Chapter Three

Design and Methodology

3.0 Introduction

In Chapter Two, studies on manipulation of the factors affecting task complexity and task difficulty were reviewed and the research questions for the present study were stated. Earlier research has shown that manipulation of the cognitive demands that tasks impose on learners may have specific consequences for learners’ production (Robinson 1995, 2001; Skehan 1996, Skehan & Foster 1997). However the empirical research up to now has not given a conclusive picture with respect to the claims of either Skehan’s Limited Attentional Capacity model (1996) or of Robinson’s Cognition Hypothesis (2001). Especially the effects of simultaneous manipulation of resource-directed and resource-dispersion variables have not been widely studied. The focus of this dissertation was to find out whether cognitively demanding tasks lead to greater complexity, variety, accuracy and coherence in writing. Through this study, we wish to provide empirical evidence for Robinson’s Cognition Hypothesis.

The research comprises of two studies. Study 1 was conducted to examine the effect of one aspect of task complexity (resource directedness) on second language writing performance. Study 2 looked at the effect of the interaction of two aspects of task complexity (resource directedness and resource-dispersion (pre-task availability)) on
writing performance. This chapter will describe the two studies and provide information about the design; the participants; elicitation tasks and procedures; the linguistic and discourse measures to study writing performance; coding and analysis of the writing elicited from participants; and the statistical instruments used for computations.

3.1 Design

3.1.1 Design of Study 1

Two studies are reported in this dissertation.

Study 1 examined task complexity along resource-directed dimension, where 40 learners wrote essays, where the task prompts varied in complexity [+complex] and [-complex] and learner essays were analyzed for linguistic and discourse features. A repeated-measures design was used in Study 1 in which the within subjects factor was Task Complexity. Two levels of Task Complexity were analyzed for the independent variable.

i. [+complex] [an argumentative task]

ii. [–complex] [a descriptive task]

Two groups of second language learners were categorized: ‘Good Argumentators’ who knew how to present an argument in writing and understood the demands of the task, and ‘Weak Argumentators’ who either did not understand the demands made by the task, or even if they did, they did not have the required knowledge of language and discourse to execute the task.
Repeated measures analysis of variance (ANOVA) of the 8 dependent variables (linguistic and discoursal variables) was carried out (cf Table 3.1 and Table 3.2).

3.1.2 Design of Study 2

Study 2 has three parts, though carried out with the same participants. In Study 2, two groups of learners who differed in proficiency wrote essays on [+complex] and [-complex] (Study 2A), similar to Study 1 and on four conditions [+complex +pre-task], [-complex +pre-task], [+complex -pre-task] and [-complex -pre-task] (Study 2B). The objective in Study 2A was to check whether task complexity effects on learner writing are influenced by proficiency differences, and Study 2B was whether interaction of ±complex and +pre-task affected learner writing, where learners differed in proficiency.

In Study 2C, learners answered a ‘task difficulty’ questionnaire (see Appendix V). Here, learners had to complete Likert scale responses (on a scale from 1 to 5) to questions, immediately after each task. These questions accessed learners’ overall perceptions of difficulty, the extent to which they found the task stressful, their confidence in their ability to do the task, the interest in the task and the processing/thinking involved in the task.

The independent variables for the studies are presented in Table 3.1. Study 1 has one independent variable (resource directedness), Study 2A has two (proficiency and resource directedness) and Study 2B has three (proficiency, resource directedness and resource-dispersion).
Let us now look in detail various measures of writing performance used in these studies.

3.2 Measures of writing performance

Eight dependent variables (five linguistic and three discoursal) were used to measure writing performance of learners. Five variables were used to tap the linguistic performance of the learners.

