POI)</th>
</tr>
</thead>
</table>

1) Conclusion and Premises

Pre-Intervention (PRI)

- Most of the students were not able to respond to the question given and hence were unable to meet the task requirement.
- About conclusions and premises there was no explicit mention of the conclusions and premises. Some of the students’ responses implicitly indicate
the conclusion and premises. These were considered to be unclear evidence of their ability to identify conclusions

Assignment (ASN)

- Almost all the students demonstrated their ability to identify the conclusion and premises without any difficulty.
- Except for 2 students all the students were able to identify the conclusion and premises in the task.

Post-Intervention (POI)

- Significant improvement was documented in stating the conclusion explicitly.
- Though the students understood and stated the conclusion of the task 2(A), they wrote inaccurately. But on closer observation of their assumptions and other possible causes, it can be inferred that they identified the conclusion but did not write it accurately.

2) Assumptions and Other possibilities

Pre-Intervention (PRI)

- With regard to assumptions, most of them were not able to identify them. In the case of few students’ responses, it was evident that they were not able to analyze the information critically and question the assumptions involved in the task 2(A).
- Only 2 students attempted to look at the information critically and were able to mention one or two other possible causes for the incident mentioned in task 2(A) in PRI.

Assignment (ASN)

- Almost all the students were able to spot the assumptions involved the task 2(A) POI.
- Further, most of the students demonstrated their ability to mention quite a few other possible causes.
Post-Intervention (POI)

- A significant improvement was noticed in POI with related to identifying assumptions and other possible causes.
- The students wrote the conclusions, premises, assumptions and other possible causes explicitly.

4.3.3 Layer 3 - Thinking:

In this layer of analysis, the analysis of Task 3(A) in PRI, and POI is presented. This task assesses the decision making abilities in a buying situation where the students have to make a choice between two items. To do so, the students need to have the

- ability to understand the situation and a need to make a decision;
- ability to make an external representation of the information available;
- ability to identify similarities and differences between the items (to be bought); and
- ability to distinguish between facts and opinions.

In order to understand the processes of learning that took place in the intervention, tasks 4 and 6 of ASN were taken up for analysis since task 4 is related to the skill of making an external representation (graphic organizer) and task 6 is related to distinguishing between facts and opinions. Therefore, separate rubrics were designed for these tasks in addition to task 3(A) in PRI and POI. In what follows, let us have a detailed discussion of the analysis.

In the tables below,

- Table 4.4 presents the analysis of students' responses to PRI and POI based on three criteria: Organization, identifying Similarities and differences, and distinguishing between facts and opinions. The number of participants whose responses met respective criteria in PRI and POI is also given.
- Table 4.4.1 and 4.4.2 describe the analysis of students' responses to task 4 and 6 of ASN respectively. Task 4 assesses students' learning of developing criteria and identifying similarities and differences whereas task 6 assesses
• the skill of distinguishing between facts and opinions.

<table>
<thead>
<tr>
<th>Criteria for Task 3(A) - Thinking</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
</tr>
<tr>
<td>Evidence of graphic representation/point-form notes showing organization of information given and planning for task performance (O3)</td>
<td>1</td>
</tr>
<tr>
<td>Unclear evidence of organization of the information given and planning for task performance (O2)</td>
<td>16</td>
</tr>
<tr>
<td>No evidence of organization or planning of any kind to do the task (O1)</td>
<td>13</td>
</tr>
<tr>
<td><strong>Similarities and Differences</strong></td>
<td></td>
</tr>
<tr>
<td>Clear Evidence of identification of similarities and differences (SD3)</td>
<td>5</td>
</tr>
<tr>
<td>Unclear evidence of identification of similarities and differences (SD2)</td>
<td>19</td>
</tr>
<tr>
<td>No evidence of identification of similarities and differences (SD1)</td>
<td>6</td>
</tr>
<tr>
<td><strong>Facts and Opinions</strong></td>
<td></td>
</tr>
<tr>
<td>Clear evidence of distinguishing between facts and opinions (FO3)</td>
<td>3</td>
</tr>
<tr>
<td>Unclear evidence of distinguishing between facts and opinions (FO2)</td>
<td>11</td>
</tr>
<tr>
<td>No evidence of distinguishing between facts and opinions (FO1)</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 4.4 Layer 3 (Thinking) – Task 3(A) Decision Making

<table>
<thead>
<tr>
<th>Criteria for Task 4 (ASN)</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Develop Criteria</strong></td>
<td></td>
</tr>
<tr>
<td>Explicit evidence of relevant criteria (DC3)</td>
<td>15</td>
</tr>
<tr>
<td>Unclear evidence of the use of relevant criteria (DC2)</td>
<td>7</td>
</tr>
<tr>
<td>Little or no evidence of any relevant criteria (DC1)</td>
<td>8</td>
</tr>
<tr>
<td><strong>Similarities and Differences</strong></td>
<td></td>
</tr>
<tr>
<td>Clear Evidence of identification of all the possible similarities and differences</td>
<td>14</td>
</tr>
<tr>
<td>Evidence of identification of some similarities and differences</td>
<td>12</td>
</tr>
<tr>
<td>No evidence of identification of similarities and differences</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.4.1 Layer 3 (Thinking) – Assignment Task 4
Criteria for Task 6 (ASN)

<table>
<thead>
<tr>
<th>Facts and Opinions</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Clear Evidence of distinguishing between facts and opinions</td>
<td>20</td>
</tr>
<tr>
<td>-Evidence of distinguishing between facts and opinions with some inaccuracy</td>
<td>8</td>
</tr>
<tr>
<td>-No evidence of distinguishing between facts and opinions</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4.4.2 Layer 3 (Thinking) – Assignment Task 6

As can be seen from table 4.4, almost every student did not make any diagrammatic representation of the information in PRI but virtually all the students in the POI have drawn a graphic organizer to organize the information. Similarly, about two thirds of the students were able to identify similarities and differences in PRI whereas a predominant number of students, i.e., 27 out of 30 in the POI were able to compare and contrast between the two items in the tasks in POI. Likewise, there is also improvement in distinguishing between facts and opinions in POI.

In what follows, we shall look at the detailed analysis of Task 3(A) in PRI and POI, and the development that took place is traced through tasks 4 & 6 of ASN. Task 6 of ASN reveals how students learnt to distinguish between facts and opinions.

Task 4 of ASN helps us understand how students learnt to develop criteria and identify similarities and differences. It should be noted here that task 2 of ASN also assesses identifying similarities and differences. However, this task was not taken here in this part of the analysis because students were asked only to write 4 sentences of similarities and differences but in task 4 of ASN, students were to read a passage, identify similarities and differences and develop criteria to organize the information to be put in a graphic organizer. Thus, task 4, to some extent, has features similar to task 3(A) in PRI and POI. Hence, task 4 was taken for analysis in this layer rather than task 2.

The analysis will be presented under three headings: Organization, similarities and differences, and distinguishing between facts and opinions.
Pre-Intervention

Task 3(A) in the PRI requires the students explicitly state their choice of mobile phone in a buying situation. From the given information about the two mobile phones, they should choose one of those mobile phones. But about one third of the students did not express their preference. Their decision was not clear as can be seen in the following responses.

Appendix S6/3
Samsung model number is S3122 it handles 900 address. Samsung size is 1.6. In these vibration facility Samsung loud speaker FM Radio is available. Samsung offers a feature through we can use languages other than English 7 African languages along with Hindi. Calendar and calculator features are there in both the phones

Appendix S15/3
I will buy Nokia phone
Nokia is a very popular Brand and is can hold 1000 Address whereas only 1000 Address is a special feature and the Nokia is costly and it's a branch. The Nokia phone is very quickly supporting

I will by the Samsung's mobile
Both phones do not have camera whereas only 900 addresses can be stored in Samsung This is vibration facility in the above phones Samsung has this Facility there is no music player is both dictionary Samsung offers Feature through which languages.

We can observe from the response of S6 that the students' decision is not clear. In the case of S15, the student was not able to respond to the question in task appropriately. This might indicate that the students are not aware of such type of tasks. Most other students did not explicitly state their choice too. However, wherever
it is possible to infer their preferences, they were considered to have mentioned their preference implicitly.

Another aspect to be discussed is whether the students made some rough work to organize the information given in the task input. Virtually no student attempted to make an explicit mapping of the information. Nevertheless, it cannot be concluded that they did not make an internal representation of the information.

About half of the students seemed to have made an internal representation, and so in the evaluation of the responses, these internal representations were also considered. It is argued here that using an external representation can enhance students’ fluency and effectiveness in writing. Of the 5 briefer responses (S12, S14, S18, S22, S28) in PRI, three of them are presented below.

**Appendix S12/2**
I want to buy the Nokia because the nokia have to hold 1,000 addresses. Nokia have FM radio Nokia is heavy in weight. But Nokia’s speaker is good. If it fell down so many times but nothing broke.

**Appendix S22/2**
I like only nokia mobail.
It is a very weight and branded company.
and this speaker is smootly
and more games in mobail.

**Appendix S28/2**
I prefer to buy a Samsung phone is so good but My Dad loves Nokia phone.

It might be inferred that these students could have produced a detailed response had they taken the help of a graphic organizer and map the information of the two mobiles.

A significant aspect of the analysis in PRI is that some of the students used information that was not given in the task input to support their preferences. The following excerpts would make the observation easy to understand.

**Appendix S15/3**
....features and the Nokia is costly.....
Appendix S16/2
Nokia phones not have loud volume....

Appendix S17/3
I will not by the Samsung mobile. That Samsung phones will be touch screen mobiles and other tab's phones and other phones Samsung phones are very big. the Samsung phones use full to young college boys and girls not use very age uncles and Aunties screen touch mobiles. the Samsung mobiles will be not use both friends.

Appendix S21/2
...this i like because of when i in meeting or class i not destabe our silf and others when rings the phone thats way I like nokia' phone

In the above excerpts from the responses, S15 wrote that Nokia was costly, which was not given in the task. S17 wrote the information that was not related to the information in the task given. S21 used personal information to support his preference. From these, it might be deduced that they thought outside the task limits since the task was able to stimulate them to think and transfer their thinking to real world situations.

As we have seen in the above excerpts of the students' responses, their inability to make an external representation to organize the information using a graphic organizer, etc., guided the study to design Lessons 1 to 6, which involved the teaching of thinking skills mentioned above. In order to analyze their learning processes in Lessons 1 to 6, tasks 3 and 4 were given to the students. The analysis of these tasks was presented in Layer 1(Thinking).

The analysis indicated that there was a significant improvement in organization and categorization of information. In addition to this analysis, students' responses to task 4 were analyzed to document their improvement in developing criteria to make a decision, which is presented below.

Task 4 of ASN

In POI, almost all the students were able to organize the information in a systematic way. Further, they could also develop the criteria on the basis of which
similarities and differences were identified. This improvement in POI was noticed owing to the fact that the students were taught to develop criteria in Lesson 11 for comparison and contrast. This is quite obvious in their responses to task 4 of ASN, which can be seen in table 4.4.1. In task 4 of ASN, the students had to read the passage on pineapples and bananas. The students were required to compare and contrast the two fruits and categorize the information in the graphic organizer given.

15 out of 30 students in task 4 of ASN were able to develop clear criteria. This can be witnessed in the following examples.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/5</td>
<td>Food; Carry; Use; Called; Size; Skin</td>
</tr>
<tr>
<td>Appendix S9/7</td>
<td>Taste; Carry; Skin; Colour; Washing; Climates</td>
</tr>
</tbody>
</table>

It can also be observed from 4.4.1 that 7 students were able to develop criteria to some extent. In the case of these 7 students (S2, S3, S4, S6, S8, S11, S18), they were able to identify similarities and differences but could not write (clear) labels that categorize the information whereas some other students wrote only a few categories because they identified only a few of the similarities and differences. The following excerpts explain this observation.

Appendix S7/5

Food

Colour

Grow

Though the student mentioned above was able to develop criteria, there was no full coverage of all the similarities and differences that can be listed. As a result, only a few criteria were developed. In other cases, the criteria were not clear as in the case of S15.

The analysis of task 3 and 4 revealed that there was a significant improvement in developing criteria and similar improvement was witnessed in the responses to task 3(A) in POI.
Post-Intervention

As can be observed from table 4.4, almost all the students have used a diagram to organize the information. They used two intersecting ovals to map the information given in the reading input for the task. The two elliptical circles were to be filled by the students with all the information given.

As hypothesized earlier that external representation of information can help write fluently and effectively, some of the students demonstrated improvement in their responses. They have clearly organized their responses in a brief manner. They have mentioned the features of the products that are relevant in justifying their decision or preference.

Appendix S3/10

I Buy a Weston T.V. Weston TV good clarity display less weight and I like brown colour more number of channels. its base is plastic it does not rust. plastic less weight. It has a guarantee of 2 years live programme storing in Weston T.V. Some people like bush T.V. But its he's opinion.

Like S3, most of the students demonstrated clarity of thought towards making the decision of buying a mobile phone. This was possible to them because they were able to learn to identify similarities and differences, the learning processes of which are traced in the following.

2) Similarities and differences

Pre-Intervention

From table 4.4 it is clear that 19 out of 30 students' responses have unclear evidence of identification of similarities and differences. One reason for such lack of clarity could be that the students did not make any external representation of the information. Another reason is that they copied the text from the reading input.

The following excerpts from the students' responses can make this point clear. In the following S1 copied the sentence directly from the task input whereas S4's decision was not clear.
Appendix S1/2

Samsung's Model number is S3127. Both the phones do not have in built camera. Nokia is a very popular brand and it can hold 1,000 addresses whereas only 900 addresses can be stored in Samsung. There is vibration facility in the above phones. Nokia does not have loud speaker but Samsung has this facility.

Vishun: I bought Samsung (S3122) 3 years ago. I like the clarity of the display but its battery is very weak and goes down very quickly. I wanted to sell it but they did not offer me a good price. I am still using it now.

Appendix S4/3

My friend is taking is lijan My Samsung pone buy why Samsung pone camora. And songs. and is display but so My Samsung pone.

Informed by the analysis of responses to task 3(A) in PRI, Lessons 2 and 3 were designed to teach students how to identify similarities and differences; and task 4 was given to students to analyze their learning processes related to identifying similarities and differences.

Task 4 of ASN

As for the similarities and differences, 26 out of the 30 students were able to identify the similarities and differences. 14 out of 30 students were able to identify and organize the similarities and differences under clear categories. In Lesson 4, the students were asked to write the category in which the objects given are same in some way. In this lesson they were encouraged to create labels to represent the information in categories. In the same way, in Lesson 5 in the intervention, the students were given a few words and were asked to put those words under the four categories given.

