CHAPTER 5

AN ANALYSIS OF STUDENTS' ABILITIES THROUGH THE STRATEGY OF NOTE-TAKING IN A LECTURE BASED LEARNING SITUATION

5.0 Introduction

This chapter which covers Survey-2, presents a more detailed analysis of the effectiveness of students' lecture notes and thereby attempts to get some support for the assumptions regarding note-taking strategy and comprehension of lectures which underlie the working model suggested in the next chapter. Survey-2, to be more specific, attempts to find out the nature of the connection between notes and comprehension and also to derive organisational dimensions (in notes taken down) which are necessary for optional effectiveness in understanding lectures. These dimensions are expected to provide valuable insights for formulating the Instructional Model (see Chapter 6) for strategy-use. An integrated approach towards learning through the use of different learning strategies is related to the analysis of students' notes. The data yielded by the analysis helps in setting out the model.

The chapter is divided into two major sections. The first section is Analysis-1 which deals with a quantitative study of students' notes mainly focussing on the information content in their notes based on lecture presentation in different disciplines. The main objective of this analysis is to see
the relationship between students' notes as taken down during lecture hours, (i.e. note-taking as an activity) and their comprehension and acquisition of lecture information. The second section of the study is Analysis-2 which presents a qualitative account of students' notes emphasizing the organisational aspect of their notes. The objective of this second level analysis is to study the organisational features as reflected in students' notes and assess their influence on the comprehension abilities of the students; and secondly, to assess students' use of note-taking as a strategy, the ability as reflected in the organisation of their notes.

5.1 The analysis of students' notes

In a study like the present one (Survey-2) the actual performance of students is assessed to see the relationship between their note-taking abilities and their learning of subject information. A number of questions are relevant here. These possible questions are considered first. In the next section the issues actually taken up in this small study are presented.

5.1.1 Questions of general interest in relation to the taking of notes by students

Some of the general questions, that are relevant at this stage are:
1. How far do students' notes reflect their understanding of the lecture information?

(a) By looking at their notes as end-products, what can be said about their comprehension abilities? This would relate to -

   (i) How well can the students use lecture for storage purposes?

   (ii) How does storing the lecture information help them in their comprehension?

   (iii) What can be said from students' notes about their encoding strategies?

(b) Does the process of encoding, i.e., working with the incoming information say anything about students' level of comprehension?

(c) Does taking notes while listening help concentration or improve attention?

(d) What does one look for when focussing on actual process of encoding in relation to comprehension where there is no review period involved? Does this relate to the organisation conventions of note-taking as well?

(e) How close is the relationship between comprehension of the content and the organisational aspects in taking notes?

2. (a) Does taking down lecture notes facilitate learning due to the encoding process involved or as an external storage system which students can later study?
(b) To what extent do the notes say anything about retrieval of information?

3. What is learnt in note-taking?

5.1.2 Focus of the present study - The hypothesis

Not all of the above set of questions can be easily answered. The study therefore raises the above questions and attempts to answer some of them. The hypothesis based on issues raised by some of the questions is the following:

From students' notes (i.e. notes actually taken down while listening) it should be possible to say something about their comprehension of lecture information. The different processing activities or encoding strategies involved should reflect their competence in comprehension of information, which could be later appropriately used and not just their immediate retrieval of information, which would be more memory dependent. Comprehension here would include the ability to adequately use the information later. In this context it would be relevant to assess if students can make use of their notes after a period of time has elapsed.

In order to test out this hypothesis students were specifically asked to take down notes (referred to as 'notes test' below); and the notes later, analysed. They were also given two tests and the tests were marked to assess the comprehension level of students and the effective use of the notes at a later date, as reflecting their encoding abilities.
The collected data was put to two types of analyses:

**Analysis-1**

This section presents a separate and more detailed study of the effectiveness of students' lecture notes. The objectives here are -

1. to find out the extent to which students' comprehension abilities could be predicted especially in their subject areas on the basis of their notes;

2. to find out the extent to which students could make use of their notes after a period of time; and

3. to find out the difficulties they have in taking down lecture notes.

**Analysis-2**

The focus of this analysis is more on the qualitative features of students' notes; it focuses especially on qualitative descriptions of the organisational aspects of notes from lectures. It is presumed that there are certain characteristics of organisation which indicate the strategy of exploitation of note-taking for comprehending lecture input.

5.2 The design of Survey-2

In order to examine the questions indicated above (section 5.1.2) the following design was adopted.
Students take down notes (in any manner they wish to) while they listen to a subject lecture of normal duration. The script thus produced is assessed to gauge their abilities in this area. The topic is taken from the official syllabus and calendar of the course, one each for Literature, History, and Economics. The lecture is prepared and delivered by the subject teacher who teaches the students. The situation is thus kept as 'natural' as possible. In addition to the note-taking task, two tests of subject knowledge-comprehension are administered — an immediate test (IT) and a delayed test (DT). Both IT and DT cover the content of the same subject lecture that was used for the note-taking task. The two tests are not identical but are presumed to be equivalent measures of the extent of comprehension-retention of the lecture information.

The notes-script (based on the subject lecture) of each student is assessed in two ways. In the first assessment the focus is on the simple capacity to get down items of information contained in the lecture (main points, subsidiary points, examples, etc.). A score representing the 'quantum' of information recorded in the notes is awarded. The maximum new score varies across the subjects because of the very different nature and scope of the 'topics' covered in the corresponding lectures. This essentially quantitative assessment is designated Notes Test-1. In the second assessment of the same notes (scripts) a greater emphasis is placed on the quality of the notes.
(discrimination between important and unimportant information, organizing the selected information, etc.). This constitutes Notes Analysis-2. The award is not a score but a categorization of the notes into good/unsatisfactory/poor.