### Table 3.2: Dependent variables in the studies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nature</th>
<th>Operationalised Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>Dependent</td>
<td>Number of error-free T-units</td>
</tr>
<tr>
<td>Syntactic complexity</td>
<td>Dependent</td>
<td>Mean of words per T-units</td>
</tr>
<tr>
<td>Syntactic variety</td>
<td>Dependent</td>
<td>Type-token ratio (Guiraud’s index) for verb patterns</td>
</tr>
<tr>
<td>Lexical density</td>
<td>Dependent</td>
<td>Type-token ratio of content words to functional words</td>
</tr>
<tr>
<td>Lexical variety</td>
<td>Dependent</td>
<td>Type-token ratio of different types of words to total number of words</td>
</tr>
<tr>
<td>Reference markers</td>
<td>Dependent</td>
<td>Type-token ratio of different types of reference markers to total number of reference markers</td>
</tr>
<tr>
<td>Linkers</td>
<td>Dependent</td>
<td>Type-token ratio of different types of linkers to total number of linkers</td>
</tr>
<tr>
<td>Coherence</td>
<td>Dependent</td>
<td>Sum of scores on an analytic scale</td>
</tr>
</tbody>
</table>
These eight measures were used for analyzing scripts in Study 1, Study 2A and Study 2B. Let us describe each of these measures in detail.

### 3.2.1 Accuracy

Error-free T-units were used as a measure for accuracy. A T-unit is defined as one independent clause with all subordinate clauses attached to it (Hunt 1965:20). Errors in syntax and lexical choice were treated as errors in this analysis. However, punctuation errors were not treated as errors in this analysis.

$$\text{Accuracy} = \frac{\text{No. of Error-free T-units}}{\text{No. of T-units}}$$

### 3.2.2 Syntactic Complexity

For Mean T-unit Length or MTUL the total number of words in a text was divided by the total number of T-units\(^3\) (the shortest grammatically correct unit) in a text (Hunt 1965). For example,

- Main clause + Subordinate clause: [John went to the market to get a pair of spectacles] 1 T-unit.
- Main clause + Coordinate clauses: [John went to the market] 1 T-unit [and then he went to the zoo] 1 T-unit [and returned home in the evening] 1 T-unit.

---

\(^3\) T-unit: one main clause with all subordinate clauses attached to it (Hunt 1965:20).
3.2.3 Syntactic variety

Syntactic variety was measured by using type-token ratio of the type of syntactic constructions used, where all the patterns were counted differently. The following list of constructions (Quirk et al. 2010) was used:

1. Be: Our most heinous crime—we are young.
2. V+ to-inf: I want to leave now.
3. Verb: Yes, we know.
5. V+ Noun Phrase: Her behaviour annoyed me.
6. VN4+ adverb/preposition: He hit the ball onto the stumps.
7. V+ adjective: He sounds sad.
8. VN+ adjective: She considered herself a looser.
9. VN+Noun: Don’t deny me the pleasure.
10. Verb+ that: He said that he would go.
11. VN+ that: Can you remind me that I have to buy fruits today?
12. V+ what clause: Catch them young is what I say.
13. VN+ what clause: I asked him where the book was.
14. VN+ to infinitive: Did you hear the phone ring?
15. Ving: She never stops singing.
16. VN-ing: Whenever there is an accident involving automobiles, the question recurs in mind, and the debate on the ideal age for a driver’s license occupies most of the readers.
17. V+ wh (Phrasal verb): I can’t figure out how to stop it. * All phrasal verbs have been taken as one individual unit (one verb).
18. V+ wh+ to inf: We know how to do things in the wrong way.
19. V+ Adv+ that: It was here that I learnt the art of academic writing.