However a few of the students could mention only a few of all the possible comparisons.

On the whole, the practice in Lessons 1 to 6 might have helped the students to create labels under which similarities and differences were categorized. This improvement also reflected in task 3(A) in POI.
Post-Intervention

As far as similarities and differences in POI, almost all the students have also identified the criteria on the basis of which comparison and contrast were done. Some examples are given below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/10</td>
<td>Model; Made in; Rate; Material; Size; guarantor</td>
</tr>
<tr>
<td>Appendix S11/13</td>
<td>Made in; Mode Number; Size; Weight; Channels; Colour; Years; Made</td>
</tr>
</tbody>
</table>

On the whole, it can be said that almost all the students have improved in identifying similarities and differences.

3) Facts and opinions

Pre-Intervention

In task 3(A) in PRI, as part of making a decision to buy one of the mobile phones given in the task, the students were to distinguish between facts and opinions in the comments given by people who had the knowledge of the mobile phones. As far as the ability to distinguish between facts and opinions, it was difficult to assess, in PRI, whether the students had this ability. This was because most of the students did not use the information related to friends' comments. They did not consider this. S2, S3, S6, S7, S8, S16, and S17 are some of the students who fall into this category.

However, some students used opinions also to justify their decisions. They treated opinions as facts and based their decision on opinions. This can be witnessed in the following examples.

Appendix S24/4

nokia phones are wonderful phones and they look good. then I am take Nokia (K1662) phone. This is the reasons
Appendix S26/3
I would prefer to buy phones is Nokia (W662)

Reasons:

5) Nokia phones are wonderful phones and they look good

S24 and S26 mentioned that they prefer Nokia phones because they are wonderful and they look good. Being wonderful and beautiful is subjective and that is an opinion but not a fact. This clearly suggests that they were not aware of the difference between facts and opinions.

Students' inability to distinguish between facts and opinions guided the study to design Lesson 9 in the intervention. To understand their learning processes in the intervention, students were given task 6 as part of ASN.

Task 6 of ASN

In Lesson 9 in the intervention, the students were required to observe two pictures carefully and write 5 facts and 5 opinions related to the two pictures. Followed by this, they were asked to write a paragraph using only facts. The students were really surprised to see that they were not able to write a long story as they do in a typical writing classroom. At that juncture, they were made to realize that most of the information in everyday contexts can contain opinions rather than facts, and the decision-making should be based on facts but not on opinions.

Learning took place in those classes reflected in the performances of ASN task 6. As can be seen in 4.4.2, about two thirds of the students provided clear evidence of their learning to distinguish between facts and opinions.

Appendix S8/9
Opinions
(1) He might came for shopping
(2) He ming running to another shop for a offered a thing
(3) It might some thing big.

Appendix S12/8
Opinions
1. He might be a thife
2. He stole some thing from the shop
3. shop keeper is chasing him (to mean shop keeper is chasing him)

Appendix S24/9
Opinions:
1) He taked things and not give many and running
2) He going bus because the bus He going
3) there are or click stop shop and one tear some items taked and going

Similar improvement was also noticed in the responses to task 3(A) in POI.

Post-Intervention

In task 3(A) in POI, about half of the students recognized that some of the information given by the friends in the task was their opinions but not facts. Let's look at some of the excerpts to understand this observation.

Appendix S3/10
Some people like bush T.V. But its he's opinion

Appendix S6/12
Weston T.V is best
Kamala: Kamala is have a opinion but bush T.V. also best

Appendix S19/14
Weston t.v. very good but games opinion Weston t.v. it does not get damage its very good in his rimon opion

Appendix S26/13
I bought weston TV, but Kamala said Bush TV is wonderful TV it looks very. That's her opinion.

It is clear from the above excerpts that in POI, students have learned the ability to distinguish between facts and opinions. Such improvement could be traced to the teaching in Lesson 9.
Summary of data analysis – Layer 3 (Thinking) – (Task 3(A) in PRI and POI)

Organization

Pre-Intervention

- About one third of the students were not able to state their decision clearly.
- Though most of the students did not mention their decision overtly, their preference for one of the phones could be inferred.
- No student attempted to organize the information given. No diagram or point-form rough work was witnessed in the students’ responses.
- Some of the students mentioned the information that is not given in the task. This indicates that the task could stimulate their thinking abilities.

Task 4 of ASN

- Almost all the students were able to organize the information systematically.
- More than one third of the students were also able to develop criteria for comparing and contrasting the two fruit given in task 4 of ASN.

Post-Intervention

- All students have used the diagram to represent and organize the information given in the task input.
- Students attempted to present all the possible information in the diagram

Similarities and Differences

Pre-Intervention

- About two thirds of the students copied the sentences from the reading passage in the task 3(A) in PRI.

Task 4 of ASN

- 26 out of the 30 students were able to identify the similarities and differences very clearly.
- However, some of the students were not able to identify all the possible comparisons in the information given.
Post-Intervention

- Almost all the students identified and mentioned the similarities and differences clearly and explicitly
- Further, they also developed common criteria based on which the comparison and contrast was made.

Facts and opinions

Pre-Intervention

- Most of the students did not consider the information given by the friends in the input for task 3(A).
- A few of them just copied the sentences from the information given by friends in the task input

Task 6 of ASN

- Most of the students were able to distinguish between facts and opinions.
- They were able to write factual descriptions of the pictures given.
- In the case of 2 students, it was difficult to infer whether they have learnt the skill of distinguishing between facts and opinions.

Post-Intervention

- Many students were able to distinguish facts from opinions.
- Some of them clearly mentioned that some of the information given by the friends is their opinion and thus they did not want to consider that.
- Though most of the students used the information given by the friends, a few of the students based their decision on the opinions of friends instead of facts.
4.3.4 Layer 4 - Thinking

Layer 4 is related to the analysis of thinking dispositions. Ideally, students’ inclination to abiding tendencies to thinking can be better captured in their performance in everyday situations. However, they can also be given performance tasks through which their inclination and sensitivities to recognize the necessity of conscious and strategic thinking in various situations can be traced. In PRI and POI, task 4(A) (i) and (ii) require the students to express their intellectual attitude to two situations.

Task 4(A) (i) requires them to demonstrate the disposition
- to ask questions, and
- to seek clarifications.

In this sub-task, the students were required to ask questions to find out the reasons for increase in the price of rice to demonstrate their inquiring attitude.

Task 4(A) (ii) requires them to exhibit the disposition
- to consider and value other’s opinions and multiple perspectives, and
- to be open-minded.

In this sub-task, the students were expected to demonstrate open-mindedness by recognizing that handsomeness is subjective and people have different opinions, and there is no right or wrong opinion in such instances.

Lesson 12 in the intervention process was designed to teach the disposition of considering multiple perspectives, and task 9 of ASN was given to the students to analyze their learning processes with regard to this disposition. Task 9 requires students to demonstrate the disposition of considering multiple perspectives.

In the tables below,
- Table 4.5 presents the analysis of students’ responses to PRI and POI based on two criteria: inquiring and other points of view. The number of participants whose responses met respective criteria in PRI and POI are also given.
- Table 4.5.1 describes the analysis of the students’ responses to task 9 of ASN.
In table 4.5, it is obvious that the students have shown improvement in POI in demonstrating thinking dispositions—*inquiring attitude* and *considering others points of view*. Let us have a detailed analysis of the responses to the task 4(A) (i and ii) in PRI and POI, and task 9 of ASN. The analysis will be presented under two headings: *Inquiring* and *Other points of view*. Under each criterion the changes in students' thinking dispositions from PRI to POI will be described. Such changes will also be traced to task 9 of ASN. It needs to be noted here that the disposition to inquire was not taught as a distinct lesson in the intervention.

However, this was covered as a part of Lesson 11, i.e., *Developing criteria*. Taking the example of *purchasing a pen*, the students were asked to note down what
questions they would ask before they buy a pen. In addition to this, at several
instances during the intervention, the students were made to understand the
importance of having an inquiring attitude.

In addition to Lesson 11, students were taught about the importance of inquiry
in everyday situations in Lesson 9. When students understood the difference between
a fact and an opinion and how opinions can lead us to ineffective thinking, through a
writing task, they were made to realize that one should collect facts before arriving at
a decision or a conclusion.

Inquiring

Pre-Intervention

Most of the students in PRI were not sensitive to the context with respect to the
application of deliberate thinking in the given situation in Task 4(A) (i). The students
were to respond imagining that he/she were Rahul and what he/she would do in the
given context where Rahul was expected to know the reasons behind the increased
price.

If the students opted to buy without questioning and knowing the reasons for
increase in the price, they would be making an ineffective choice. Therefore, the
students were expected to inquire and know the reasons behind such increase.

But most of the students did not demonstrate this inquiring attitude in PRI.
The responses of these students have clear patterns:

- Buying in an another shop (S5, S6, S7, S8, S9, S10, S11, S22);
- Buying in the same shop because parents asked to do so (S13, S24, S29); and
- Not buying at all (S15, S17, S19, S26, S27).

Some of the responses are given below as examples of the three patterns

Buying in an another shop

Appendix S5/4
I am go to othere shope and to buy rice, and good rice take to the House,

Appendix S6/4
As we can see from table 4.5, there is marked improvement in students’ demonstration of intellectual curiosity.

In task 4(A) (i), the students were required to demonstrate an inquiring attitude in the event of buying an item whose price increased suddenly. 22 out of 30 students,
in table 4.5., wrote that they would enquire before they buy. Some of them have also written very clearly what questions they would ask. This can be seen in the following excerpts.

Appendix S3/12

1. I will ask the question with merchant How to increase the price
2. I will bargain with merchant
3. I will go to next shop
4. I will ask the same questions other merchant
5. I will argue the merchants why we are increase the price stage.

Appendix S13/17

I will go to other shop and ask the merchant about the problem like these.
1. When the rate is raised?
2. Is the quality changed?
3. Is only the shop taking 25%.
4. I will ask him to show the wheat?

Appendix S22/14

I go to other shops and I ask the merchants and take information.
1) why wheat's price is increase?
2) Before 2 days 15 Rs. After 2 day why 10 Rs price increase?
3) Before gives wheat a cheap quality?

This type of Questions

As shown in the above responses, the students have demonstrated clearly an inquiring attitude.

Other points of view

Pre-Intervention

Regarding task (ii) of 4(A), the students were expected to consider and value others' points of view. In the task the students were asked to judge who was right among the three members of the family. The students were expected to think and
respond that handsomeness is very subjective and it differs from person to person. Thus, they cannot say who is right.

But as many as 26 out of 30 students wrote that one of them was right. Out of the 30 students, 14 students mentioned that the sister was right, and 9 voted for Vishal and only 4 were in favour of the mother. A considerable number of these students gave reasons for their choice.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S12/3</td>
<td>Salman khan is most handsome man because he have body and good look</td>
</tr>
<tr>
<td>Appendix S18/3</td>
<td>My favourite hero is Aamir khan but is style is very very good</td>
</tr>
<tr>
<td>Appendix S22/3</td>
<td>My opinion is a Salman Khan because he is a six pack body.</td>
</tr>
<tr>
<td>Appendix S29/3</td>
<td>Shahrukh khan is the most had some mand So he likes him. Hindi movie in which the lead role was played by shahrukh khan.</td>
</tr>
</tbody>
</table>

As we can see from the above, they gave reasons for why a specific actor was handsome. This indicates that their thinking is self-centered, which means that they could not think of the positive aspects of heroes other than their preferences. Such acknowledgement would make them realize that handsomeness is a subjective notion, and it is not possible to say a right or wrong opinion.

Informed by the findings in the PRI, Lesson 12 was designed aiming at teaching considering multiple perspectives.

Task 9 of ASN

In Lesson 12, the students were given situations and various groups of people who were the stakeholders. They were asked to write how those groups of people view the situation from their perspectives. The students were to demonstrate their disposition to consider the issue given from multiple perspectives.
This disposition also reflected in task 9 of ASN. Therefore, the responses to task 9 were analyzed to document the improvement in POI.

In task 9, the students were asked to write the groups of people who get affected by the capital punishment awarded to Afzal Guru.

As we can see from table 4.5.1, 20 out of 30 students were able to consider an issue from multiple perspectives.

**Appendix S3/7**

**Govt**
a) feel very pride
b) then will be more security

**public:**
a) feel very happy
b) They will fear about bomb

**Terrorists:**
They will fear, or angry
So They will planned bomb blast

Here, S3 is able to view the consequences of a situation for different groups of people. While hanging a terrorist means success to government, it is devastating to terrorist outfits. Similar responses were written by most of the students, as given below.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
</table>
| Appendix S24/9 | Terrorist:-
| | 1) He lose one man.  
| | 2) be will attack again  
| | People:-
| | 1) Peopol had happy  
| | 2) Peopol are sad  
| | Government:-
| | 1) fast the terrorist attack.  
| | 2) And Governmante happy. |
On the whole, it can be inferred that Lesson 12 in the intervention helped students in inculcating the dispositions to inquire and consider a situation from multiple perspectives.

In POI, students have shown a positive improvement with regard to showing intellectual empathy, i.e., considering others' points of view.

**Post-Intervention**

As for the responses to 4(A) (ii), 24 out of 30 students opined that each person would have different personal preference. And so, they cannot say which flower is more beautiful. The following excerpts would make this clear.

**Appendix S3/12**

My opinion is Red colour is good. But its there opinion. Sukanya loves white. Arpitha Like red colour. Poojitha Like yellow colour sometimes Red is good colour. Some times white is good colour. Some times yellow is good colour. Most people like other colours.

**Appendix S7/14**

Arpita likes rose colour sukanya loves white colour and poojitha said "yellow colour" sometime rose colour see very wonderful colour and sometimes white colour very nice and yellow colour also very good that opinion.
Appendix S24/17
there three colours are Beautiful. But some time 'yellow chamanti' flowers. Like. Some rose flower like And some time lilies flowers like but there are our opinians.

Appendix S29/13
some time have rose colour beautiful. Some time have yellow colour beautiful. So some time have white colour is beautiful. So some times are all colours are very beautiful. so no colours are beautiful white=shanty rose=love yellow=peaceful three flower are use decoration.

In the above responses, S3 and S7 wrote that each of the colours can be beautiful depending on the circumstances and S29 asserts that each of the colours has certain signifying abstract quality and so they cannot say which of the colours is more beautiful.