Since the data from Notes Test 1, IT, and DT are in the form of numeric scores, a limited extent of statistical analysis is carried out. Simple descriptive statistics (mean, SD, correlation, coefficients) are computed for the three sub-samples linked to the different subjects covered. The findings from Notes Analysis-2 (which covers only a smaller representative set of scripts) are discussed in qualitative terms.

5.3 The criterion-referenced approach to assessment

All the tests used in the present study are based on the criterion-referenced approach. A standard of adequacy is applied in the final assessment of the students' performance — their notes and their test responses. A brief review of the technical literature on criterion-referenced testing is presented here. In the next section the use of c-r in the present study is explained. (c-r → criterion-referenced)

5.3.1 Criterion-referenced testing

It has been argued that criterion-referencing is a function to which a test is put and is not a method of test
construction. According to Davies (1982), "a criterion-referenced test emphasises the cut-off point, and a norm-referenced test the distribution of the scores among the testees." It is therefore clear that the same test can perform both criterion-referenced and norm-referenced functions. According to S. Brown (1981), criterion-referenced testing does not focus on any knowledge or abilities, but on those that reflect the educational concerns of the curriculum planners and teachers.

In criterion-referenced testing an educational decision is taken to determine what the tester considers to be adequate knowledge and what constitutes inadequate knowledge. The decision of what constitutes adequate knowledge is "intuitively" determined (Davies, 1982). The intuitive decision is largely based on what the examiner considers necessary knowledge for the student to proceed to the next stage.

According to Davies (1978, pp.145-159 and 215-231) -

"What teachers require is a criterion-referenced use of a norm-referenced test, i.e., a test that does not discriminate greatly among their students, but which does establish an adequate dichotomy between knowledge and no knowledge."

a) **Criterion-referenced assessment and attainment**

It will be appropriate at this stage to look at the relationship between assessment and attainment. In order to conceptualise
attainment in any subject area, it is necessary to identify the abilities that are seen as necessary at one particular level if students are to have an adequate grasp of that subject. For example, the concepts and constraints in terms of which attainment in History is described is likely to be different from the way in which sufficient attainment in Economics is described. The finished products i.e., students' criteria are likely to be different even if the psychological processes involved in learning the two subjects are comparable. In criterion-referenced testing, it is the tester who decides what constitutes adequate and inadequate knowledge.

b) Domain-referenced testing

A criterion-referenced test is interpreted as a domain referenced test. It consists of a selection of a number of items which form a representative sample from a specified domain of items representing an objective.

Talking about domains it is important to emphasize what a particular subject is about. What does it mean to understand a subject? The criteria that characterise domains seem to arise from behaviours that are found in specific subject areas, rather than from general knowledge. There seems to be an agreement among subject specialists on the features which are considered to be crucial in the discipline. The crucial elements would constitute the first criterion for the selection of major
categories of a domain. Popham (1978), Brown (1981) agree that the criteria against which students' attainment is assessed must arise from an understanding of the nature of the knowledge itself and not from the same superficial scheme of behaviour, which would relate more to general knowledge and preconceived idea about what a subject is. Understanding the nature of the knowledge would involve a deeper understanding of the structure of a subject.

c) **Validity and criterion-referenced testing**

Content is most closely associated with criterion-referencing and assessment, i.e., criterion-referenced measures are validated primarily in terms of the adequacy with which they represent the criteria.

The content validity of a test does not change but the validity of any interpretations of scores does change from one testing situation to another. Clearly then, content validity evidence is not sufficient to establish validity of test score interpretations. It is assumed that content validity will determine what interpretations are possible, but it does not establish the validity of the interpretation given to the scores.

A new idea of functional validity was introduced by Popham (1978). Functional validity is the accuracy with which a criterion-referenced test satisfies the purpose to which it
is being put, for example, predicting success in something which is difficult to measure.

5.3.2 **Criterion-referencing and the present analysis**

The investigation attempts to show that to establish a cut-off point which distinguishes adequate from inadequate knowledge presupposes an identification of the abilities necessary to the discipline in question. The cut-off point is thus determined by the educational needs which the teachers perceive the students to have.

Students notes are assessed against a cut-off score which is set up based on what is thought to constitute an adequate level of ability in that subject. The cut-off points are not necessarily the same across different subject areas. A cut-off point was interpreted as a point which distinguishes adequate from inadequate notes in terms of information content. The cut-off point for English Literature and Economics was 70%, while for History it was 60%. They were intuitively arrived at taking into account a number of variables like the speed of presentation, the mode of presentation and the amount of information presented. The cut-off point for History was fixed at a lower point because of the heavy load of information, and the speed at which the information was presented. It was also suspected that because of such constraints the History teacher did not expect students to take down most of what was delivered.
Setting up the criteria in different disciplines will involve a different set of criteria depending on the nature of the subject. However, there are features which are common to all the subject areas. The micro-skills and strategies needed in noting in the subject areas vary, hence the varying characteristics of each criteria.

An analysis of students' notes is made against an external criterion. The external criterion constitutes the researcher's notes. The aim of scoring students notes is two-fold:

1. To check whether students have recorded the main points accurately.

2. To arrive at a judgement of the level of comprehension of the students from their lecture notes.

Administration of tests

Two tests were administered to students — one immediately after the lecture note-taking; and another at a later date.

The main purpose of the tests was to find out students' level of comprehension and their skill in recording, encoding information accurately on the basis of their notes, e.g., by attempting to assess the use they made of their notes.
5.4 The instruments used in the Survey

The nature of the instruments used for data collection and their preparation are discussed in this section.

5.4.1 The note-taking exercise

5.4.1.1 Selection of stimulus material - lecture content

For each of the three subjects covered, one topic suitable for discussion in a single lecture session was selected in consultation with the subject teacher. This teacher prepared and delivered the lecture. The topics of the lectures were:

Literature: Milton's "Paradise Lost"
History: "The Birth of Indian National Congress"
Economics: "The Employment Policy"

(The texts of the lectures as actually delivered are given in Appendices 4A, 5A and 6A.)