---

*N-Noun, V-verb, adv-adverb, prep-preposition, adj-adjective, N-noun, wh-what clause, NP- noun phrase, ing-ing form of verb. All patterns were counted differently.*
20. V+ Adj+ wh: *It is very unfortunate if one loses one’s organ in the middle of his/her life span.*

21. V+ Adj+ Ving: *They are not worth looking into.*

The ratio between types and tokens (TTR) decreases systematically with increasing text length because speakers/writers have to repeat themselves, which leads to less variety or types of verb patterns. This makes it impossible to compare texts with different lengths. Guiraud’s index compensates for the decreasing TTR. Therefore, Guiraud’s index (different types divided by twice the square root of tokens) has been used to calculate TTR.

\[
\text{TTR: } \frac{\text{Type of verb patterns}}{\sqrt{2} \times \text{Verb pattern token}}
\]

### 3.2.4 Lexical Density

Lexical density, on the other hand, measures the relationship between grammatical items and lexical items. By studying this, we get to know about *information packaging*: a text with a high proportion of content words contains more information than a text with a high proportion of function words (prepositions, interjections, pronouns, conjunctions and count words). It was calculated by dividing the ratio of content words in the text (Noun, Verb, Adjective and Adverb) to the ratio of function words in the text.

\[
\text{Lexical density} = \frac{\text{Type-token ratio of content words}}{\text{Type-token ratio of function words}}
\]
3.2.5 Lexical variety

Lexical variety was used to check the lexical richness of the text. The more varied vocabulary a text possesses, the higher is the lexical variety. For a text to be highly lexically varied, the speaker or writer has to use many different words, with little repetition of the words already used, and thus a richer vocabulary. Lexical variety was studied by dividing the total number of different words (frequency of both content and function words) in the text by the total number of words in the text. *Numerals and symbols (%, &) were not counted.

Lexical Variety: Types of words
Total no. of words

3.2.6 Reference markers

Reference markers are the words which on its own does not have a meaning and instead make reference to something else for its interpretation (Halliday & Hasan 1976). They are: Personal reference (Noun/ Pronoun, determiner); Demonstrative reference (this, these, that, those, etc); Comparative reference (Adjective-same, equal, similar, other, etc); Adverb-likewise, such, similarly, equally, etc.). Different reference marker categories were not counted separately. These were counted as one major category of reference markers. It was analyzed by different types of reference markers divided by the total reference markers in the text.

Reference Markers: Types of reference markers
Total no. of reference markers
3.2.7 Linkers

Linkers act as a cohesive tie between clauses or sections of text in such a way as to demonstrate a meaningful pattern between them. They are: Additive (and, furthermore, besides, that is, by contrast, etc.); Adversative (yet, though, only, etc.); Causal (so, then, hence, therefore, etc.) and Temporal (then, next, after, first, etc.). Different linker categories were not counted separately. These were counted as one major category of linkers. It was analyzed by different types of linkers by total linkers in the text.

<table>
<thead>
<tr>
<th>Linkers:</th>
<th>Types of linkers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total number of linkers</td>
</tr>
</tbody>
</table>

3.2.8 Coherence

Coherence is being able to make meaning of a text while processing on the basis of its linguistic structure and knowledge (both linguistic and world). Coherence is not a measurable construct and therefore, analytical tools were used. Coherence themes were selected on the basis of essay rating rubric (Crossley & McNamara 2010). We chose only these seven parameters as these are most commonly used in descriptive and argumentative writing.

<table>
<thead>
<tr>
<th>Structure:</th>
<th>Clarity of division into introductions, argumentation, and conclusion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity:</td>
<td>Strength of connection of ideas and themes within and between the essays’ paragraphs (cohesion).</td>
</tr>
<tr>
<td>Ease and Fluency:</td>
<td>Overall coherence and ease of understanding.</td>
</tr>
<tr>
<td>Topic Sentences:</td>
<td>Presence of identifiable topic sentences in argumentative paragraphs.</td>
</tr>
<tr>
<td>Evidential Sentences:</td>
<td>Use of evidential sentences in the argumentative paragraphs that support the topic sentence or paragraph purpose.</td>
</tr>
<tr>
<td>Conclusion:</td>
<td>Clarity of the conclusion.</td>
</tr>
</tbody>
</table>

Modified from McNamara, Crossley, & McCarthy (2010).
Coherence was analyzed by taking sum after assigning points on a 5-point Likert scale (5-highest and 1-lowest).