### Summary of data analysis – Layer 4 (Thinking) Task 4(A) (i),(ii) in PRI & POI

1) **Inquiring**

**Pre-Intervention**

- Many students were not sensitive to the context where they need to apply deliberate thinking to take effective decision. They were ready to just buy the product in the task without knowing about it.

**Post-Intervention**

- A remarkable progress was noticed in POI that many of the students wrote questions that demonstrated an inquiring attitude in a given situation.

2) **Other points of view**

**Pre-Intervention**

- As many as 26 out of 30 students were not able to consider the issue from multiple perspectives.
- The students mentioned the reasons that conform to their beliefs.
• They were not able to recognize the subjectivity involved in forming opinions.

Task 9 of ASN

• The students were given a situation which could affect different groups of people. When they were asked how they would see that situation from different perspectives, they were able to mention clearly how this situation would be viewed by different sets of people.

• 20 out of 30 students clearly mentioned varied views of different groups.

Post-Intervention

• When the students were to respond to the question of which was the best colour, they clearly mentioned, 24 out of 30 students mentioned that it was a subjective consideration and so it varies from person to person.

4.3.5 Layer 5 - Thinking

In Layer 5, we shall discuss the analysis of the responses to 1(B), 2(B), 3(B), and 4(B) in PRI and POI. Since all these tasks are related to metacognition, they were considered as single task for analysis. Each of the above tasks contains two questions: the first one requires the students to articulate their monitoring of the cognitive processes while the second focuses on assessment of cognitive processes involved in task performance. Two lessons, Metacognition-1 (M1) and Metacognition-2 (M2) focused on teaching for metacognition in the intervention. The learning processes in the intervention can be seen in task 10 of ASN. So, to understand their improvement, task 10 of ASN is also analyzed.
Table 4.6 Layer 5 (Thinking)—Task 1(B), 2(B), 3(B), and 4(B)—Metacognition

<table>
<thead>
<tr>
<th>Criteria for Task 1(B), 2(B), 3(B), 4(B) - Thinking</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
</tr>
<tr>
<td>Metacognitive monitoring</td>
<td></td>
</tr>
<tr>
<td>- Evidence of observing and checking cognitive</td>
<td>0</td>
</tr>
<tr>
<td>processes and experiences of task performance</td>
<td></td>
</tr>
<tr>
<td>clearly and elaborately (M3)</td>
<td></td>
</tr>
<tr>
<td>- Evidence of observing and checking the cognitive</td>
<td>9</td>
</tr>
<tr>
<td>processes and experiences of task performance</td>
<td></td>
</tr>
<tr>
<td>to some extent (M2)</td>
<td></td>
</tr>
<tr>
<td>- No or unclear evidence of metacognitive monitoring</td>
<td>21</td>
</tr>
<tr>
<td>(M1)</td>
<td></td>
</tr>
<tr>
<td>Metacognitive evaluating</td>
<td>0</td>
</tr>
<tr>
<td>- Evidence of assessing the effectiveness of cognitive</td>
<td></td>
</tr>
<tr>
<td>processes in task performance clearly and</td>
<td></td>
</tr>
<tr>
<td>elaborately (E3)</td>
<td></td>
</tr>
<tr>
<td>- Evidence of assessing the effectiveness of cognitive</td>
<td>9</td>
</tr>
<tr>
<td>processes in task performance to some extent</td>
<td></td>
</tr>
<tr>
<td>(E2)</td>
<td></td>
</tr>
<tr>
<td>- No or unclear evidence of metacognitive evaluation</td>
<td>21</td>
</tr>
<tr>
<td>(E1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6.1 Layer 5 (Thinking)–Task 10 Assignment

<table>
<thead>
<tr>
<th>Criteria for Task 10 (ASN)</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metacognitive monitoring</td>
<td></td>
</tr>
<tr>
<td>- Evidence of observing and</td>
<td>9</td>
</tr>
<tr>
<td>checking the cognitive</td>
<td></td>
</tr>
<tr>
<td>processes and experiences</td>
<td></td>
</tr>
<tr>
<td>of task performance</td>
<td></td>
</tr>
<tr>
<td>clearly and elaborately</td>
<td></td>
</tr>
<tr>
<td>(M3)</td>
<td></td>
</tr>
<tr>
<td>- Evidence of observing and</td>
<td>19</td>
</tr>
<tr>
<td>checking the cognitive</td>
<td></td>
</tr>
<tr>
<td>processes and experiences</td>
<td></td>
</tr>
<tr>
<td>of task performance</td>
<td></td>
</tr>
<tr>
<td>to some extent (M2)</td>
<td></td>
</tr>
<tr>
<td>- No or unclear evidence of</td>
<td>2</td>
</tr>
<tr>
<td>metacognitive monitoring</td>
<td></td>
</tr>
<tr>
<td>(M1)</td>
<td></td>
</tr>
</tbody>
</table>

In the above tables,

- Table 4.6 sets out the analysis of students' responses to PRI and POI based on two criteria: metacognitive monitoring and metacognitive evaluating. The number of participants whose responses met respective criteria in PRI and POI are also given.

- Table 4.6.1 presents the analysis of the students' responses to task 10 of ASN with respect to metacognitive monitoring. In this task, only metacognitive monitoring was assessed since there were 10 tasks of ASN and it would be laborious for the students to write about their metacognitive monitoring and evaluating in all the 10 tasks.
As we can see in table 4.6, there is noticeable improvement in POI in both the aspects of metacognitive thinking. In PRI, more than two thirds of the students were not able to reflect on their cognitive processes whereas in POI, 22 out of 30 students were able to articulate reasonably well about cognitive processes involved in task performance.

In what follows, the analysis of the data collected from Task 1(B), 2(B), 3(B), and 4(B) in PRI and POI will be presented under two criteria, which formed the basis for the analysis: metacognitive monitoring, and metacognitive evaluating. Under each criterion, the students' thinking abilities from PRI to POI will be described. The changes from PRI to POI will also be accounted for through the analysis of task 10 of ASN.

**Metacognitive monitoring**

**Pre-Intervention**

Task 1(B), 2(B), 3(B), and 4(B) in PRI are the questions related to metacognitive monitoring and evaluating of the performance of tasks 1(A), 2(A), 3(A), and 4(A) respectively. They were to articulate their metacognitive experience in the performance of these tasks.

In PRI, most of the students were not able to articulate their metacognitive thinking of task performance. Some of the students wrote very clearly that they did not know how to answer the questions.

**Appendix S1/2**

(2) I dont know

**Appendix S2/2**

(2) I dont know

... (2) I dont know

Some other students could not respond to the task and they wrote irrelevant answers as in the following:
Appendix S19/3

Task 2(B):

i) sanjay, a 10-year old boy.

ii) extent successful in accomplishing

This indicates that the students were not aware of such type of questions related to metacognition. This finding is also supported by the fact that their textbooks do not contain tasks that can stimulate metacognitive thinking. Such lack of awareness of metacognitive tasks informed the study in the preparation of the two metacognitive lessons.

Task 10 of ASN

In ASN, task 10 was given to the students to understand their learning in the intervention with regard to metacognitive monitoring. The task requires the students to write about the observation and regulation of cognitive processes involved in tasks 1 to 9. Since this task relates to all the 9 tasks, it was decided that the metacognitive task might be restricted to only monitoring, and thus metacognitive evaluating question was not given in task 10.

It is obvious from table 4.6.1 that most of the students were able to write about metacognition to some extent.

A significant improvement noticed in ASN is that the students were able to express clearly what interested them much, what was difficult or easy, etc.

Appendix S7/8

I am interesting. All tasks but 7th task so interesting that irrelevant find the irrelevant and writing I am so interact but 9th task was so difficult because I didn’t understand that matter terrorist this matter not understand cleverly I am tearing this what I don’t Now I know anything that similarities, metacognition, categorizing, Assumption relevant and irrelevant, criteria, and perspectives this are I know

Some of the students such as S14 wrote about metacognitive evaluating even though they were not asked to write about it. This indicates the intextricable link
between monitoring and evaluating. This is also a strong indication that the intervention was successful in stimulating their metacognitive thinking.

**Appendix S14/11**

Ans: I find interest in task 1 & 2

I got difficult in task 6.

I find difficult in it because task 6 is different so, what I have to or not I did not get right facts opinion but I wish what I wrote it is correct.

Some of the students wrote that some of the words were difficult for them and that they were enjoying doing the tasks.

**Appendix S19/10**

I am an interesting task xxxxxxx (unable to decode) in new words and understand task 9 in 2nd is difficulty I am enjoying I am interested task is irrelevant learnt new words. difficult task 9 considering multiple perceptions.

Many of the students were inclined to write more about their metacognitive experiences as in the case of S26.

**Appendix S26/9**

In the tasks 1 to 10 I have interested for Task - 3 when, answers are given these & ask the write separate the words. So Task-3 is interesting but Task-9 difficult. There on picture is given and asked write a facts & opinions. When there is not given any information. I am difficult on the task-5. These not given for the Assumption, other possibilities. So, I face some difficulty, Task-7 is very interesting & easy. There is given answers. So It is easy. I learnt some similarities & differences of the banana & pineapple. I learnt New words prickly, cereal, delicious. So I happy for the task-9. I write & draw graphic organizer also.

On the whole it can be said from the analysis of metacognitive tasks in PRI, POI, and ASN that there is considerable improvement in students’ articulation of metacognitive monitoring and evaluating.

The practice in lesson Metacognition-1 and 2 gave students good practice and a significant improvement was seen in task 1(B), 2(B), 3(B), and 4(B) of POI, which is described below.
Post-Intervention

In POI, there is a significant improvement in metacognitive monitoring. From table 4.6, it is quite obvious that 21 out of 30 students were able to articulate their cognitive processes.

Appendix S1/1

............

...we are confusing is this 4 parts hear having four parts I am confusing seasons But it is very very interesting

While in PRI, most of the students simply wrote either the tasks were easy, hard, or interesting, in POI they also mentioned what was difficult, easy or interesting.

Appendix S3/12

(1) Task 3(A) some hard. Not very easy. but interesting. I think this Task use to me I leaned new words new things. I understand some names and words. Base, rust, damage, Weston, cheaper.

(2) I think I am completed Task 3(A) But its hard and interesting. I like this task. I learned most new words. and meanings this words are use on me.

Appendix S21/9

1) This task is not hard But some part of this task is very hard and it is very easy because which word we want to write that word is take out very soon and wrote in the paper this is very interesting because the task 1A is given dy Antarctica.

In the above excerpts, S1 explained clearly what was confusing in the tasks; S3 wrote the words which were difficult to understand; and S21 was trying to explain that it was easy picking up the key phrases that were necessary to fill in the diagram. Similarly, many of the students were able to articulate their metacognitive experiences of task performance.

Thus, it can be said from the above that the students have shown considerable improvement in articulating their metacognitive monitoring of task performance.
Metacognitive evaluating

Pre-Intervention

Most of the students could write a sentence or two to express metacognitive evaluation of task performance in task 1(B), 2(B), 3(B), and 4(B) in PRI. Their answers were very brief as in the following excerpts.

Appendix S7/1
Task 2(A):- 75% percent I did it

Appendix S13/5
Task 4(B)
I like interesting in Task 4(A) is nice. This Task is easy.

Almost all the students wrote that they were successful. Two of the students wrote percentages indicating their success rate.

Appendix S7/1
2A:- 75% percent I did it

Appendix S22/1
2(A) I thing 60% right answers deffenetlly.

Some of them just copied a few sentences from the reading passage since they do not know how to answer such questions.

However, their performance improved predominantly in their responses to POI, which is presented below.

Post-Intervention

Task 1(B), 2(B), 3(B), and 4(B) in POI are the questions related to the metacognitive evaluating of the performance of tasks 1(A), 2(A), 3(A), and 4(A) respectively. They were to write their metacognitive experiences in the performance of these tasks.

As can be seen in the table 4.6, 22 out of 30 students correspond to the criterion E2. Most of them were able to articulate think about their effectiveness of their cognitive processes. This can be witnessed in the following examples.
Appendix S1/11
2(A) I wrote a little good only and I wrote an easy I wrote a equal only it is successful it is good only

Appendix S3/13
2) I think Task 4(A) (i) is did not complete well. But Task 4(A) (ii) is completed well. So that I am learned more things, words, and meanings. I understood.

Appendix S8/14
2) I am successful in this task.
   Because I did well in Graphic organizer Some hard to do Answering but task is very easy I learned how to write in my own sentence.

Appendix S9/15
To write in Graphic organizer and to write about T.V. I successfully accomplished. Task 3(A) My opinions is very nice.

As we can see in the above excerpts, most of the students, apart from articulating to what extent they were successful, they were also able to reflect on their learning processes. This is quite obvious in the students’ statements that they were able to write in their own sentences.

Summary of data analysis – Layer 5 (Task 1(B), 2(B), 3(B), & 4(B) in PRI & POI

Metacognitive monitoring

Pre-Intervention

- Most of the students were not able to articulate their metacognitive thinking of task performance
- Some of the students could not respond to the task, which reveals that such kind of metacognitive questioning is unfamiliar to them.
- A few of the students wrote irrelevant answers.
- Some of the students wrote very clearly that they did not know how to answer metacognitive questions.
Task 10 of ASN

- A significant improvement documented in ASN is that the students could distinctly express what interested them much in the task, what made them feel difficult or easy in the task.

Post-Intervention

- They have understood the nature of the task and began attempting to think metacognitively.
- Students have shown considerable improvement in explaining clearly what words hindered their task performance in addition to just mentioning that the task was difficult or easy, which happened in the case of PRI.

Metacognitive evaluating

Pre-Intervention

- Most of them could not write even a sentence to evaluate the effectiveness of cognitive processes in the task performance.
- Quite a few of the students wrote just percentages to express their effectiveness.
- Most of them just expressed that they were successful but, in fact, they could not think about their thinking.

Task 10 of ASN

- An impressive improvement was witnessed where some students wrote about their metacognitive evaluating of task performance even though they were not asked for it in task 10 in ASN.
- Most of the students were inclined to write more about metacognitive experiences.

Post-Intervention

- The students wrote to what extent they were successful in specific tasks.
• They began writing more describing their accomplishment of the task in POI too.
• A remarkable improvement is noticed with regard to their reflection of learning processes, where the students distinctly mentioned that they have learnt to write sentences on their own.
4.4 Analysis of the data– Language abilities

Before we proceed to the analysis of language layers, a brief discussion about the treatment of language in the study is essential to understand the process of language learning vis-à-vis teaching thinking.