As mentioned earlier students were expected to treat the lecture as a regular class session and take notes as they normally did. No format or style for taking down notes was suggested to them. Some students in each 'class' did not take notes. Only those who did produce a script for assessment are covered in the study. (The researcher attended the lectures and took notes. A tape-recording of each lecture was made; and this was used in preparing the scoring schemes.)
5.4.1.2 Scoring schemes for the analysis of students' notes

The study follows a criterion-referenced approach, in which students notes are compared to the lecture content in three different subjects. A set of criteria in the form of a set of researcher's notes in all three subjects are prepared against which students' notes are compared. The researcher's own notes were taken to be criterial for the following reasons mainly in relation to the key points and the broad framework in terms of organisation.

1. The researcher was familiar with the basic or fundamental concepts that were presented in each of the subjects.

2. The researcher sat through all the lectures and made it a point to take notes as students did.

3. The notes taken down were later discussed with the subject teachers both in terms of content and organisation.

It is true that the activity of note-taking is a very personal and individualistic one. In such a context notes as they appear after being taken down would not make much sense to another person. This is because the notes could be in the form of just a few words and abbreviations, a few sentences or detailed notes in the form of a summary. However a certain minimum adequacy in terms of the information base they contain can reasonably be expected. A distinction can be made between
the student who consciously and strategically selects and records from the sequence of information units in a lecture, and the student who fails to catch the basic information while trying to do that. In order to be able to make this distinction the researcher's notes are taken as an external criteria. But this is only in terms of the actual content and organisation as presented in the lectures. Talking in terms of the use of notes for later reference and study, a definite review period is a must for making notes meaningful. But notes as taken down in terms of the main points presented are also of relevance in the context of the study and whether the students' notes have most of those main points in their notes are seen to be important.

It is based on these facts that students' notes could be further refined and revised, and this capacity in the students could be developed. Therefore comparing students' notes with an external criterion mainly for adequacy of points was seen to be important inspite of most of the formats having some kind of rigidity about them. The researcher was conscious of the rigidity factor keeping in mind the situation and the level of the students. A more flexible framework would be possible later with development in students' performance. Under the given circumstances, the best external criterion was the researcher's own notes.
It is assumed that the set of researcher's notes would be more or less the same when compared to a subject teacher's concept of adequate notes and could be treated as the criterion for understanding of the subject. The question of how a subject teacher's concept of adequate notes would be different from a language teacher's is not important here. The main information content of the lectures was fairly simple even for a language teacher familiar with the disciplines. Thus it is assumed that there would not be much of a difference between the subject teachers' and language teachers' set of adequate notes on the main information content of the lectures.

(a) Scoring procedure for Notes Test-1

The main scoring procedure adopted for the assessment of students' notes was the following.

The researcher's notes in each of the three disciplines contained all the relevant and important main and sub-points, i.e., the information content of the lectures was divided up into informational units. Each of the units was allotted one mark. A student was awarded a mark for each unit of information that appeared in their notes. The marks were awarded keeping in mind the main criteria, i.e., separate informational units of the lectures set up for assessing students' notes. Their notes were compared to the researcher's notes on the topics
presented. English Literature was scored out of a total of 32. History was scored out of a possible 50. Economics was scored out of 42 (see Appendices 4C, 5C and 6C).

(b) **Assessment scheme for Notes Test-2**

In this second analysis of the notes (scripts) of the students, the focus is on the format, content and language, each contributing to the overall organizational aspect of students' notes.

The analysis follows a framework where students' notes are studied against a standard, which is the researcher's notes based on the corresponding lecture. Notes are compared in terms of the main organisational points present in the researcher's notes. A three point scale representing three different levels in terms of -

A - adequate
B - borderline, i.e., not so adequate and
C - poor

is used to assess the notes. Each of the three levels are defined in terms of proficiency in noting expected of the students. Students' notes after analysis are then placed at any one of the levels on the scale.

This section also presents (consolidates) the key features under organisation, that are to be taken care of when assessing
students' notes. During assessment, students' notes are compared to the researcher's notes first, and later, they are looked at in relation to their performance in the two comprehension tests.

Features of Organization

The following features include format/layout, information content and language, in terms of clarity and appropriateness contributing to overall organisation.

1. Lengthy notes in paragraphs
   or
   schematic notes
   or
   pointwise presentation of notes.

2. Detailed points presented as chunks of information.

3. Key words, concepts, terms, events presented in point form.

4. Information noted from the blackboard.

5. Underlining words and using abbreviations.

6. Identification and relationship between main and sub-points through proper categorisation under appropriate headings and sub-headings.

7. Sequence of points according to their importance.

8. Noting of lecture signals and discourse markers.
Defining Levels of Adequacy

Level A: Adequate

Being able to produce a clear format in terms of it being lengthy or brief, schematic or point wise. Ability to produce an appropriate layout in accordance with the subject topic. Being able to underline key words, concepts and events and use appropriate abbreviations. Ability to effectively reproduce information accurately, i.e. the amount of information or detailed facts. Being able to note most of the key words, concepts, events. Ability to make a clear distinction between the main and the sub-points. Is able to appropriately note words from the blackboard. Being able to present appropriate relationship between the main and sub-points by categorising points under relevant headings and sub-headings related to the subject topics. Is able to present facts in proper sequence and accurately note lecture signals and discourse markers.