3.3 Hypotheses

Broadly our hypotheses for the study are:

a) When task complexity is increased on resource-directed dimension, the writing becomes more complex and varied.

b) When task complexity is decreased on resource-dispersion dimension, the writing becomes more complex and varied.

The following are the study-specific hypotheses:

- Hypotheses 1 to 3 pertain to Study 1;
- Hypotheses 4 to 6 pertain to Study 2A;
- Hypotheses 7 to 9 pertain to Study 2B and
- Hypotheses 10 and 11 pertain to Study 2C.

We present the rationale for the hypotheses before we state them.

According to Robinson’s Cognition Hypothesis (1995), accuracy in writing increases with increase in task complexity. Therefore, the accuracy levels in writing would be greater for [+complex] than for [-complex] tasks. Learners will show an increase in levels of accuracy in writing [+complex] than [-complex] tasks (Hypothesis 1).
An argumentative task (+complex) is expected to compel the learners to use more complex sentences like *I believe..., I think..., I am of the opinion that...* thereby increasing the length of T-units. Also, a greater involvement with the content in the task would increase the repeated processing of information leading to use of the less activated words in the lexicon, thereby increasing lexical density of writing. *Learners will show greater linguistic complexity (syntactic and lexical) in writing [+complex] than [-complex] tasks (Hypothesis 2).*

In writing a descriptive [-complex] task, tight coherence is not necessary and the sentences can be loosely strung together. The linearity of presentation often is enough to lend coherence to the text. However, in writing argumentative essays, a clear thesis and supporting evidence need to be put together. This requires an overt use of cohesive devices to indicate the main claim, topic shifts, and to present the essay in an organized manner. Therefore, we expect to find better coherence and more frequent use of cohesive devices in an argumentative writing than in descriptive writing. *Learners will show better coherence and a greater use of cohesive devices in writing [+complex] than [-complex] tasks (Hypothesis 3).*

To reiterate, Study 1 examined the effect of task complexity ([+complex] vs. [-complex]) on linguistic and discoursal aspects of writing. However, proficiency was added as an independent variable in Study 2. So we had two proficiency levels: low and high proficiency levels. This was meant to check whether proficiency interacts with task complexity and its effects on writing. Along with this added dimension, in Study 2B, we
also looked at another aspect of task complexity-presence/ absence of pre-task. Therefore, there were three independent variables- (a) [-complex]/ [+complex] (b) ±Pre-task and (c) Proficiency – whose interaction effects were examined on writing. Study 2C looked at the effect of perception of task difficulty and simultaneous manipulation of task complexity.

The relevant hypotheses are presented below:

**Study 2A: Proficiency, task complexity and writing**

**Hypothesis 4**: High proficiency learners will show better performance on all the eight measures than low proficiency learners on [+complex] and [-complex] tasks.

**Hypothesis 5**: High proficiency learners will show greater linguistic complexity (syntactic and lexical) on [+complex] tasks than low proficiency learners.

**Hypothesis 6**: High proficiency learners will show better coherence and a greater use of cohesive devices on [+complex] tasks than low proficiency learners.

In earlier research (Robinson 2001; Gilabert 2005) the complex versions of task were seen as more difficult more stressful and requiring more thinking than the simple versions. It was found in these studies that learner’s perception of difficulty correlated also with fluency in performing the task. Also, a task perceived as requiring higher
thinking and processing, would correlate with linguistic complexity and variety used in writing.

Study 2B: Resource directedness and resource disperseness and proficiency

**Hypothesis 7:** In both groups, when [+complex] tasks are provided with a pre-task, learner writing will show greater linguistic complexity (syntactic and lexical) than when they are provided without pre-tasks.