The central thesis of this study is that thinking should be recognized as a distinct component in the ESL curriculum. In other words, it is argued here that in addition to the language skills and elements, i.e., listening, speaking, reading, writing, grammar, and vocabulary, thinking needs to be taught explicitly, and as a part of the ESL curriculum. Therefore, this argument preempts the conception that thinking is not related to language teaching.

As explained in the relevant sections of the previous chapters, the study aims at seeking answers to the question whether thinking can be taught as a distinct component in the ESL curriculum. It is hypothesized here that such teaching of thinking inevitably involves language skills and elements, and thus, it leads to the development of language also. So, here, language becomes the throughput or medium for teaching thinking skills and dispositions. Hence, there is no case for a misconception that language is considered to be unimportant, neglected, or ignored. Indeed, language is also taught in this study, but implicitly, which means that lessons were not designed with an explicit objective of language skills and elements. Instead, the students were provided with an environment where they were to think deeply about a problem, decision, etc., and appropriate language that supports and facilitates thinking was used in the classroom in solving such problems. In these processes, the students were expected to acquire words, phrases, and sentences that can help them access, modify, and express their cognitive processes. So, the tasks in PRI and POI were analyzed for students' language development, which is documented in five layers.

Layers 6 to 10 (See fig 4.1 (b)) of the analysis attempt to document the changes in the language abilities of the students after the intervention process. To analyze the data, tasks from PRI and POI were taken, and to trace the development or otherwise, specific tasks were chosen in the ASN.
To analyze language abilities, specific rubrics were designed for specific tasks depending on the language aspects that can be assessed through those tasks. In other words, the language rubric used for task 1(A) in PRI and POI is different from task 2(A) in PRI and POI. This is justified in view of the fact that while some of the tasks can elicit sentences as answers, some other tasks elicit only words from the students. For instance, in task 1(A) in PRI and POI, and task 4 of ASN, students need only words or phrases to answer them, and thus it is not possible to analyze those responses for cohesive devices and coherence. Similarly, it is not possible to look for punctuation problems in those responses which contain only words to be filled in a graphic organizer. Therefore, different rubrics were designed to capture different language aspects in the tasks.

As in the case of analysis of thinking abilities, the tasks in PRI and POI formed five layers (Layers 6 to 10) of analysis, which is presented hereunder.

4.4.1 Layer 6 - Language

Layer 6 presents the analysis of students' responses from Task 1(A) in Pre- and Post-Intervention. To account for the development in language abilities, task 4 was also analyzed. Task 1(A) is a Graphic Organizer Task, which involves the following language skills—

- Ability to use appropriate vocabulary and sentence structure;
- Ability to use correct punctuation and spelling;
- Ability to use own words or sentences; and
- Ability to identify key words or phrases that express the gist.

The skills mentioned above were covered as part of Lesson 6 in the intervention and were also covered in task 4 but implicitly. The criteria used for analyzing the language abilities in the Graphic Organizer Task are given below. In table 4.7, the number of participants whose responses correspond to the various criteria is given.
Table 4.7 compares the language abilities of the students in Task 1(A) in Pre-\textit{Intervention (PRI)}, Post-\textit{Intervention (POI)}, and task 4 in Assignment (ASN). With regard to Grammar, 23 responses met the criterion S2 in PRI and S3 in POI. In the use of correct punctuation and spelling, most of the students' responses correspond to M3 and M2 criteria in PRI whereas 22 responses met M3 criterion in POI.

<table>
<thead>
<tr>
<th>Criteria for Task 1(A) – Language</th>
<th>Number of Participants</th>
<th>Pre-\textit{Intervention}</th>
<th>Post-\textit{Intervention}</th>
<th>Assignment Task 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Evidence of using own words/sentences, and identifying key words and phrases to use in the diagram (O3)</td>
<td></td>
<td>5</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>-Evidence of using a mix of own words/sentences and words, sentence copied from the given text; identifying key words and phrases to some extent (O2)</td>
<td></td>
<td>22</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>-Evidence of using mostly copied words/sentences; unable to identify key words or phrases (O1)</td>
<td></td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Grammar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of adequacy and accuracy (S3)</td>
<td></td>
<td>5</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of adequacy and accuracy (S2)</td>
<td></td>
<td>23</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>-Evidence of a low level of adequacy and accuracy</td>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Mechanics (Punctuation, Spelling)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of accuracy (M3)</td>
<td></td>
<td>10</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of accuracy (M2)</td>
<td></td>
<td>16</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>-Evidence of a low level of accuracy (M1)</td>
<td></td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.7 Layer 6 (Language) – Task 1(A) in PRI & POI, and Task 4 (ASN)

In the following, the analysis of the data collected from Task 1(A) in PRI and POI will be presented under three headings: \textit{Construction, Grammar,} and \textit{Mechanics.} These criteria formed the basis for analyzing the changes in students’ language abilities from PRI to POI. To trace the development to the intervention process, task 4
was analyzed. The responses to task 4 were analyzed to understand the developmental changes.

Construction

Pre-Intervention

Most of the students did not use their own words or sentences to respond to the task. In fact, they did not use the diagram given as an input in the task. They copied the exact language in the task input to some extent. This is obvious from table 4.7 where 22 out of 30 students are in criterion O2. Most of them could not narrow down the information to the key phrases that are enough to perform the task, instead, they split the paragraphs and ordered them randomly.

Appendix S11/1

1) The Arctic is a large region of the earth around the North Pool
2) This region includes the Arctic ocean. Greenland, Iceland thousands of smaller islands and the Northern Part of three continents

Since these students took sentences from the given text, it is difficult to infer their abilities related to Mechanics and Grammar. Some students were able to find a few sentences that they considered to be important though they were not able to use the given diagram. S22 is an example of this pattern.

Appendix S22/1

i) The Arctic is a large region of the earth around the north pole.
ii) wildlife in the Arctic includes wolves, polar bears, foxes, many birds, caribou, lemmings, wolves, walruses and arctic hares.

In Lesson 6, the students were taught to make an external representation of the information given. Students had the practice of picking up key phrases, creating category labels, and using graphic organizers. Such creation of labels also suggests that their vocabulary is developing. This development can be witnessed in their performance to task 4 of ASN.
Task 4 of ASN

Table 4.7 depicts the criteria used for the assessment of the responses to task 4 of ASN and the number of participants whose responses correspond to the criteria. In Construction, 22 students attempted to use key words or phrases that sum up the gist of the task input. On deeper analysis, the following observations were made.

In task 4 of ASN, the students were asked to compare and contrast bananas and pineapples for which they should use the given graphic organizer.

Most of the students were able to identify the key phrases as in the following:

Appendix S8/7
Weight
Use
Skin
Colour
growing place

Appendix S16/7
Taste
Carry
Skin

In the case of S8, it can be observed that the student was able to write his own words growing place as one of the category labels. Similarly, S16 created a category of carry to summarize a part of the information. A number of instances of students using their own labels and ways of creating category labels can be found.

This improvement can also be traced to the SCUMPS (Size, Colour, Use, Made, Parts, and Shape) strategy discussed in Lesson 1. In this lesson, the students were taught to identify the properties or characteristics of an object using SCUMPS strategy.

The students' involvement and improvement in language learning is apparent in the above example. This does not mean that all of them used grammatically correct phrases and sentences—certain developmental errors were also noticed in case of a few students. In the following excerpts, we can observe different types of language errors made by the students.
<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
</table>
| Appendix S7/5 | ...to not wash  
...use for drink juice *(error related to to-infinitive)* |
| Appendix S10/5 | ...Pineapples is used *(error related to subject-verb concord)*  
...Both is used |
| Appendix S18/5 | 1. Bananas are very taste *(error related to subject-verb concord)*  
3. They wonderful taste |
| Appendix S22/5 | Bananas skin is very smoothly  
Bananas carry easily  
...pineapples also grows  
...Pineapples is not excellent breakfast food *(error related to subject-verb concord)* |

This improvement can also be witnessed in the responses to task 1(A) in POI.

### Post-Intervention

A substantial improvement was noticed with respect to the ability to identify the key words or phrases to fill in the diagram. Instances of this can be found in the responses of S1, S9, S18, S21, S25, and so on.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
</table>
| Appendix S1/8 | States  
Con ine nt  
South Pole  
Three oceans |
| Appendix S9/11 | Sea bird  
| Appendix S18/8 | 1. Temperature; 2. Freeze; 3. Brutal |
Appendix S21/9

<table>
<thead>
<tr>
<th>Temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1°; 2 below zero; 3 200</td>
</tr>
</tbody>
</table>

Appendix S25/12

<table>
<thead>
<tr>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile; Norway; Great Britain</td>
</tr>
</tbody>
</table>

However, it should also be noted that in an attempt to use a few key words that could fit in the diagram, S21 did not mention what 200 refers to, and S18 used unsuitable key words. This aspect of appropriate label for a category label or a category constituent was analyzed in Layer 1 (Thinking).

A few students attempted to create category labels on their own. Their willingness to use their own labels was clearly demonstrated in the responses of the following students.

Appendix S3/8

What about land
How many Nations
What about studio scientists

Appendix S12/10

Surrounded by
Summer

On the whole, it can be inferred that the students developed the ability to pick up the key words and phrases that express the gist, choose or create labels to create categories.

Grammar

Pre-Intervention

As far as the grammatical abilities in Task 1(A) in PRI, some students copy some phrases and attempted to create their own sentences. But these had problems related to grammar, which are clear in the following excerpts.
Appendix S3/1
3) Wild life in includes wolves, polar bears, foxes, many birds, caribou, lemmings, walrus, and arctic hares lived in Arctic.

Appendix S5/1
(1) Arctic region includes the Greenland, Iceland, thousands.
(2) the northern parts of three continents
(3) The continents North America, Europe, and Asia.

Appendix 14/1
2) This region includes the Artic ocean, Greenland, Iceland, thousand of smaller island, and the northern parts of three continents:- North America, Europe, and Asia.
6) Still other are happs, yakuts, and chukchi.

Appendix 27/1
1) Arctic is a North America, Europe, and Asia.
2) this is a still others are Lapps, Yakuts, and Chukchi.

In the above responses of the students, S3 did not combine two sentences properly and used preposition in unnecessarily. S5 split a single sentence into three parts which are not complete ideas. In the case of S14, thousand, island, and other should be used in plural. Error in the use of the indefinite article a in the case of S27 may also be noticed.

Task 4 of ASN

In task 4 of ASN, the students were to read a passage on bananas and pineapples and fill the gist in the given graphic organizer. The students had the opportunity to create their own category labels to organize the information. Hence, some of the language problems were noticed.

In the case of S7, the student is not able write a to-infinitive construction and unable to use phrases with meaningful sentence construction.

Appendix S7/5

Bananas
to not wash (instead of *not to wash*)

**Food**

use for drink juice (instead of *can make juice*)

Subject-verb agreement was another problem noticed in the case of some students. S10, among a few others, has a problem with subject-verb concord.

**Appendix S10/5**

3) Both is used for making ice cream etc. (instead of *Both are...*)
3) Pineapples is used to making pizza, ice cream or cakes. (instead of *Pineapples are...*)

**Appendix, S22/5**

- Pineapples is not excellent breakfast Food. (instead of *Pineapples are...*)
- ....pineapples also grow... (instead of *pineapples also grow...*)

Problems with word forms were also noticed in the case of some students. S18 demonstrates willingness to construct his own sentences but commits errors. The student is unable to use the word *taste* as a verb, as shown below.

**Appendix S18/5**

1. Bananas are very taste
2. Pineapple are very taste
3. They wonderful taste

Since the students were asked to use a graphic organizer in task 4 of ASN, they were stimulated to produce language. Even so, this task could reveal only some of the grammatical problems the students have.

**Post-Intervention**

As in the case of PRI, there is limited scope, in POI too, to analyze the students’ responses for assessing grammar and vocabulary. However some of the problems found are described below.
In the case of S5, the article *the* is not required. In the case of S10, wrong use of the verb *know* can be seen. S10 did not use *the* in front of the superlative degree adjective. S14 used a wrong preposition.

On the whole, it can be said that the students’ grammatical abilities are not fully captured through this task because it is a graphic organizer task.

**Mechanics**

**Pre-Intervention**

A significant observation with regard to spelling is the word Arctic. Most of the students incorrectly spelled this as *Artic*. It should be noted that the students had the opportunity to check the spelling in the task input. Besides, mistakes in spelling, problems with capitalization were noticed in many of the responses. Some of the students such as S4, S7, and S19 did not use capital letters at the beginning of each of the sentences. In the response of S8 too, some errors related to Mechanics were noticed.
(iv) the region ....  
(v) the most common ....  
(viii) the Arctic climate  

Appendix S19/1  
(i) the Arctic is a large  
(ii) this region includes the  
(i) many of the inhabitants  
(ii) still others  
(iii) the northern parts

Appendix S8/1  
.islands Greenland, Iceland  
...in winter  
...even bitter.

However, as for some of the responses, since they were directly copied from the task input, inferring abilities related to Mechanics was relatively difficult.

Task 4 of ASN

As far as the Mechanics are concerned, spelling was problematic in the responses of some of the students, which are as follows.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
</table>
| Appendix S11/1 | .slices (instead of slices)  
                  ...juicy (instead of juicy)  
                  ...prickly (instead of prickly) |
| Appendix S12/6 | .cary (instead of carry)  
                  .doesn’t have parts (instead of doesn’t have parts) |
| Appendix S20/6 | ...cereal (instead of cereal)  
                  ...brack (instead of break)  
                  ...froots (instead of fruits)  
                  ...smmoth (instead of smooth) |
Most of the spelling errors committed in the above examples could have been avoided by the students had they observed these words more consciously in the reading input. They committed such mistakes even after they were taught in the intervention process, which suggests that they were in the process of learning. However, only a few mistakes were committed in the POI as far as spelling and capitalization are concerned.

**Post-Intervention**

On observing students 4, 11, and 24, it is obvious that they have improved in paying attention to their spelling, punctuation, and capitalization. However, this is not the case with some of the students because spelling and capitalization problems can be seen to some extent.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix 1/8</td>
<td>contr utrin</td>
</tr>
<tr>
<td></td>
<td>Norway</td>
</tr>
<tr>
<td>Appendix 30/11</td>
<td>Soun indg</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
</tr>
<tr>
<td>Appendix 8/</td>
<td>pecif c</td>
</tr>
<tr>
<td></td>
<td>temperature</td>
</tr>
<tr>
<td>Appendix 16/12</td>
<td>pacific ocean</td>
</tr>
<tr>
<td></td>
<td>animal s</td>
</tr>
<tr>
<td></td>
<td>Norway</td>
</tr>
</tbody>
</table>

In the following, we shall look at the summary of the analysis of Layer 6.
Summary of data analysis (Layer 6)- Task 1(A) in PRI & POI, Task 4 of ASN

Construction

Pre-Intervention
- Most of the students copied the sentences for the text in the reading passage.
- They were not able to identify the key words that can express the gist of the passage.