Level B: Unsatisfactory

Being unable to present a clear format though there is a record of points as per lecture presentation. Important words and concepts are not always underlined or focussed. Is able to reproduce some of the information accurately. Is not able to produce all of the detailed points or facts and therefore there are gaps in the information recorded and in the noting of key
words, concepts and events. Is not able to clearly make a distinction between the main and sub-points though most of the key points are present. Is not able to clearly show the appropriate relationship between the main and the sub-points. Though there is a record of categorisation of information under different headings related to the subject topics, there is some confusion in placing them under different sections. Noting of lecture signals is not consistent all through.

**Level C: Poor**

Is not able to produce a format of any sort, not even point-wise presentation of the facts. Important words and concepts are not underlined or focussed. Is not able to note key words and concepts. There are big gaps in the information presented with very few accurately noted facts. Is unable to make any distinction between the main and the sub-points. Is not able to present any relationship between the main and sub-points by categorising points under different headings and sub-headings. Is unable to note lecture signals and markers though the notes have some kind of a sequence as presented in the lectures.

5.4.1.3 **Examples of organisational features from researcher's notes**

A few examples from researcher's notes are presented below:

(a) **Economics**

1. Highlighting the main sections of the lecture and focussing on the main points.
"The main sections _____ suggestions."

(Page 36, Appendix 4C)

2. Presentation of sections under proper headings.
- Approach of Government of India
- Classification of employment
- Need for employment oriented planning."

(Page 36, Appendix 4C)

3. Important aspects presented point-wise.
- "Three important aspects _____ rural or urban."

(Page 39, Appendix 4C)

4. Presentation of sub-points under the main headings showing relationships between points.

"Specific employment programmes
a. This is different ------
b. Provide raw materials."

(Page 41, Appendix 4C)

5. Recording lecture signals.
- "Important aspects
   Next important aspect."

(Page 36, Appendix 4C)
6. Presentation of key words, concepts as different points.
   "a. wage income.
   b. non-wage income."
   (Page 42, Appendix 4C)

(b) History

1. Main views on the topic.
   "Several views -----------
   ------ creator of the Congress."
   (Page 78, Appendix 5C)

2. Topic events presented point-wise
   "Hume - a civil servant
   ------------------------
   ---- the then Governor General."
   (Page 78, Appendix 5C)

3. Categorisation of information under different headings like causes related to the topic.
   (Page 78, Appendix 5C)
171

(c) **Literature**

1. **Presentation of events in the topic as separate paragraphs.**
   (Page 111, Appendix 6C)

2. **Record of references from the text and other books.**
   "the next lines from the poem ---
   --- books of 'Paradise Lost'.
   (Pages 113, 114, Appendix 6C)

5.4.2 **Subject comprehension tests**

The tests based on the content of the three subject lectures constitute a second set of instruments prepared for the study. The design called for two measures of subject comprehension for each subject (i.e. lecture). The first test administered immediately (IT) was to measure the extent of comprehension of the lecture information. The second test administered after a gap of one month (DT) was to assess the extent to which the students could retain or retrieve this information.

The pair of tests for each subject though not identical were taken to be broadly comparable. In constructing them, the transcripts of the lectures were referred to and the subject teachers consulted. The structure and scope of the comprehension tests are given below:
Economics: (See Appendix 4D)
IT  7 free-response items
DT  3 free-response items
   4 T/F items
   2 multiple choice items

History: (See Appendix 5D)
IT  5 free-response items
DT  3 free-response items
   3 multiple-choice items

Literature: (See Appendix 6D)
IT  5 free-response items
DT 10 free-response items.

5.5 Sample and procedure for Survey-2

5.5.1 The sample

Three different sets of students were covered in the three parallel exercises for the three subjects, i.e. English Literature, History and Economics. In all 59 students' scripts were analysed as first part of the study of notes, i.e. Notes Test-1. Of these 24 were from Economics, 15 from History and 20 from Literature. For the second part of the study of notes, that is, subject comprehension tests (IT and DT), 51 students were involved. Of these 24 were from Economics,
15 from History and 12 from Literature. The groups of students in each of the disciplines for both the tests were the same.

In Survey-2, analysis-2, where students' notes were analysed qualitatively, there were in all 30 students scripts, 10 in each of the disciplines.

These students belonging to different groups are taken to be matched in terms of the following variables. This claim is explained in paragraphs that follow.

(a) **Students' educational and social background**

Out of 59 students whose notes were analysed, about 55 of them came from the same social status and had more or less similar educational backgrounds. At the college level they were all in the English-medium section.

(b) **Age**

Most of them were of the same age group as they were all final year college students.

(c) **Mother tongue and sex**

Almost all the students belonged to the same region, i.e., from Andhra Pradesh. Their common L₁ was Telugu, and they were all girls.
(d) **Students' proficiency**

80% of them were assumed to have the same proficiency level as they would have had similar school and early college education.

Most of the information on variables (a) to (d) was got from questionnaires that was administered to them. Variable (e), i.e. their proficiency in the language was got from their performance in the immediate and delayed tests administered to them. It was not thought necessary to administer a separate test for assessing their language performance. In the two topic tests, the students were required to provide short answers where their language competence was well reflected. One variable that could not be controlled was the students' prior knowledge of (familiarity with) the specific topic in their subject of special study. Another uncontrolled variable related to the lectures was the presentation of the topics. The structure and style of presentation in different disciplines can affect students' comprehension and noting abilities. However, the study does not focus on this aspect of the problem. When analysing the notes, the influence of lecture information on their notes will however be observed.

5.5.2 **Procedure**

As mentioned earlier the lecture sessions were kept as normal as possible. The students were not specifically
asked to take down notes during the lectures; there were a few who did not. Specific instructions as to whether they should note points were deliberately avoided. The second test was administered after a gap of one month from the time the lectures were presented. After a gap of one month, their notes were returned to them. They were required to answer short comprehension questions with the help of their notes. This was done in order to see how much of the information taken down in the form of notes could be used to answer a test question without being dependent on memory.