**Hypothesis 8:** In both groups, when [+complex] tasks are provided with a pre-task, learner writing will show greater coherence and a greater use of cohesive devices than when they are provided without pre-tasks.

**Hypothesis 9:** In both groups, when [-complex] tasks are provided with/without a pre-task, learner writing will show no difference.

Study 2C: Task difficulty and simultaneous manipulation of task complexity

**Hypothesis 10:** [+complex] tasks will be perceived as more difficult, more stressful, and generating more thinking and less confidence than [-complex] tasks by both groups.

**Hypothesis 11:** [+complex-PT] tasks will be perceived as more difficult, more stressful, and generating more thinking than [+complex+ PT] which in turn will be seen as more difficult than [-complex-PT] and [-complex+ PT] for both groups.
3.4 Participants

Study 1 had 40 learners, who were selected from a pool of 80 learners, after administering a proficiency test to get a homogeneous group of learners (details of the groups in Chapter 4). Study 2 had 30 learners, divided into Low Proficiency (LP) and High Proficiency (HP) groups on the basis of a proficiency test (details of the groups in Chapter 5).

Let us now look at the details of the proficiency test administered to the learners.

3.5 Proficiency test

There were 63 multiple-choice items in the two-hour proficiency test created by the researcher. The proficiency test was used to know the level of learners in Study 1, and to divide learners into higher and lower proficiency groups in Study 2. There were 20 grammar items; 12 questions on reading (3 reading passages); 20 vocabulary items; 5 questions were on speaking (dialogue completion). The last section was writing and had two parts. The first required ordering of sentences (5 items) and the second was a free-writing task where learners had to write either on a descriptive (education system is making present day youth bookworms) or an argumentative task (working women vs. homemaker) from the two options given. This was done to assess content, fluency and accuracy of learner writing.
The proficiency test was administered to 80 Class IX KV students. Out of these, 40 learners completed both the tasks and were the subjects in Study 1. The z-scores were within the range of -2 to -1 (6 subjects), -0.9 to 0 (18 subjects), 0.1 to 1.9 (12 subjects) and 2.1 to 3 (2 subjects).

In Study 2, proficiency was varied. The Lower Proficiency group consisted of 15 learners with a mean of 34.4 (SD=4.27) and High Proficiency group consisted of 15 learner with a mean of 67.4 (SD=4.92) on the proficiency test. The details of this grouping will be given in Chapter 5.

### 3.6 Elicitation tasks and tests

In Study 1, two task topics were used and for each a [+complex] and [-complex] prompt was created. For Study 2A, five task topics were used and for each a [+complex] and [-complex] prompt was created.

For Study 2B, for two of the five topics, a pre-task was created for [+complex] and [-complex] versions. Along with these elicitation tasks, a questionnaire taping perception of task difficulty for Study 2 (A & B) was prepared. To categorize learners into proficiency groups in Study 2A and Study 2B, a proficiency test was also designed and administered. We begin with the tasks and then give details of the questionnaire.

#### 3.6.1 Writing tasks

Before giving details about the writing tasks, the process of selection of the topics for the tasks is reported. Learners had to write 4 essays in Study 1, and 14 essays in Study 2. It
was imperative to choose topics that would interest the learner and would not pose
difficulty in terms of content familiarity. The selection process was done in three parts to
the learners.

**Phase 1:** 30 undergraduate students, enrolled in an undergraduate programme at the EFL
University, Hyderabad participated in Phase 1. An initial informal discussion with the
students generated around 100 topics. To select 10 out of the 100 topics, a questionnaire
format was used. This questionnaire was administered to a random sample of 30
undergraduate students at the EFL University and they were asked to indicate their
preferences as to which topics would they be interested in writing essays. This preference
for the task topic was to be indicated on a 5-point Likert scale where 1 indicated ‘Least
Interesting’; 2: ‘Tolerable’; 3-‘Average’; 4-‘Good’; 5-‘Most interesting’). On the basis of
the questionnaire, the following ten topics were found to be most preferred by the
learners:

- Topic 1: Globalization
- Topic 2: Global warming
- Topic 3: Education System
- Topic 4: Evaluation system
- Topic 5: Love Marriage vs. Arranged Marriage
- Topic 6: Product Description
- Topic 7: Movies and Morality
- Topic 8: Culture
- Topic 9: Working women: Work vs. Family Commitments
- Topic 10: Social networking sites
**Phase 2:** In Phase 2 of the selection procedure, two versions of tasks were prepared for each of the 10 topics. The first version was a descriptive task [-complex] and the second an argumentative [+complex] task. Recall that according to Robinson’s *Cognition Hypothesis* (2001), when specific linguistic resources need to be used in writing because of the quality of the prompt (as in argumentative task) the task becomes cognitively more complex, and thus is expected to raise the complexity of the resultant writing. For example for the topic, *Product Description*:

**Task 1: Descriptive [-complex]:** Write a description of a new product that your company is planning to launch in the market.

**Task 2: Argumentative [+complex]:** “Customers buy products that look attractive and are promoted heavily rather than products of better quality which do not look attractive and are not promoted much”. Do you agree? Give reasons.

The task on the topic, *Product Description* required learners to describe a product that their company is planning to launch in the market [-complex]. The argumentative [+complex] version of the task required the learners to take a stance on what they feel should be given preference-an attractive and extensively promoted product or an unattractive product, high on quality though not extensively promoted.

These tasks were then trialled with 10 undergraduate learners from the same group in Phase 1. The learners were asked to write the main points for each of the tasks. These main points helped us to understand whether learners had understood the task instructions and could generate content on those topics. Learners were also asked to evaluate each
task again and indicate on a 5-point Likert scale (1-Least Interesting; 2: Tolerable; 3-Average; 4-Good; 5-Most interesting).

The writing sample and the questionnaire rating for a [-complex] task on ‘Product Description’ are given in Appendix IB.

As can be seen from Appendix IB, the topic generated a lot of interest in the learner. The language and content used for the points obtained in the task was relevant. This led us to believe that the task instructions were clear and the topics were relevant. The mean preference for the 10 topics are presented in Table 3.3.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Preference Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Movies and morality</td>
<td>4.41 (0.67)</td>
</tr>
<tr>
<td>2. Love marriage vs. arranged marriage</td>
<td>4.37 (0.71)</td>
</tr>
<tr>
<td>3. Smoking</td>
<td>4.36 (0.63)</td>
</tr>
<tr>
<td>4. Product Description</td>
<td>4.35 (0.68)</td>
</tr>
<tr>
<td>5. Social networking sites</td>
<td>4.33 (0.65)</td>
</tr>
<tr>
<td>6. Globalisation</td>
<td>4.30 (0.71)</td>
</tr>
<tr>
<td>7. Culture</td>
<td>3.82 (0.58)</td>
</tr>
<tr>
<td>8. Education system</td>
<td>3.50 (0.66)</td>
</tr>
<tr>
<td>9. Evaluation system</td>
<td>3.45 (0.65)</td>
</tr>
<tr>
<td>10. Global warming</td>
<td>3.02 (0.70)</td>
</tr>
</tbody>
</table>

Maximum mean: 5, Standard deviation is given in parenthesis and italicized

Subjects in Study 1 were administered two sets of tasks on two topics (Smoking and Product Description). Movies and morality, Love marriage vs. arranged marriage, Product Description, Social networking sites and Globalization were chosen as topics for subjects in Study 2. Subjects were administered 10 tasks based on these topics (10
Pre-tasks gave help to learners about style and organization to be used in the main task. It also helped familiarizing the learner with the content and language of the task. Providing pre-task was expected to reduce the cognitive load and also increase the processing of information, thereby freeing up attentional resources and enabling better use of linguistic resources in the writing output.