Task 4 of ASN
- Most of the students were able to identify key words and phrases that express the gist of the information given.
- There was a conscious attempt by the students to create their own labels and most of the students were successful to a large extent. Task 4 of ASN stimulated the students to produce language.

Post-Intervention
- A substantial improvement was documented with regard to identifying key words and phrases that express the gist.
- As in task 4 of ASN, students also attempted to create their own labels, which indicate improvement in language production.

Grammar and Vocabulary

Pre-Intervention
- It was difficult to assess grammar and vocabulary of the students through task 1(A) since most of them copied the sentences from the reading text.
- Errors related to sentence combining, prepositions, plural form of nouns, and articles were found in the case of few students.

Task 4 of ASN
- Errors related to to-infinitive constructions, subject-verb concord, and word forms were found.
Post-Intervention

- Only a few problems related to articles, word forms, and prepositions were noticed.
- However, it cannot be inferred that the students have developed drastically since task 1(A), which is a graphic organizer task, cannot fully elicit their language abilities.

Mechanics (Punctuation, Spelling)

Pre-Intervention

- Though students had the opportunity to check the spellings in the reading passage given as part of task input, many students committed spelling mistakes.
- The word Arctic was wrongly spelt by most of the students.
- Some of the students did not use capital letters at the beginning of the sentences.

Task 4 of ASN

- In task 4 of ASN, there were quite a few spelling errors.
- Spelling mistakes were noticed even after the intervention process.
- However, the incidence of spelling mistakes in task 4 of ASN was lower than those in PRI.

Post-Intervention

- There is a considerable improvement in the spelling of the students in task 1(A) in POI.
- Very few errors relate to spelling were found.
- But a few students committed errors related to capitalization.
4.4.2 Layer 7 - Language

Layer 7 contains the analysis of data from Critical thinking task, i.e., Task 2(A) in PRI and Task 2(A) in POI. To account for the learning processes related to language abilities, task 5 of ASN was analyzed. Task 2(A) in PRI and POI is a critical thinking task.

Table 4.8 presents the analysis of the students' responses to PRI, POI and task 5 of ASN based on two criteria: Grammar and Cohesive devices and Mechanics (Spelling).

A glance at table 4.8 reveals that there is no significant improvement in the POI as far as the use of grammar and cohesive devices are concerned. Even in the ASN, as many as 25 out of 30 students showed only a medium level accuracy in structure. Though a slight improvement can be noticed in the case of capitalization and spelling, there is no substantial improvement.

<table>
<thead>
<tr>
<th>Criteria for Task 2(A) – Language</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
</tr>
<tr>
<td>Grammar and Cohesive Devices</td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of adequacy and accuracy (S3)</td>
<td>1</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of adequacy and accuracy (S2)</td>
<td>22</td>
</tr>
<tr>
<td>-Evidence of a low level of adequacy and accuracy (S1)</td>
<td>7</td>
</tr>
<tr>
<td>Mechanics (Spelling)</td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of accuracy (M3)</td>
<td>5</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of accuracy (M2)</td>
<td>20</td>
</tr>
<tr>
<td>-Evidence of a low level of accuracy (M1)</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4.8 Layer 7 (Language) – Task 2(A) in PRI & POI, Task 5 (ASN)

In the following, the analysis of the data collected from Task 2(A) in PRI and POI will be presented under two headings: Grammar and cohesive devices, and Mechanics (Spelling). Under each criterion, the changes in students' thinking abilities
from PRI to POI are described. Such changes will also be accounted for through the analysis of task 5 of ASN.

Grammar and Cohesive Devices

Pre-Intervention

In task 2(A) in PRI, the students were given a situation in which students need to critically look at the conclusion made by Sanjay's sister about Sanjay's visit to the zoo. It is quite clear from Table 4.8 that a predominant number of students' responses correspond to the criterion S2.

A major grammar problem that was present in almost all the students' responses was subject-verb disagreement.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S5/2</td>
<td>Sarjay go to the zoo...</td>
</tr>
<tr>
<td></td>
<td>The animals was denger</td>
</tr>
<tr>
<td>Appendix S12/2</td>
<td>...because if Animal have bitten the...</td>
</tr>
<tr>
<td>Appendix S13/4</td>
<td>...Because animals is not bite....</td>
</tr>
<tr>
<td>Appendix S16/1</td>
<td>There have also secruity awards.</td>
</tr>
<tr>
<td>Appendix S21/1</td>
<td>Many animal are there and many people comes to see the zoo.</td>
</tr>
<tr>
<td>Appendix S24/3</td>
<td>Sanjay not reply the mother's asked quesens then he don't know what Happened.</td>
</tr>
<tr>
<td>Appendix S25/2</td>
<td>One insects is bitting that way's...</td>
</tr>
<tr>
<td>Appendix S29/2</td>
<td>...in the Park some animal have bitten him.</td>
</tr>
</tbody>
</table>
Most of the students' responses in PRI were very brief. In the case of some of the students, only one sentence was written as a response. Inaccurate sentence constructions were found as in the case of the following excerpts.

Appendix S1/1
1) No, we cannot tell that thing he went or no go zoo park

Appendix S7/3
Sanjay's sister is wrong because in zoo animals do not beats. so sanjay's sister wrong.  
(Inaccurate use of the verb form beat: Absence of the use of verb is)

Appendix S10/2
Sanjay's sister was not wrong because in zoo the animal will be in Kave. Sanjay mait fell down and got wound in his leg. (Inaccurate use of the verb form fall)

Appendix S14/2
The Sanjay's sister was wrong because in zoo every animal is in tie or closed. Sanjays was fell down but his sister was wrong. (Inaccurate use of the verb form fall)

Appendix S22/2
Some animals not bitten to Sanjay. because. All animals are in zoo. (Inaccurate use of verb form bite).

It can be deduced from the above that there are problems in basic sentence construction. Furthermore, most of the students did not use any conjunction such as so or because. The difficulty in assessing grammar and cohesive devices was further increased by the fact that a few students copied the sentences from the reading input.

Task 5 of ASN

In task 5 of ASN, students have improved in using the modal might. This might be the result of Lesson 7 and 8 in the intervention. In those lessons, students took part in strategic interactions with the teacher. There was an extensive oral and written use of this modal might by the students, and hence the improvement, which can be witnessed in the following excerpts.
<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
</table>
| Appendix S3/6    | He might have doesn’t drive
(2) He might have drunk and drive
3) He might have vehicle breakes fail
4) He might have drove speed |
| Appendix S5/11   | He might have go to the midel of road,
He might have play on the road
He might have cross the road
He might have the Backs brake sealed |
| Appendix S8/8    | He might dunk when he was coming back to home
(2) He might drove the vehicle in a wrong way..
(3) The vehicle’s brakes might have failed.
(4) He might got headech while he driving his vehicles
(5) He might don’t know how to drive A vehicle. |
| Appendix S20/7   | He might have not drive on a Viswanath
(2) He might have drink
(3) He might donot diveing
(4) His car bracs is failed |

In the above responses, we can see that even though students were able to use the modal *might* its perfect conditional form was not learnt by the students and the same reflected in the POI. This is one of the reasons why most of the students’ responses did not show any improvement in POI and ASN in table 4.8. Although students wrote a number of sentences in POI and ASN, because of the errors in the use of the perfect conditional form of the modal *might*, they met criterion S2 instead of S3. Apart from this, the students demonstrated a high level of fluency in writing.

**Post-Intervention**

As mentioned earlier, there was no apparent improvement from PRI to POI as far as the grammatical abilities are concerned. However, it should be noted that the
responses to task 2(A) in POI were relatively longer. The students used more number of sentences than they did in PRI. Thus, there is a possibility for high incidence of grammatical errors, which becomes quite evident as some of the excerpts from the responses are presented below.

Before we look at the analysis, it needs to be noted that the students did not directly respond to the question in task 2(A). In this task, the students were asked to write a paragraph justifying their critical response to the conclusion made by Sudheer's sister. But the students used a format in which they used the sub-headings conclusion, premise, assumptions, and other possibilities. This was due to the fact that they were taught in the Lessons 7 and 8 to identify the above in such format. They used the same format in POI. This is viewed positively here because they were attempting to apply what they had learnt in the intervention. However, it should also be acknowledged that their ability to convert their critical thinking skills into a format that is demanded by the question is still developing.

A major pattern found in the responses in POI is the use of the perfect conditional form of the modal might. Almost all the students attempted to use this modal but such use was not free from errors. Though they were able to use might have in most cases, they could not use the third form of the verb correctly.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/9</td>
<td>1) he might have fell on the road</td>
</tr>
<tr>
<td></td>
<td>2) he might have Drink and Drive</td>
</tr>
<tr>
<td>Appendix S4/13</td>
<td>* He might have drinking.</td>
</tr>
<tr>
<td></td>
<td>* He might have driving.</td>
</tr>
<tr>
<td></td>
<td>* He might have go with speed.</td>
</tr>
<tr>
<td></td>
<td>* He might have sleep.</td>
</tr>
<tr>
<td>Appendix S17/11</td>
<td>(1) Sucher might have the road is breakable</td>
</tr>
<tr>
<td></td>
<td>(2) he might have he drive speedly</td>
</tr>
<tr>
<td></td>
<td>(3) he might have he drank and drive.</td>
</tr>
<tr>
<td></td>
<td>(4) he might have another vehicle driver is drank and drive.</td>
</tr>
</tbody>
</table>
| Appendix S22/11 | 1) Sudheer might have running in road  
2) He might have not follow the ..  
3) he might have break failed. |
|----------------|----------------------------------------------------------------------------------|
| Appendix S23/14 | 1) He might have drink  
2) He might have speed Runing |
| Appendix S26/11 | (1) He might have Drink & Drive  
(2) He might have suddenly cross a road |
| Appendix S30/12 | He might have ran in the road  
He might have drink  
He might have became giddy  
He might have bike came speed and he have knocked |

In addition to these, it was noticed that a few students attempted to create different sentence structures with *might*, which can be seen in the following responses.

**Appendix S8/12**

Sudheer might haven’t be walked on Footpath.  
(2) He might played while he walking on the road  
(3) He might walked on the road.  
(4) He might haven’t haven’t seend the bike

From the above, it can be inferred that students got the conditional knowledge of the use of the modal *might*, however, the structural accuracy seems to demand some more practice. Nevertheless, it is quite obvious from the excerpts that the fluency in writing has increased dramatically since they were to explain other possibilities, which were very subjective, on their own.

In the written response to task 2(A), another improvement noticed is related to the use of *because*. Almost all the students picked up the use of *because* in writing the assumption as a part of the response. To explain the logical connection between the conclusion and the premise, it is necessary to use a causal linker. Most of them were habituated to use this conjunction in Lessons 7 and 8 in the intervention process. They
were able to transfer successfully this learning to POI, which can be observed in the following responses.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S2/12</td>
<td>Assumption: because Sudheer hit him from stick god give punishment</td>
</tr>
<tr>
<td>Appendix S13/13</td>
<td>Assumption: Shudher met with an accident because in the morning he bet his sister</td>
</tr>
<tr>
<td>Appendix S15/11</td>
<td>Assumption: Shudher met with an accident because in the morning he bet his sister</td>
</tr>
<tr>
<td>Appendix S21/10</td>
<td>Assumption: because of morning hit is sister it got punishment from got</td>
</tr>
<tr>
<td>Appendix S22/10</td>
<td>Assumption: Because sudheer he sistr hit in the morning and God punishment today so sudheer got a accident.</td>
</tr>
<tr>
<td>Appendix S25/13</td>
<td>Assumption: God has given Sudheer punishment because hit her sister</td>
</tr>
<tr>
<td>Appendix S30/12</td>
<td>Assumption: because he hit her sister god gives punishment.</td>
</tr>
</tbody>
</table>

**Mechanics (Spelling)**

**Pre-Intervention**

As far as spelling and capitalization are concerned, only a few errors were noticed. This might also be the case because of the obvious reason that there are few sentences in the responses of the students.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S2/2</td>
<td>.biting.</td>
</tr>
</tbody>
</table>
With respect to spelling, very few errors were found in most of the responses in ASN. Only three students, whose responses are given below, have made more than three errors in spelling.

**Appendix S20/7**
..diveing..
..bracs..
..falled..

**Appendix S22/6**
..happend..
..tire..
..pumpture..
Post-Intervention

As for the mechanics, more spelling mistakes were found in POI for the reason that the students attempted to use more sentences on their own. In order to write other possibilities, they should imagine various possible situations and create their own sentences. As a result they had an opportunity to use more language and so they committed more errors.

Appendix S5/11
..accedent...
..fealed..
..cretical..
..dyamejed..

Appendix S24/13
..hited..
..happend..
..controld..

Appendix S29/10
..drnk..
..airoplane..

If we observe S5’s response, it is easy to understand that the student is attempting to use some words from the auditory memory but does not have visual memory for the words such as critical and damaged. Other spelling errors noticed in the case of few students are related to the words accident, assumption, possibilities, and vehicle. However, these mistakes might have been made because of only a little exposure to the written form of the words. In the case of a few students, they demonstrated clearly their earning of spelling too. For instance

Appendix S29/2 (PRI)
...right becaues in the prir...

Appendix S29/6 (ASN)
..because of black cat..

Appendix S29/10 (POI)
..because He hit his sister...

When we observe the development of student 29, as in the above excerpts, it is very clear that the students are engaged in deep learning process through which spelling can also be improved. These and the other developments can be traced to their learning in the intervention and ASN.

| Summary of data analysis: Layer 7 (Task 2A in PRI & POI, & task 5 (ASN)) |

**Grammar and Cohesive devices**

**Pre-Intervention**

- A major grammatical problem found was related to subject-verb concord.
- Even in briefer responses, grammatical errors were found with regard to inaccurate use of verb forms.
- Problems with basic sentence construction were noticed.
- With regard to cohesive devices, there was no use of conjunctions such as so or because

**Task 5 of ASN**

- Students began using the modal auxiliary might. However, its perfect conditional form of the modal might was not learnt by the students.
- Nevertheless, the students' writing of more number of sentences was witnessed.