5.6 Analysis-1

As mentioned in the design of Survey-2, the study of students' notes has two parts. The first part examines the data yielded by the Notes Test 1, and the two comprehension tests (IT and DT).

5.6.1 Performance on Notes Test 1

5.6.1.1 Defining a level of adequacy

The assessment of the scripts for Notes Test 1 focussed on the quantum of lecture information 'captured' in the notes. The raw scores varied across the subjects. In order to interpret the scores obtained by students some standard of adequacy had to be set. In other words a cut-off point was fixed for the Notes Test-1, for each subject as mentioned earlier (p.159).
5.6.1.2 The results of Notes Test-1

The following table is a presentation of the data obtained after scoring students' notes against an external criteria of researcher's notes. The table contains:

1. The number of scripts in each discipline (i.e., number of subjects who took down notes)
2. The possible total score in each subject.
3. The mean.
4. The range.
5. Standard deviation.
6. The cut-off point.
7. The number qualifying.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Economics</th>
<th>History</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of scripts (N)</td>
<td>24</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Max. Score</td>
<td>42</td>
<td>50</td>
<td>32</td>
</tr>
<tr>
<td>Range</td>
<td>16</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Mean</td>
<td>35.2</td>
<td>21.33</td>
<td>19.55</td>
</tr>
<tr>
<td>S.D.</td>
<td>4.36</td>
<td>8.82</td>
<td>2.25</td>
</tr>
<tr>
<td>Cut-off point</td>
<td>30</td>
<td>27.6</td>
<td>22.4</td>
</tr>
<tr>
<td>Number qualifying</td>
<td>21</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
5.6.1.3 Interpretation of the results

(a) Economics

1. In terms of the external criteria only 3 out of 24 students scored below 70% — the cut-off point. This indicates that most of their notes were adequate in terms of the main and sub-points.

2. The high mean score of 35.2 which is important, reflects the presentation of the topic to some extent.

3. The S.D. is small indicating that there was not much of a difference in their note-taking abilities as measured by the scoring procedure. This suggests that students adopted similar strategies while noting.

4. Although the scores for the two types of notes do not indicate major differences between Economics and Literature, a difference begins to emerge when a closer look is taken.

Economics students were capable of clearly signalling the nature of the relationship between various propositions in their notes, a way of presenting notes that was absent in Literature. The clear relationship between various points might show the level of comprehension of the students.

However, 4 or 5 students' notes were inaccurate. The inaccurate noters also seemed to have low scores. It is possible that inaccurate note-taking might be an indicator
of a low level of comprehension. Inaccuracies are attributed to a low level of processing abilities, rather than to idiosyncratic factors such as hearing impairment.

The Economics notes showed evidence of an ability to discriminate between main and sub-points, unlike Literature notes. Since the differences in basic ability cannot simply be assumed, one has to search elsewhere for an explanation. When the two lecture transcripts are looked at closely, i.e., Economics and Literature, it becomes evident that one of the sources of differences is the mode of presentation adopted by the lecturer.

Almost all of the Economics students' notes reflected the presentation style of the lecturer. The difference between the notes might have been a result of the way the lecturers taught the subject matter. The Economics lecture had adequate lecture signals which seemed to have helped students organise their material. It has been found that the mode of presentation of the lecture does have an influence in the way students take notes. Stating an item as important seemed to cause students to process the information more fully and make them better able to elaborate the point.

(b) History

The cut-off point was initially set at 60% in History due to variables like heavy informational load and the way
the lecture was presented. All the students scored below the level of sufficient adequacy. Even with the cut-off point lowered to 50%, only five students proved to have adequate notes. This pattern is different from that of Economics and Literature. In both these subjects, with an arbitrary level of 50%, the majority of the students are found to be adequate. This seems to suggest that History students experienced considerable problems in encoding the information unlike the students of Economics and Literature. Here again the distribution of scores is what matters.

The range and SD are relatively high, suggesting higher individual differences in the History students as a group. This probably reflects factors like individual comprehension, ability, amount of attention, background knowledge etc. During the analysis of the History notes it was found that quite a number of scripts were inaccessible to the researcher. Though the main information points were identified, it was considerably more difficult to follow the lecture notes than the notes in the other two subjects. Differences in the degree of accessibility seem to operate independently of whether the notes were meant for the researcher or not. A more fruitful question is whether the students would have been able to make a more worthwhile use of their notes had they been more relevant to themselves. This would have been possible if
students' performance on a test in this experiment was then compared with their performance after having taken down notes differently.

(c) Literature

Only 3 out of the 20 students reached the level of adequacy. The dispersion of scores was fairly small as seen in the S.D. This shows that the scoring procedure did not discriminate between the students. When the cut-off point is lowered to 50% of the total score, only 3 students are below the cut-off point. This shows that 20 students are between 50% and 70%. This seems to suggest that most of the students took down notes in a similar manner, covering the points they thought were necessary.

It is quite possible that the question of low SD arises because of the ways students took down notes. Some of them took down the lecture verbatim. The similarity in their scores might reflect the fact that a majority of them were able to take down at least half of what the lecturer said. Thus the homogeneity could be an outcome of the limited differences in their way of noting.

Another interpretation is possible. The measuring instrument might not have been refined enough to capture the essential qualitative features of discourse in the discipline.
Since Literature tends to be a rather discursive subject, the students might not have felt the need to take down most of the information except that which demonstrated the way the lecturer's main argument unfolded. It is quite likely that a different measuring instrument has to be designed for a subject like English Literature, in which there is a lot which depends on the interpretation, rather than on 'factual' information.

In 18 out of 20 notes the information was accurate but the relationship between propositions was not clear. It is difficult to say from an analysis of the notes whether the absence of the relationship between propositions was due to time constraints imposed upon students because of the lecture situation, or an indication of an inadequate comprehension of the way the argument was presented, or that the cohesive devices were omitted.

Regarding organisational factors, most of the students seem to have a correct sequence of events consistent with the way the lecturer presented the points. Two competing interpretations are possible. Firstly, it is possible that students were generally able to follow the sequence of events in the lecture. Secondly, it could be because students were successful in recording what the lecturer said without an adequate level of comprehension. Support for the latter point is corroborated by the absence of a clear discrimination between main and sub-points in the students' lecture notes. The absence of
signals about relationship might also be attributable to the format of the lecture. In the lecture presentation, probably the lecturer did not signal and distinguish key points from the rest.

Something more tangible can be said about students' comprehension of references to mythological figures; students' notes contained inaccurate information about the mythological references. This seems to indicate the problems students were confronted with because they were unfamiliar with the assumed background information.

Though 17 out of 20 students' notes contained 50% of the information presented, which was below the initial set cut-off point consisting of 70%, it is difficult to draw inferences about how much the students had internalised the information from their notes. This supports the importance of having an immediate and delayed test to evaluate the extent to which students can make use of their notes to answer test questions. The low mean score indicates that probably students did not think it necessary to take down all points.

5.6.1.4 Summary of the findings

1. For assessment of students' notes in all three disciplines, a cut-off score was established which showed their adequacy of performance in their notes. When a cut-off score of 70% was maintained, very few, i.e., 17 out of 20 students had
adequate notes in Literature, but with 50% most qualified, 15 students' performance was adequate. Students performed well in Economics. A different picture emerged for History. Even with the cut-off point lowered to 50%, very few notes were adequate.

2. There was not much individual variation in note-taking abilities in Economics and Literature, but variation was high for History. With the cut-off point lowered to 50%, very few students' notes are adequate and there is greater individual variation among the students with a higher SD and range. It is obvious that the gravity of the problem facing each of the students in comprehending notes is different. Some students have greater problems than others.

3. 12 out of 15 students' notes lacked an indication of the relationships between points. It is not easy to draw inferences about students' comprehension from the absence of links between points. The absence of points might be an indicator of failing to realise significant relationships between points, or might be a characteristic defining feature of notes, i.e., coherence minus cohesion.

4. The mode of presentation contributed towards the way students took down notes. The extent to which differences in students' performance is due to lecture styles has to be explored independently using one lecturer teaching in two different styles to two comparable groups.
5.6.1.5 Procedure of the subject comprehension tests
(IT and DT)

The two tests were administered to assess the extent to which students were able to make use of their notes to answer test questions. Students were allowed to consult their notes for reference. A time constraint was put on the tests to gauge the efficiency with which students would use their notes as reference. The first test (IT) was administered immediately after the presentation of the lecture and the second (DT), after a period of one month. Both tests consisted of short comprehension questions on the topic which had been the subject of the lecture. Though the two tests were different in having two different sets of questions, an attempt was made to have the items in the two tests similar in terms of type and complexity with the exception of a section on multiple choice type questions in the delayed test in Economics and History. Before the delayed comprehension test, students were given about ten minutes to go through their notes, which were returned to them at the beginning of the session. The Literature tests were initially scored out of 10 marks. Later they were converted to the scale of the notes, i.e., out of 32 so that they could be presented and compared in the same table. Similarly, the Economics tests carrying marks of 32, 30 were converted to the scale of 42 and the History tests of 18 and 25 marks converted to the scale of 50 marks.
5.6.1.6 Results of the subject comprehension tests (IT and DT)

A summary of the scores obtained by the students (in three separate samples) on the pairs of subject comprehension tests is given in the table below. (The actual scores are given in Appendices 4P, 5F and 6F.)

Table 2

<table>
<thead>
<tr>
<th>Subject Test</th>
<th>Literature</th>
<th>Economics</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IT</td>
<td>DT</td>
<td>IT</td>
</tr>
<tr>
<td>Sample (N)</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Maximum Score</td>
<td>32</td>
<td>32</td>
<td>42</td>
</tr>
<tr>
<td>(converted)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>27.46</td>
<td>21.86</td>
<td>25.6</td>
</tr>
<tr>
<td>S.D.</td>
<td>3.96</td>
<td>6.96</td>
<td>7</td>
</tr>
<tr>
<td>Cut-off Score</td>
<td>22.4</td>
<td>22.4</td>
<td>30</td>
</tr>
<tr>
<td>No. qualifying</td>
<td>10</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

5.6.1.7 Correlations between the three measures

Within each subject-related sample three tests were administered. The correlations between the Notes Test-1, the IT and the DT obtained for the three subjects is given below.
5.6.1.8 Interpretation

In examining the results in Tables 2 and 3 no clear picture emerges. Despite the conversion of the IT and the DT in each case to a common scale, these short, partly pre-response and partly selection type tests cannot be treated as equivalent tests. No conclusions can be drawn from the apparent changes in the values of the mean and SD as significance values cannot be established. The high correlations in the case of History has to be seen in the light of the consistently poor performance of the entire sub-sample.

As conceded in the discussion of the performance of students on the notes test, the uncontrolled variation in the nature of the topic and the style of presentation across the three subjects present the identification of a linear dimension of note-making ability, that can be measured reliably. This difficulty was compounded by the limitations in the psychometric
dependability of the two subject comprehension tests. The proposed method of considering differences between means and correlation coefficients cannot thus be employed to test the hypotheses relating to the usefulness of note-taking activity as process, and notes as product in fostering subject learning. The discussion therefore proceeds to the qualitative analysis constituting the second part of Survey-2.