**Post-Intervention**

- In the cases of most of the students, they began using the modal might. The students also attempted to write its perfect conditional form have + verb III form, but they could not write the third form of the verb correctly.
- Instead of the third form of the verbs, many students used other forms of the verbs inaccurately.
- Almost all the students began using the conjunctions because and so, which was a significant improvement from PRI to POI.
Mechanics (Spelling)

Pre-Intervention
- With regard to spelling and capitalization, students used only a few sentences as such only a few errors were noticed.

Task 5 of ASN
- The incidence of spelling errors in task 5 of ASN reduced to some extent.
- Only a few students committed spelling errors

Post-Intervention
- In POI, more number of spelling errors was found when compared with PRI.
- This could be because that there was more number of sentences in POI since they should imagine the other possible causes for the incident in the task.
- Some of the students began using the words that were used orally by the teacher in the classroom interaction.

4.4.3 Layer 8 - Language

In Layer 8, we will look at the analysis of language abilities in task 3(A) in PRI and POI, and task 2 and 6 of ASN. Task 3(A) in PRI and POI is a decision-making task and task 2 of ASN involves the skill of identifying similarities and differences between a ceiling fan and a mixer and task 6 is related to distinguishing between facts and opinions based on a given picture.

As we can see from table 4.9, 27 out of 30 students in POI have constructed their own sentences at least to some extent. But, as far as grammar and cohesive devices, and mechanics are concerned, we can see mixed results in the improvement.
Table 4.9 Layer 8 (Language) – Task 3(A) Decision Making

In the following account, the analysis of the data collected from Task 3(A) in PRI and POI will be presented under three headings that formed the basis for the analysis: Construction, Grammar and Cohesive Devices, and Mechanics (Punctuation and Spelling).
Under each criterion, the changes in students’ language abilities from PRI to POI are described. These changes will be justified through the analysis of task 2 and 6 of ASN.

Construction

Pre-Intervention

In PRI, only 3 out of 30 students attempted to try to construct their responses using their own sentences and the rest of them copied the sentences from reading input. Some students copied the whole reading text in the task. While the number of students who have written their own sentences to some extent stood at 13, these include minor changes to the input. The following excerpt is an example.

**Appendix S9/14**

The Weston TV is 21 inches it will fit in my shelf. Weston’s TV weight is less than ... Bush TV Price is costly only But quality is more good. I want to see more channels in Weston there is 120 channels..

**Appendix S10/2**

In Nokia is a very popular brand and it can hold 1,000 addresses whereas only...

In Nokia, there is a special feature called ‘T9’ dictionary....

In it many language along with Hindi.

Though 3 out of 30 students were able to construct their own sentences, the responses were not related to the question in task, in which the students were to express their preference in buying one of the products given. S17 wrote about the information outside of the context given in the task, which can be seen in the following.

**Appendix S17/3**

I will not buy the Samsung mobile. That Samsung phones will be touch screen mobiles and other tab’s phones are very big. the Samsung phones use full to young college boys and girls not use very age uncles and Auntsie screen touch mobiles. the Samsung mobiles will be not use both friends.

Similarly S20 and S21 wrote the information that is out of the scope of the task.
Appendix S20/3
...and the internet
...there geams

Appendix S21/2
...this i like because of when i in meeting or class i not destabe our silf and others when rings the phone that’s way...

These students were also considered to have written their own sentences even though they mentioned the information that is not given in the task input.

**Task 2 & 6 of ASN**

Task 2 of ASN requires the students to write two similarities and two differences between the two objects given in the task. Almost all the students were able to construct sentences on their own. Though they needed to write only four sentences on the whole, their attempt to write sentences on their own using the conjunctions was noticed.

Likewise, in task 6 of ASN, the students had to write three sentences expressing facts and three sentences expressing opinions. Almost all the students constructed sentences on their own.

**Post-Intervention**

It is quite clear from table 4.9 that students have demonstrated enthusiasm to construct their own responses despite the help that can be taken from the given input. 27 out of 30 students in POI have attempted to construct their own sentences at least to some extent.

**Appendix S6/12**

We can Programmes in Weston Tv. it colour is very good. it inches is 210 weight 2 kg if Iron is there shock will comes plastic is not. That’s Weston T.V is best.
Appendix S8/14
It have more channels and not a weighter one. I am not underestimating bush TV. That is also good but it has Iron base. It will rusts that is why I am fixed to buy Weston, and It will be easy to carry hear and there when are shifting from one place to another place. but bush bus TV is not sufficient to carry here and there that is very heavy I think.

In the case of S6, though the sentence construction was grammatically poor, the student attempted to use his own sentences. Similarly, S8 was more articulate in giving reasons and used more words demonstrating fluency in language production.

Some students have copied the sentences to some extent and used some of their own sentences.

Appendix S26/13
It looks beautiful. It has more price but it quality T.V. Its base made by plastic. Its not rush. .....It's has remoted control..

**Grammar and Cohesive Devices**

**Pre-Intervention**

As far as the grammatical structures are concerned, since most of the students copied from the given text, it was difficult to analyze their abilities accurately. However, many of them committed errors wherever they attempted to modify or change the sentences taken from the text. Subject-verb concord seems to be a serious problem with most of the students.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S12/2</td>
<td>.....he nokia have to hold 1,000 adresses...</td>
</tr>
<tr>
<td></td>
<td>.....Nokia have F.M radio...</td>
</tr>
<tr>
<td>Appendix S13/3</td>
<td>.....Nokia have a different phones</td>
</tr>
<tr>
<td></td>
<td>.....Nokia have a loud speaker...</td>
</tr>
<tr>
<td>Appendix S14/2</td>
<td>My mother have nokia phone...</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Appendix S21/2</td>
<td>i like k1662 model it have low sound in speaker...</td>
</tr>
</tbody>
</table>

There are also other types of errors related to verb forms (S5, S15) and plurals of nouns (S13, S18).

Appendix S5/3

...Nokia phones are can not be repaid.

Appendix S15/3

...popular Brand and is can add 1000...

Appendix S13/3

...Nokia have a different phones...

...Nokia have a Bluetooth and games videos..

Appendix S18/2

...because he has a very good mobiles..

Task 2 of ASN

In POI, we have seen that there is more frequent use of the connectives and and but. The connectives and and but were taught implicitly in Lesson 3 and the development reflected in task 2 of ASN (See table 4.9.1). Most of the students i.e., 24 out of 30 were able to use the said connectives with at least reasonable accuracy.

Appendix S6/5

Similarities
Both of them have machines
Both them have a current use

Differences
Ceiling fan can fixed up but mixi cannot fix up
Ceiling fan have a big wing but mixi have small wings.

**Appendix S8/5**

*Similarities and Differences*

(1) Both will work with Electricity.

(2) Both can be keep in a particular place

*Differences*:

(1) Mixi can grind some thing, but Fan cannot grind anything

(2) Mixi will be having a cap, but a fan will not have any cap

In the above case, it can be observed that the students were able to use the connective *but* with structural errors. Some other students used both *and* and *but* to refer to the contrastive conjunction *but*. This indicates that they need further practice in this aspect.

**Appendix S11/6**

*Differences*

1. Mixi: Can grind anything But fan cannot grind

2. fan will gives air and mixi will not gives air

**Appendix S12/5**

1. Mixi can grind any thing But fan can not grind

2. fan will gives air and Mixi will not gives air

**Appendix S15/6**

1) Mixi can gain only Thing But Four can not gaind

2) fan will give all and Mixi will not gives all.

However, there are a few students who were not able to use *but* at all.

**Appendix S21/5**

1) Ceiling fan can give air mixi didno give air

2) Ceiling fan have rod mixi didno have rod.

**Appendix S22/4**

1) fan gives air mixi dus not gives air.

2) ceiling fan fit on slab mixi dus not fit on slab

In all the above response excerpts, we can observe that the students attempted to write their own sentences. But most of those sentences were grammatically
inaccurate. This indicates that teaching thinking is able to stimulate students to produce language without being anxious about committing errors.

Task 6 of ASN

Students attempted to write their own sentences to express facts and opinions. From table 4.9.1, it is obvious that 24 out of 30 students were able to write, though with grammatical errors, sentences that can express what they intend to. Even with these students, a few errors were found.

A few students have the problem with basic sentence construction. It is difficult to comprehend the meaning in the sentences they used. The following examples can exemplify this.

**Appendix 19/8**

i) inside is he table

ii) inside is the have inkbottles.

iii) when inside gon shoes out side

**Appendix 20/7**

fact:- one Boy going for shop and he haw stooll the quick stop shop and he might have stooll Boy and he lagej in his hand and runninga stool Boy

A major grammatical problem noticed was with regard to the use of verb forms. Many students had problems in using the correct tense and passive form of the verbs. This can be explained with the following excerpts of the students.

**Appendix S1/6**

Facts 1. There have one Quick stop

2. There have on open Booed

3. There have one person

Opinions

3) he going hurry.

**Appendix S7/6**

(i) He running to out side (F)

(ii) He bag have bomb (O)
(iii) shop owner might bit him (O)

(v) He Relations might accident (O)

Appendix S14/8
1) He did not going slowly.
2) The shop keeper not looking.

In addition to these, errors related to articles, prepositions were also found in the responses of a few students, as in the below excerpt:

Appendix S5/8

Facts  He is a Kary the bag
       He is a go to a any plase
       He is a falo any bady.

Though there were problems with grammaticality of the sentences, an improvement was seen with related to the use of modal might in their sentences. In Lessons 7 and 8 in the intervention, the teacher and the students used the modal *might* in oral and written form several times. The use of this modal auxiliary was necessary in task 2(A) in PRI and POI and task 5 of ASN, but, it can also be seen in task 6 of ASN.

Appendix S7/6

(iii) shop owner might bit him (O)

(v) He Relations might accident (O)

Appendix S12/8

Opinions
1. He might be a thife.

Appendix S13/9

Opinions
1. He might be a fight

Appendix S23/10

facts
1) He might have open in the Door
2) He might have knock in the Raning
3) He might have one leg is in the Doort
4) He might of steal
5) He might have one bag
6) He might have wonderful

**Appendix S28/7**

3 He might have theft the Items

In the above excerpts, S7, S12, S13, and S28 were using the modal auxiliary *might* to express probability of their opinion. While these students used it appropriately, S23 used *might* to express facts. S23 was not able to use *might* in the right context. The students needs further practice and guidance to learn this aspect.

**Post-Intervention**

With respect to grammar and cohesive devices, subject-verb disagreement was observed in the students’ responses.

**Appendix S5/13**

....weston TV have 120 channels..
....this TV have remote, remote is....

**Appendix S13/16**

It have more channels and not a...

**Appendix S16/14**

It is made Chennai. and its have my favourite

Most of the students were able to use the connectives *and* and *but* more frequently.

**Appendix S9/14**

I will see a qualite and colour
Frist mony and Qualite how maney years..
How many channels are there and how much Rate will be remote
Appendix S24/16
..and easy to Peke. but Bush TV’s remote control..
But Bush TV has only a guarantee of...
..but this facility is not have there in Bush TV.
Appendix S29/12
..but Weston TV does not have any free gift..
..but James and Rehman like Weston TV..

Problems related to articles, prepositions, plurals of nouns, verb forms were also found among most of the students.

Mechanics (Punctuation and Spelling)

Pre-Intervention

Regarding spelling and punctuation, in addition to the spelling errors, capitalization error of the letter / was found in the responses of a few students.

Appendix S3/2
And Nokia phone option: i like it...

Appendix S20/3
..i need a Samsung mobile: is very good mobile.

Appendix S21/2
...i like K1662 model it ..
...sound in speaker this i like because of when i in meeting or class i not destabe

A few of the students did not use any kind of punctuation throughout or a major part of the responses.

Appendix S7/2
I am buying a Nokia mobile Nokia is very popular brand and it can hold 1,000 addresses whereas only 900 addresses can be stored in Samsung In Nokia there is a special feature called “T9” Nokia display sizes are: Nokia- 1.8 inches; Samsung – 1.6 inches Samsung phones Bluetooth and video options are not available in these phone so I buy only Nokia mobile
Some other spelling mistakes were also found in the responses despite copying the text to a large extent.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S13/3</td>
<td>.biger</td>
</tr>
<tr>
<td>Appendix S15/3</td>
<td>.by</td>
</tr>
<tr>
<td></td>
<td>.di:tnory</td>
</tr>
<tr>
<td></td>
<td>.features.</td>
</tr>
<tr>
<td></td>
<td>.add:reeses</td>
</tr>
<tr>
<td>Appendix S18/2</td>
<td>.cale:do:</td>
</tr>
<tr>
<td>Appendix S20/3</td>
<td>.imeages</td>
</tr>
<tr>
<td></td>
<td>.ate</td>
</tr>
<tr>
<td></td>
<td>.pobones,</td>
</tr>
<tr>
<td></td>
<td>.geams</td>
</tr>
<tr>
<td></td>
<td>.p:ear</td>
</tr>
<tr>
<td></td>
<td>.Blutont</td>
</tr>
<tr>
<td>Appendix S22/2</td>
<td>.mobail</td>
</tr>
<tr>
<td></td>
<td>.smootly</td>
</tr>
</tbody>
</table>

Task 2 of ASN

Task 2 involves writing only a few sentences about similarities and differences. The students were to create their own sentences and as a result there were a few common spelling mistakes.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S15/6</td>
<td>.sied</td>
</tr>
<tr>
<td></td>
<td>.hom</td>
</tr>
<tr>
<td></td>
<td>.electronik</td>
</tr>
<tr>
<td></td>
<td>.mishins</td>
</tr>
</tbody>
</table>
Task 6 of ASN

Task 6 of ASN revealed the spelling errors in the responses of the students. The students were to write only 6 sentences expressing facts and opinions. Some of the errors are given below.

Appendix S4/8
..stiling
..raing
..raining
..thip

Appendix S9/9
..thife
..cheesing

Problems with capitalization were also found in the case of a few students. Most of them did not use full stop at the end of the sentences. Nevertheless, it is quite apparent that they attempted to write correct spelling of the words. This was conspicuous at many places in the responses where the students struck off to rewrite the correct spellings of the words.