5.7 Analysis-2

This part of the chapter presents a separate study of the effectiveness of students' notes especially in relation to the organisation of notes. Therefore, the focus is more on the essential qualitative features of discourse in each of the disciplines. The study takes into account the format, content, and language, each contributing to the overall organisational aspect of students' notes. The main objective of the analysis is to see if students' notes contained features which could be exploited for comprehension and subsequently for consolidating learning. In this particular context, note-taking is a strategy which students could consciously use for learning and not just an activity which serves more as an aid to memory. Those students whose notes do not have features of good organisation could be trained in acquiring certain skills while noting. Students' notes that are well organised could be trained to make appropriate use of their notes through different tasks for learning. It is assumed that the... contd. on Page-188
organisational aspect of students' notes would reflect the basic structure of a subject topic. Students could then be further trained to use their notes effectively focusing on the basic features of the topics. Therefore in this section, the focus is more on the skill of note-taking as a strategy which the students are expected to use while noting during lecture hours and reviewing notes after lecture hours.

5.7.1 Questions related to the analysis

The hypothesis stated below is related to some of the following questions, which are relevant to the analysis.

1. How far do the organisational features in students' notes reflect their understanding of the lecture information?

2. How far do these features show evidence of the potentiality of notes being useful later?

3. How far do these organisational features reflect the structure of the topic in the discipline presented in a lecture?

The analysis is based on the following assumptions:

1. Students' notes, in relation to the organisational features, reflect their understanding of the lecture
information based on the structure of the discipline.

2. The very presence of the features of organisation in students' notes confirms the use of the skill of note-taking as a strategy, i.e., a tool for learning and not simply an activity for storage purpose.

5.7.2 Analysis of notes - findings

This section briefly looks at the organisational aspect of students' notes in terms of -

1. Comparison of notes with the lecture tape script and researcher's notes and assessed against the three point marking scale.

2. Comparison of students' notes with their performance in the two comprehension tests, the immediate and the delayed. About ten sets of notes in each discipline were examined. Of these, three sets of notes from each subject are closely looked at and presented in Appendices 4G, 5G and 6G.

(a) Economics

1. Comparison of students' notes with the lecture tape script and researcher's notes

The organisational features present in the lecture are well reflected in students' notes. 7 out of 10 scripts of
notes were well organised with proper sequence of points, section headings and the main points under each heading. The lecture in Economics was fairly well organised. Notes contained point-wise presentation of facts and most of the information presented. These notes had all the points on the board. It seemed that these notes could be used for later reference. Though the relationship between the main and sub-points can be seen to some extent in being able to categorise information under different headings, there are constraints on attempting to evaluate the extent to which students' notes demonstrate an adequate awareness of the relationship between points. This is because the students might have omitted some of the cohesive devices which link the various propositions in the notes. Thus there is the problem of determining the extent to which students' notes are coherent without the supporting cohesive devices. The notes contained specific lecture signals in relation to -

a. the beginning of a lecture,
b. the conclusion of a lecture, i.e., the intra-textual relationships in the text of a lecture.

Students' notes placed against the levels of adequacy are as follows:
Of these, three sets of notes representing the three levels of adequacy are taken up. Script 1 (see Appendix 4G) was found adequate when assessed based on the marking criteria, defining the different levels. Script 1 had a clear pointwise presentation of facts with proper underlined headings and sub-headings. Most of the information was presented effectively and accurately. Notes contained most of the key words and concepts. Detailed information is not present. This only shows the students were able to select important and relevant information and leave the rest out. Notes contained categorisation of information under appropriate headings. All the points were noted in the sequence they were presented.

Script-2 was placed at Level B, i.e., not quite satisfactory (see Appendix 4G). Though most of the information was present in script-2, it lacked clarity. Distinction between the main and sub-points were not indicated. Though important words and concepts were recorded, they were not highlighted. Indication of lecture signals was not present. There seemed some confusion in the presentation of information.
Script-3 was an example of poor notes — coming under the category of Level-C (see Appendix 4G). This particular script lacked any kind of lay-out. There were gaps in information recorded and absence of lecture signals though some of the key concepts were underlined. There was no effort in categorising information.

2. **Comparison of students' notes with their performance in the two comprehension tests**

There is a clear distinction seen in students' performance belonging to three different levels of proficiency. Students with well organised notes and containing most of the important points did well both in the immediate and delayed tests. Those with disorganised notes and fewer points performed badly in the comprehension tests.

In this particular instance, there is a strong suggestion that organisation, mainly noting the main, important points in proper sequence does influence students' performance in the comprehension tests. It is not just the presence of information content that is important but also the layout present in students' notes.

(b) **History**

1. **Comparison of students' notes with the lecture tape script and researcher's notes**

Here again 8 out of 10 scripts reflected the presentation style to some extent. The notes lacked any sort of format and
presented information in the form of long paragraphs. All 10 students' notes were much longer than the notes in the two other subjects. 6 out of 10 scripts had most of the information but were badly lacking in organisation. The notes seemed to have some scope for revision and reorganisation.

Students' notes placed against the levels of adequacy are as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Adequacy</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Adequate</td>
<td>-</td>
</tr>
<tr>
<td>Level B</td>
<td>Unsatisfactory</td>
<td>6</td>
</tr>
<tr>
<td>Level C</td>
<td>Poor</td>
<td>4</td>
</tr>
<tr>
<td>(N = 10)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As in Economics, three sets of notes are taken up for analysis. Script 1 (see Appendix 5G) was placed at Level B. Although the notes contained almost all the information presented in the lecture, they were totally devoid of any organisation. Notes do not make a distinction between the main and the sub-points though most of the key points were present.

Scripts 2 and 3 (see Appendix 5G) were placed at Level C, poor. These notes had information gaps and lacked organisation. Information was presented as running notes in different paragraphs. The notes do not identify key words and concepts, No distinction was made between the main and the sub-points.
The notes contained proper sequence of points, which was not difficult with the lecture presentation. The notes followed the sequence in the lecture.

2. **Comparison of students' notes with their performance in the two comprehension tests**

Students' notes that contained very few points did poorly in both the tests. Another reason for their bad performance was due to lack of some kind of organisation, which would have helped them to make sense of their notes when answering the delayed test questions. Those students with hardly any points in their notes, did badly in the immediate test as well. It is obvious that these students had problems understanding the lectures. Students whose notes were of an average standard, that is, contained more or less 50% of the information presented in the lecture minus the organisation, scored 50% and above in the delayed test and a little less than 50% in the immediate test.

In this particular discipline, organisation of points in students' notes did not have much influence on their test performance. If they had adequate information in their notes, they did relatively well in the comprehension test. Those students whose notes contained 70% of the information, performed well in both the tests, though a little better in the delayed test. If students' notes were organised, they probably would have performed better.
(c) Literature

1. Comparison of students' notes with the lecture tape-script and researcher's notes

In Literature 8 out of 10 students' notes reflected the lecture in terms of its organisation, that is, students notes contained the main points in the topic and there was no connection between the main and sub-points. Points that were repeated and lines read out from the text were omitted in students' notes. When compared to lecture tape-script, students' notes seemed to be better organised. This indicates that students had the skill to identify the main information content from the lecture.

All their notes were taken down verbatim. 8 out of 10 scripts contained words and sentences actually spoken by the teachers and were therefore lengthy. Important words and phrases were not highlighted or underlined in any of their notes. Hardly any abbreviations, or headings were used. Though the notes contained most of the important points — they were inadequate, i.e., they lacked the necessary detailed information required for proper comprehension of the lectures. Information here includes detailed points which show relationships between concepts, ideas, definitions, points of comparison and contrast etc. It was obvious from their notes that students had problems with the mythological references. Notes did not contain the right facts and were unclear. 7 scripts out of 10 did not look like they could be improved much on
revision as they did not have all the necessary information. However some kind of organising could be done later on these notes.

Students' notes in Literature were placed against the following levels of adequacy.

<table>
<thead>
<tr>
<th>Level</th>
<th>Adequacy</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Adequate</td>
<td>5</td>
</tr>
<tr>
<td>Level B</td>
<td>Unsatisfactory</td>
<td>3</td>
</tr>
<tr>
<td>Level C</td>
<td>Poor</td>
<td>2</td>
</tr>
</tbody>
</table>

(N = 10)

Of these, three sets of notes representing the three levels of adequacy are given in the appendix. Script 1 (see Appendix 66G) was placed at Level A. The notes contained almost all the important information as presented in the lecture though it lacked a clear format. The events were however presented in different paragraphs. Most of the key events were present though not underlined. Notes did not contain all the detailed information and references but only the main points/events. Probably the student was able to select and discriminate between the relevant and irrelevant information.

Script-2 was placed at Level B (see Appendix 66G). Though the information was presented point-wise and followed the sequence of the lecture, quite a few relevant information
was absent from the notes script. The detailed points were not noted. No effort was made to highlight important and crucial events presented in the lecture.

Script-3 was placed at Level C. The notes lacked proper point-wise presentation of facts. Quite a few relevant and detailed information was found absent from the notes. Distinction between the main and sub-points was not recorded in the notes. Notes did not contain any focus on important events by way of underlining words or phrases.

2. **Comparison of students' notes and their performance in the tests**

Like the other two disciplines, students who had almost all the relevant information in their notes did well in the comprehension test. It is evident that when the information present in students' notes had some sort of a systematic sequence, it helped them to use their notes for answering test questions.

5.8 **General findings**

1. About 70% of the students' notes in all three subjects contained more than 50% of the information presented in lectures but lacked in proper organisation. Since the notes contained information of points as presented in the lectures, i.e., taken verbatim, it was not clear if students understood the relationships between different concepts and ideas.
2. In case of students whose notes did not contain detailed facts but only the main points, it was evident that these students did not feel the need to note down all the detailed information except that which demonstrated the way the lecturer's main argument unfolded. These notes reflect better processing on the part of the learner.

5.9 Conclusion

The above sections attempted an analysis and interpretation of the assessment of students' notes both in terms of content and organisation and tried to -

- correlate students' notes test with the two comprehension tests in terms of information content;
- compare students' notes with the lecture tape-script, and researcher's notes in terms of organisation;
- compare students' notes with the two comprehension tests in terms of organisation.

Interpretations focus on the following facts:

(a) Students have problems in adequately comprehending lectures and taking down notes.

(b) Students are not aware of the use of cognitive learning strategies.
(c) Taking notes during lecture is an activity which is a mechanical encoding process, used mainly for storage purposes and not as a tool for learning.

(d) Students do not know how to make use of their notes for later reference.

(e) Students are not acquainted with the skill of appropriate and relevant noting related to subject specific demands, i.e., their notes show lack of grasp of the structure of the topic.

(f) Apart from making students aware of certain subject specific cognitive demands required while noting, the strategy use of note-taking, i.e., focusing on the skill as an enabling tool, will have to be given adequate importance. Therefore training is essential and relevant in making students use their notes for better comprehension.

(g) For better comprehension, the presence of information content in notes alone is not adequate. Proper organisation of the information is essential. Therefore note-taking is not just an activity but a strategy to be used consciously for learning both in and outside lecture hours.

(h) The structure of a topic in a discipline is best reflected in the organisation of notes, i.e., the way noted down. Through the use of note-taking as a strategy, students could be trained to understand the basic nature of a subject.
1. In this section and henceforth students' lecture notes are referred to as notes test, as a different set of notes are taken up for a detailed analysis. The main purpose of this was to assess the use of students' notes for performing different tasks.

2. In the study, the term 'noting' is sometimes used to refer to 'note-taking'.