Post-Intervention

As there was an attempt from the students to construct their own sentences, there was only a marginal improvement in spelling and punctuation.
<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S21/12</td>
<td>beautifull</td>
</tr>
<tr>
<td></td>
<td>channels</td>
</tr>
<tr>
<td></td>
<td>guarante</td>
</tr>
<tr>
<td></td>
<td>ingues</td>
</tr>
<tr>
<td>Appendix S22/13</td>
<td>because</td>
</tr>
<tr>
<td></td>
<td>ther</td>
</tr>
<tr>
<td></td>
<td>repayre</td>
</tr>
<tr>
<td></td>
<td>sead</td>
</tr>
<tr>
<td>Appendix S28/13</td>
<td>opinions</td>
</tr>
<tr>
<td></td>
<td>calirty</td>
</tr>
<tr>
<td>Appendix S29/12</td>
<td>wight</td>
</tr>
<tr>
<td></td>
<td>birg</td>
</tr>
<tr>
<td></td>
<td>janes</td>
</tr>
</tbody>
</table>

But, some of the students demonstrated their willingness to improve their spelling through their corrections and writing the correct spelling as in the case of S3, S6, S30, etc.

**Summary of the data analysis—Layer 8 (Task 3(A) in PRI & POI, Task 2 of ASN)**

**Construction**

**Pre-Intervention**

- Many of the students copied the sentences from the text and did not attempt to create their own sentences.
- Some of the students copied the whole text given in the reading passage in the task input.
• Only 3 out of 30 students attempted to construct sentences by themselves. Even so, these students have mentioned the information that is not given as part of task input.

Task 2 of ASN

• Almost all the students were able to construct the sentences required to express similarities and differences.

Post-Intervention

• 27 out of 30 students attempted to construct sentences on their own.
• A remarkable improvement was noticed in the case of a few students who constructed sentences on their own.
• However, copying from the text to some extent could still be noticed in the case of some students.

Grammar and Cohesive Devices

Pre-Intervention

• Subject-verb concord seems to be a serious problem with most of the students.
• Errors related to plurals of nouns and verb forms were also witnessed.
• Since most of the sentences were copied from the text given, it was difficult to understand whether the cohesive devices, such as and, because, etc., were used on their own.

Task 2 of ASN

• It was evident that most of the students constructed sentences on their own and used the connectives such as and, because, but, etc.
• Most of the students were able to use these connectives with reasonable accuracy.
• However, most of the students struggled to write grammatically accurate sentences. Despite their construction of sentences on their own, they were not able to construct meaningful sentences.
Post-Intervention

- Errors related to Subject-verb concord continued to exist in POI too.
- Other grammatical problems such as related to articles, prepositions, verb forms were seen very frequently. This could be because the students were attempting to write more sentences on their own than in PRI.

Mechanics (Punctuation and Spelling)

Pre-Intervention

- Quite a few students did not capitalize the letter I in their responses.
- A few of the students did not use any kind of punctuation throughout a major part of their answer.
- Spelling mistakes were found even though there is a predominant copying from the text.

Task 2 of ASN

- A few spelling mistakes were found in the responses to task 2 of ASN.

Post-Intervention

- There were many spelling and punctuation errors.
- However, it was quite evident that most of the students, who committed spelling errors, attempted to write the spelling correctly. This was apparent in their corrections, striking out, and rewriting words to get the right spelling.
- It can be inferred that students began thinking consciously about writing words with accurate spelling.

4.4.4 Layer 9 - Language

Layer 9 deals with the analysis of the students’ responses to Task 4(A), which includes two components or sub-tasks (i) and (ii) in PRI and POI, and task 9 of ASN. Since this layer focuses on the improvement of language abilities, both the sub-tasks
(i) & (ii) were considered as one for analysis. The criteria taken for analysis are presented in table 4.10. The data from PRI and POI will be compared to understand the improvement. To trace the development, students’ responses to task 9 of ASN will be analyzed.

A glance at table 4.10 reveals that there is some improvement in POI as far as grammar and cohesive devices are concerned. However, in the case of spelling and punctuation, there is low level of performance in POI when compared with that in PRI. For a deeper understanding of the language abilities, let us look at the analysis of the responses.

<table>
<thead>
<tr>
<th>Criteria for Task 4(A) (i) and (ii) — Language</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
</tr>
<tr>
<td><strong>Grammar and Cohesive Device:</strong></td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of adequacy and accuracy (S3)</td>
<td>1</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of adequacy and accuracy (S2)</td>
<td>9</td>
</tr>
<tr>
<td>-Evidence of a low level of adequacy and accuracy (S1)</td>
<td>20</td>
</tr>
<tr>
<td><strong>Mechanics (Punctuation, Spelling)</strong></td>
<td></td>
</tr>
<tr>
<td>-Evidence of a high level of accuracy (M3)</td>
<td>4</td>
</tr>
<tr>
<td>-Evidence of a reasonable level of accuracy (M2)</td>
<td>17</td>
</tr>
<tr>
<td>-Evidence of a low level of accuracy (M1)</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 4.10 Layer 9 (Language)—Task 4(A) (i and ii), Task 9 (ASN)

In the following, the analysis of the data collected from Task 4(A) (i) & (ii) in PRI and POI will be presented under two headings *Grammar and Cohesive devices*, and *Mechanics* (Punctuation, Spelling). Under each criterion, the changes in students’ language abilities from PRI to POI are described. Such changes will also be explained through the analysis of task 9 of ASN.
Grammar and Cohesive Devices

Pre-Intervention

In PRI, two thirds of the students have demonstrated low performance related to language structure and cohesive devices. A variety of errors in sentence construction were made by the students. In task 4(A) (i), the students were given a situation where the students needed to demonstrate an inquiring attitude by asking questions to find out the reasons for increase in the price of rice. This task requires the students to imagine as if they were Rahul and they were to use the conditional clauses to express the subjunctive mood. So, the main clause should contain would. Virtually, no student used the conditional clause accurately. However, there are very few students, e.g., S10 and S24, who attempted using If-clauses with inaccurate grammatical constructions.

Appendix S10/10
If I will be a Raj the I will not buy the wheat Because the wheat Reats will increases also and deincreses

Appendix S24/5
I would buy rice becuase Perent have asked then I buy rice
S24, as can be seen above, was able to use would but could not use the If-clause.

Subject-Verb disagreement is also of serious concern in PRI. Quite a few of the students committed errors regarding this grammatical aspect.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S5/9</td>
<td>People was happy</td>
</tr>
<tr>
<td>Appendix S9/4</td>
<td>...his height and his action is very good.</td>
</tr>
<tr>
<td>Appendix S12/3</td>
<td>Salman Khan is most handsome man because he have body and good look</td>
</tr>
<tr>
<td>Appendix S15/4</td>
<td>Rice merchant tell 43 per kg.</td>
</tr>
</tbody>
</table>
Appendix S17/4 | I will ask merchant rice. 39 per kg. he tell
---|---
Appendix S24/5 | I would buy rice becuase Perent have asked then I buy rice.
Appendix S25/5 | ...why means Salman Khan have fit body the fight with....
Appendix S30/4 | Rahul’s parent have asked him to buy a kio of rice...

Apart from subject-verb concord, other types of errors were noticed in addition to the serious problem of inaccurate verb forms.

Appendix S6/4
Rahul went to a merchan:s and asked... (wrong use of article)
I brought ago 3 days I buyed 39... (subject-verb disagreement)

Appendix S7/3
I am Rahul did not buy rice I go another shop (absence of preposition to)
Vishal his sister his right because I am fan of Salman khan (using his for is)

Appendix S10/3
If in place of Rahul I will be means will buy the rice for the merchant....

Appendix S14/3
...I agree this (absence of the preposition to)

Appendix S17/4
I will be place in Rahul (wrong use of form of verb place)

Task 9 of ASN

Since the ability of considering an issue from multiple perspectives is related to task 4(A) (i) and (ii) in POI and task 9 of ASN, responses to task 9 of ASN were analyzed.

As for the language structure, a few errors were noticed. Problems with verb constructions were found to be common.
Appendix S1/7
b) people are not come F~wear

Appendix S6/7
(2) He not tention governrment

People
(1) All people not fear.
(2) All people felling very happily

Appendix S14/9
(a) Terrorist sad about Afzalguru was hanged.

Post-Intervention

From table 4.10, it is quite obvious that most of the student responses correspond to criterion S2. 20 out of 30 students demonstrated improvement in sentence structure and cohesive devices. Though this improvement is modest, some noticeable changes have been documented; and they are presented in the following analysis.

A significant change noticed was the minimal occurrence of subject-verb disagreement. With regard to the responses to tasks 1(A), 2(A), and 3(A) of POI, there was no significant improvement in relation to this grammatical aspect. But in this task 4(A) (i) and (ii), there was less frequency of errors related to subject-verb agreement, which is why the scores of the students met the criterion S2.

Another important change is more number of students’ attempting to use If-clause and a few of them with near accurate structures.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S6/12</td>
<td>(1) if I be in Raj place I will do argive.... I finally decision is I will took</td>
</tr>
<tr>
<td>Appendix S8/15</td>
<td>If I am in Raj’s place I will not buy the wheat</td>
</tr>
<tr>
<td>Appendix S9/16</td>
<td>If I in raj’s place, I will not buy the wheat...</td>
</tr>
<tr>
<td></td>
<td>If I buy it is also cretical position only...</td>
</tr>
</tbody>
</table>
...if importins will be is deficult than i also....

| Appendix S10/10 | If I will be a Raj the I will not buy the wheat Because the wheat Reats will increases also and decreases. |
| Appendix S13/17 | If I am in Raj’s place I will not buy the wheat because lost time... |
| Appendix S16/15 | (i) if I am in Raj place I will agist them.  
...  
(4) if your importing will you xxxx(difficult to understand) wheaat. |
| Appendix S19/15 | 1) if i be in Raj price then i do foishop owner. |
| Appendix S26/14 | If i were Raj I am go to another shop & asking the salesman.... |
| Appendix S28/14 | If i was Raj mean I went to another shops ask... |

One more important development is the use of questions in the responses to task 4(A) (i). Students used a few questions to demonstrate their inquiring attitude.

**Appendix S8/15**
(1) When the rate is raised?  
(2) Is the quality changed?  
(3) Is only the shop taking 25/-  
(4) “I will ask him to show the sheet”?

**Appendix S24/17**
Why taking extra many?  
What Prices increase? And why?

**Appendix S25/16**
why are more price kept good quality is came ...  
why are you keeping more price
Task 9 of ASN

Many spelling mistakes were also found in the students’ responses. This can be seen in the following excerpts.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S1/7</td>
<td>fewear; attract</td>
</tr>
<tr>
<td>Appendix S5/9</td>
<td>tenstion; tigt; scaryurity; peopules; feyear; liveing</td>
</tr>
<tr>
<td>Appendix S7/7</td>
<td>well (for will); escap; attact</td>
</tr>
<tr>
<td>Appendix S20/8</td>
<td>Governament; terrorists; feell</td>
</tr>
</tbody>
</table>

Post-Intervention

While there was considerable improvement with respect to grammar, students’ performance in spelling was poor. There was high occurrence of spelling errors in task 4(A) (i) and (ii) in POI when compared those of PRI.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S5/14</td>
<td>Sam; incrys; baregn; coloures</td>
</tr>
<tr>
<td>Appendix S9/16</td>
<td>i; increas; increase; takeing; importins; difficult</td>
</tr>
<tr>
<td>Appendix S13/17</td>
<td>whe; marchant; roes; coulour; devent; couloure</td>
</tr>
<tr>
<td>Appendix S16/15</td>
<td>agist; firs; i; exapand; happed; importing; peple; the re; lik; spaciality</td>
</tr>
</tbody>
</table>
In addition to the ones mentioned above, a number of spelling errors were committed by almost all the students. It is hypothesized here that while some of the errors were due to lack of conscious awareness to print forms of alphabet. Most of the words students used here are the ones heard but were not exposed to their written form. The tasks were effective enough to motivate the students to use language without fear of committing errors. As a result, they attempted to use as much language as they could, and consequently, more number of spelling errors were committed by them.

<table>
<thead>
<tr>
<th>Summary of data analysis—Layer 9(Task 4(A) (i),(ii) PRI &amp; POI, task 9 (ASN)</th>
</tr>
</thead>
</table>

**Grammar and Cohesive devices**

**Pre-Intervention**
- Most of the students demonstrated low level of performance with regard to grammatical ability.
- Task 4(A) (i) requires the use of conditional clause. Virtually no student was able to use the accurate structure of the conditional clause. Nevertheless, some of the students attempted to use the if-clause with errors in verb forms.
- Some of the students committed errors related to subject-verb agreement.
- Errors related to verb forms were also documented in several of the students' responses.

**Task 9 of ASN**
- Errors related to verb forms were noticed in addition to problems with basic sentence construction.

**Post-Intervention**
- The conditional form of the verb *would* has not been acquired. Nevertheless, noticeable improvement was found with regard to grammatical abilities—minimal incidence was documented with regard to errors of subject-verb concord in the if-clauses.
• An impressive improvement was that the students used a few interrogative sentences to demonstrate their inquiring attitude. Though these have structural problems, the meaning could be inferred without intelligibility being affected.

**Mechanics (Punctuation, Spelling)**

**Pre-Intervention**
• Errors related to spelling were found in most of the responses of the students.

**Task 9 of ASN**
• There were many spelling errors in the responses to task 9 of ASN.

**Post-Intervention**
• More spelling errors were seen in task 4(A) (i) & (ii) in POI when compared with those of PRI.
• Some of the words that were mis-spelt were used by the teacher orally in the classroom. It needs to be understood that the students were attempting to use the language they heard but were not exposed to their print form.

4.4.5 **Layer 10 - Language**

In this layer, tasks 1(B), 2(B), 3(B), and 4(B) in PRI and POI are analyzed to find changes in language abilities. In PRI and POI these tasks were given to the students to assess their metacognitive thinking. Since all these tasks are related to the same set of skills, these were considered to be one and the analysis thus presented is related to all these tasks. To understand learning processes related to language abilities in PRI, the responses to task 10 of ASN will be analyzed. Task 10 of ASN is also related to metacognitive thinking.

On observing table 4.11, it is clear that there is no significant improvement in language abilities, i.e., either in grammar and cohesive devices, or mechanics. Let us deeply analyze responses to these tasks.
In what follows, the analysis of the data collected from Task 1(B), 2(B), 3(B), and 4(B) and task 10 of ASN will be presented under two headings: Grammar and Cohesive devices, and Mechanics (Punctuation and Spelling). Under each criterion, the developmental changes in students’ language abilities from PRI to POI are described. These changes will also be justified through the analysis of the students’ responses to task 10 of ASN.

**Grammar and Cohesive devices**

**Pre-Intervention**

In PRI, 21 out of 30 students performed reasonably well in relation to grammatical accuracy of language use. As in the case of other tasks, here too, a variety of errors were committed by the students. It is important to note that the students committed these errors in their responses that have few sentences. However, the most common problems found in their responses are discussed below.
Firstly, a major problem faced by the students was related to the accurate use of verb forms, which include errors in voice and not using a verb at all.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student's response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S5/2</td>
<td>..there someny animals in the zoo</td>
</tr>
<tr>
<td>Appendix S6/2</td>
<td>Some animals are bitten.</td>
</tr>
<tr>
<td></td>
<td>..there sanjay sister leg wound.</td>
</tr>
<tr>
<td>Appendix S9/1</td>
<td>2) I am thinking that wrote well</td>
</tr>
<tr>
<td></td>
<td>I wonte watch Hindi movies more (S9/4)</td>
</tr>
<tr>
<td>Appendix S10/1</td>
<td>.Arctic fish is the char was very hard...</td>
</tr>
<tr>
<td></td>
<td>..I had did not hear the name of char....</td>
</tr>
<tr>
<td></td>
<td>..The hard is that rice will be nikress are will be be less price</td>
</tr>
<tr>
<td>Appendix S11/1</td>
<td>..Interesting in Task 1(A) the having Arctic what methods and difficulties having in ..</td>
</tr>
<tr>
<td></td>
<td>..I really successfull (S11/2)</td>
</tr>
<tr>
<td></td>
<td>..This really in tallient on the Man that way (S11/5)</td>
</tr>
<tr>
<td>Appendix S14/2</td>
<td>..I successful to writing and understanding</td>
</tr>
<tr>
<td></td>
<td>..I successful in experience (S14/3)</td>
</tr>
<tr>
<td></td>
<td>..I successful those informations and advices (S14/3)</td>
</tr>
<tr>
<td>Appendix S24/2</td>
<td>...and Asia sentence has easy.</td>
</tr>
<tr>
<td></td>
<td>..Sanjay’s sister said has rong ... (S24/3)</td>
</tr>
<tr>
<td></td>
<td>..there really hard has a difecal Quesen (S24/4)</td>
</tr>
<tr>
<td>Appendix S25/4</td>
<td>I am think and wrote that way’s we wrote Nice.</td>
</tr>
</tbody>
</table>

As we can see there are a wide variety of errors related to the wrong use of verbs. Similarly, subject-verb disagreement is also one of the problems related to Grammar and cohesive devices.
<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
</table>
| Appendix S4/1| I am Task 1(A) experiences is weari interesting and hard.  
1) Task 4(A) easy. why Amir khan Pichars is I am looking (S4/4)                                                                                      |
| Appendix S5/2| (2) The Task 2(A) were new i can nat be see and lesan  
Sanjay sister wrth “Sanjay go to the zoo there someny animals in the zoo the animals was denger.  
...wonderful phones they look good, (K1662) is wevy good model..(S5/3)  
(2) All people was to the othere choyse so I think som people was lisk... (S5/4)                                                                 |
| Appendix S10/3| ...my father have the Nokia phone from ten years..                                                                                                                                                                        |
| Appendix S13/3| ..Nokia have a different phones Nokia have a loud speaker it fell down...  
..Nokia have a Bluetooth and games videos..  
...because animals is not bite why means.. (S13/4)  
...Heros is handsome movies is nice mother telling.. (SI3/5)                                                                                      |
| Appendix S14/2| My mother have nokia phone so..  
My mother have nokia phone befor 5 years.                                                                                                                                                                               |
| Appendix S15/1| ..This sister tell thank is a such..  
..Rice merchant tell 43 per kg... (S15/4)                                                                                                                                                                           |
| Appendix S24/2| ..really hard has some sentenses has hard. there easy has the northern parts of ...                                                                                                                                                  |
| Appendix S26/2| Yes, I were extent successful in .....                                                                                                                                                                                         |

In addition to subject-verb disagreement, grammatical errors related to correct usage of nouns were also noticed. Many of the students have problems with countability issue of nouns. This can be observed in the following response excerpts.
Appendix S6/4

...Rahul went to a merchants..

Appendix S10/3

...his mother will lead role about hero’s.

Appendix S14/3

...those informations and advices.

Appendix S24/4

..there gaveling friend’s advises

Appendix S26/3

..There is given for good & bad informations.

As for the use of cohesive devices, virtually no students used any cohesive devices. But in task 10 of ASN, some of the students used them. This is demonstrated in the following excerpts

Task 10 of ASN

Task 10 of ASN is related to metacognitive thinking. The students were required to articulate their metacognitive processes related to the performance of tasks 1 to 10. When their responses were analyzed for language abilities, it was revealed that the students performed relatively slightly better in task 10 when compared with tasks 1(B), 2(B), 3(B), and 4(B) in PRI.

However, errors related to verb forms were also noticed.

Appendix S6/8

And I am Interest all of Tasks
.I felling very happily.

Appendix S7/8

..I am interesting..

Appendix S11/10

..Task is very difficult To Writes them

The use of cohesive devices can be seen in the following responses of the students.
Appendix S1/7
....she words so Task 6 is interesting but...So I face some difficult...

Appendix S2/10
....the wode. So task - 6 is very interesting but task 7 difficult.....write a facts and
    opinions....

Appendix S7/8
....All tasks but 7th task so interesting...

    Students have demonstrated improvement in the use of cohesive devices even in POI.

Post-Intervention

In table 4.11, it can be observed that 22 out of 30 students performed reasonably well in accuracy of sentence structure. An important development noticed in POI is using more number of sentences when compared to those in PRI to express their metacognitive processes comprehensively. As a result, it is possible that the number of errors could have increased. On comparing PRI and POI, it might be seen on the surface level that there is no significant improvement, however, errors related to structure, verb forms and spelling remained the same.

Similar to PRI, among a wide variety of errors, problems with the verb forms are the most common.

<table>
<thead>
<tr>
<th>Appendices</th>
<th>Student’s response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix S3/8</td>
<td>I am learned, new things, new words. earthquakes,... Task &lt;(A) (i) not easy and not hard. (S3/10)</td>
</tr>
<tr>
<td>Appendix S5/10</td>
<td>a) I think i was all comptited and I think i som was was pending. B) This task was really had, and interesting (S5/11)</td>
</tr>
<tr>
<td>Appendix S6/9</td>
<td>I happen easy is parareading... therefore it is felted that’s is tough. The suedeer sister is told god give to you...</td>
</tr>
<tr>
<td>Appendix S7/9</td>
<td>I am interesting scientific study I didn’t understand....</td>
</tr>
</tbody>
</table>
As evident from the above responses, wrong use of verb forms was found among these tasks. Besides, errors related to subject-verb agreement were also found but they were relatively slightly few in number when compared with those in PRI. But due to errors in verb forms, most of the responses could meet only criterion S2. Some of the Subject-Verb disagreement problems are listed below.

Appendix S3/12
..this words are use on me.

Appendix S7/10
..thrive and guesting this are the words...

Appendix S8/12
In this task other possibilities is Some hard.

Appendix S25/16
This exams is very Nice.

Appendix S26/10
To extent I are successful in...

As for the cohesive devices, they were noticed in quite a few of the responses of the students.
| Appendix S10/8 | 2) I am not successful in accomplishing Task-(A) **Because** I can't understand... |
| Appendix S21/13 | ...more number of channel **because** is plastic.... .....in it is not hard **but** easy... |
| Appendix S22/11 | 1(A) ... this story was very difference **and** exacting. **and** ther... 2(A) **But** I learn some new words I think. |
| Appendix S28/11 | 1(A) In this Task was so interesting **and** so easy in Task 2(A)... |
| Appendix S28/13 | 1A. ...choose the good T.V Bush or Weston... |

**Mechanics (Punctuation, Spelling)**

**Pre-Intervention**

As for the punctuation some of the students did not use any punctuation marks even though they wrote full sentences, which can be seen in the following excerpts.

**Appendix S1/2**
1) it is very vry interesting in writeing and Reading.
2) it is very very extend

**Appendix S5/4**
2) All people was to the othere choyse so I ihink som people was lisk shahrukh khan, are salmanan khan and Aamir khan and othere.

**Appendix S10/8**
2) I am not successful in accomplishing Task-(A) **Because** I can't understand more in the passage it is somewhat difficult the table also

In the above excerpts, we can see problems related to capitalization also.
Errors related to spelling were also found to be severe in the students' responses, which can be seen in the following excerpts. It should be noted that in the following excerpts page numbers in students' appendices are not given since the spelling errors mentioned are related to all the four tasks 1(B), 2(B), 3(B), and 4(B) of PRI.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Appendix S2</td>
<td>..prefect; ..realy</td>
</tr>
<tr>
<td>Appendix S4</td>
<td>..sister; ..pnes; ..youing; ..rayting; ..gilags</td>
</tr>
<tr>
<td>Appendix S12</td>
<td>..thet; ..easyly; ..naerly; ..thes; ..understinding; ..condision; ..herow</td>
</tr>
<tr>
<td>Appendix S16</td>
<td>..attamped; ..quation; ..tody; ..adderesses; ..lik; ..becase; ..sentances</td>
</tr>
<tr>
<td>Appendix S29</td>
<td>..beasues; ..rechreged; ..intersting; ..houes; ..fevaret</td>
</tr>
</tbody>
</table>

Task 10 of ASN

Punctuation problems were also noticed in the responses to task 10 of ASN. Though almost all the students wrote as many as seven sentences on an average, some of the students did not use any punctuation marks as in the case of PRI. Some of the students used punctuation incorrectly. This can be explained in the following.

Appendix S3/2
1) Task 3(A) is very easy, and interesting, and I am enjonying.

Appendix S4/4
Task 4(A) easy, why Amir khan pichars is I am looking.

Some of the errors related to spelling can also be seen in the following excerpts.
To sum up, it can be inferred that in the responses to tasks 1(B), 2(B), 3(B), and 4(B), students have demonstrated only minimal improvement in language abilities. This growth was noticed even as the students use more number of sentences of ASN and POI.

**Post-Intervention**

Punctuation problems existed even in the responses in POI. This can be seen in the following excerpts. Some of the students did not use any punctuation while some others have used them inaccurately.

**Appendix S10/11**

2) I am successful in this Task-4(A) Because the the friends choose is not very well and I will not like this three colours.

**Appendix S15/13**

1A) Raj’s parents have asked him to buy a kilo of wheat 12 eggs kilos of tomatoes Raj went to the vegetable

2A) These girls named Arpita Sukanya and Poojatha are good Friends.
In the students’ responses to metacognitive questions in POI, many spelling errors were noticed.

<table>
<thead>
<tr>
<th>Appendices</th>
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<tbody>
<tr>
<td>Appendix S1</td>
<td>writing; rote; close; wonterfull</td>
</tr>
<tr>
<td>Appendix S9</td>
<td>pampairing; possibilities; difficulte; intrresting; accomplished; sould</td>
</tr>
<tr>
<td>Appendix S12</td>
<td>undastand; interesting; menings; opinens; incrss</td>
</tr>
<tr>
<td>Appendix S19</td>
<td>smillary; premise; contient; wrrting</td>
</tr>
<tr>
<td>Appendix S29</td>
<td>Sendense; untrutood; insteresting</td>
</tr>
</tbody>
</table>

As can be seen from the above excerpts, most of the students did not show any significant improvement in language abilities. This is because almost all the students have written longer responses when compared with those in PRI. Moreover, they used more content words in these responses and hence more number of spelling errors were found.

Summary of Layer 10–Task 1(B), 2(B) 3(B) 4(B) in PRI & POI & Task 10 (ASN)

Grammar and Cohesive devices

Pre-Intervention

- In the responses to tasks in PRI and POI, a variety of grammatical errors were found: tense and voice of verb forms, subject-verb agreement, and nouns.
- It needs to be noted that these errors were committed despite the very limited language produced by the students.
- Almost all the students did not use any cohesive devices.
Task 10 of ASN

- Errors related to verb forms were found to be severe in the students’ responses to task 10 of ASN.
- The use of cohesive devices was found in the responses of a few students.

Post-Intervention

- Students used more number of sentences in POI when compared with those in PRI. As a result, the number of grammatical errors might have increased.
- Errors related to verb forms and subject-verb concord were found to be common among many students.
- Quite a few more number of students used cohesive devices in the responses to the tasks 1(B), 2(B), 3(B), and 4(B) when compared with that in PRI.

Mechanics (Punctuation, Spelling)

Pre-Intervention

- Spelling errors were found to be severe in responses to metacognitive questions in PRI.
- A few of the students did not use any punctuation while some other students used them inaccurately.

Task 10 of ASN

- Even though the students were asked only about metacognitive monitoring, errors related to spelling were more in number.
- Punctuation problems existed in the responses to this task too.

Post-Intervention

- Spelling errors continued to show up in the students’ responses to metacognitive questions in POI.
Even though students wrote longer responses, punctuations problems in the case of some of the students were noticed.

4.5 Conclusion

In this chapter, we have covered the procedure adopted in the analysis of the data. A comprehensive analysis of the data was presented in 10 Layers to represent the specific tasks in PRI, ASN, and POI—Layers 1 to 5 were related to thinking and layers 6 to 10 dealt with language improvement. The analysis of the data revealed that teaching thinking has shown a positive impact on students thinking and language abilities. The important findings are presented below.

- The students’ ability to process the information systematically improved substantially, which fed into the process of planning for the task performance.
- There was a good improvement in their metacognitive thinking, which was evident through the better articulation of their cognitive processes in performing the tasks.
- As far as the writing abilities are concerned, improvement in coherence and cohesion was documented in their planned performance of written responses.
- Use of cohesive devices such as ‘because’, ‘so’, ‘and’, and ‘but’ were picked up by the students, which was evident in their written responses and spoken interaction. However, in the case of some students, incorrect grammatical constructions were found in using the cohesive devices mentioned above.
- Students began using complete sentences instead of fragments and phrases. Moreover, it was quite evident that the students began constructing their own sentences instead of copying the sentences from the input given.
- Use of more number of content words was documented but with spelling mistakes. This might be due to their inadequate exposure and scant attention to the orthography of the language.

As a result of the intervention study, a conceptual framework for teaching thinking as a distinct component in the ESL curriculum evolved. The detailed discussion of the framework together with an example from the study will be offered in the next chapter. Further, a discussion of the findings with reference to the research...
questions will be presented. This will be followed by the implications, recommendations, and suggestions for further research.