Two topics were selected from the five most preferred topics (§3.5.1) – Product description and Globalization. The same pre-task was given for both the [+complex] and [-complex] version of these tasks. Since the pre-task was made keeping in mind that learners are helped with the content, organization and linguistic features, so the same pre-task seemed justified. Also, since the focus was how pre-tasks effect language writing when task complexity is manipulated, it was important that same kind of pre-task be provided for both, [+complex] and [-complex] tasks. Learners performed four tasks for each topic: [+pre-task, +complex]; [+pre-task, -complex]; [-pre-task, +complex] and [–pre-task, -complex]. Note that the tasks were presented with sufficient time gap between them to avoid practice effect.

Given below is the pre-task (advertisements in Appendix IVA) for the Product description task (Task 1 and Task 2, cf 16). These questions were formulated after a careful analysis of the features of advertisements.
Sample Pre-task for Product Description

What is your favourite advertisement at the moment and why?

What according to you is a good advertisement? What famous advertisement slogans can you remember? [What made them so memorable? What was so special about them? Can you describe the product (uses, appearance, etc. of the product)?]

Six advertisements were shown to the learners. For each advertisement, learners had to answer the following questions.

- Who would use the product?
- Does it create curiosity about the product?
- What is the message of the product? What is the number of messages in the product?
- Was the message simple or complex?
- Does the advertisement talk about the qualities of the product?
- Do you think the slogan is relevant?
- Does it talk about how it is different from other brands?
- Is the advertisement interesting? How effective is the presentation of the product?

As this pre-task was a teaching task, it led to generation of a lot of sub-themes along with the questions given. This facilitates better language production in the main task. These questions provided learners with the content required for the main task. It reduced the linguistic load by helping learners prepare for the main task (in the form of organizing of ideas and vocabulary for the task).

In the pre-task, as learners analyzed the structure of an advertisement carefully, it helped them in describing a new product in a better manner. Hence the pre-task helped learners explore advertisements and all its features (content and language). Providing pre-task also helped learners to generate linguistic resources to be used for the main task, which would specifically be helpful for argumentative tasks, as accomplishing an argumentative task entails use of specific linguistic resources.
3.6.2 Task difficulty questionnaire

A questionnaire was designed that was administered after the completion of each writing task. The questionnaire tapped information about learner perceptions of task difficulty. There were questions on how difficult, how stressful the task was, and how confident they (the learners) felt about their performance on the task, how interested were they (the learners) were in doing the task, and whether the task demanded deep thinking or not. The learners had to rate each writing task on the questions on a 5-point Likert scale (5-Strongly agree and 1-Strongly disagree).

Let us now look at the analysis of a sample script to understand how different measures were computed.

Figure 6. The task difficulty questionnaire

<table>
<thead>
<tr>
<th>Please tick the appropriate option</th>
<th>Strongly agree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thought this task was easy.</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>I felt relaxed doing this task.</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>I did well on this task.</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>This task was interesting.</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
<tr>
<td>I had to think a lot for this task.</td>
<td>5 4 3 2 1</td>
<td></td>
</tr>
</tbody>
</table>
3.7 Analysis of Sample Script

Extract from a script

The idea and the very purpose behind a creative cause called “Social Networking” is belittled by the thought of “Moral Policing”. Social Networking Sites are tools and the tools as such do not have a defined characteristics within it. It is the user who attributes characteristics to these sites.

(Script No. 4B)

Accuracy

Let us start by looking at the number of T-units in this extract.

\[
\begin{align*}
&\text{[The idea and the very purpose behind a creative cause called “Social}\n\
&\text{Networking” is belittled by the thought of “Moral Policing”]} \quad 21 \text{ words} \\
&\text{[Social Networking Sites are tools]} \quad 5 \text{ words and} \\
&\text{[the tools as such do not have a defined characteristics within it]} \quad 12 \text{ words*} \\
&\text{[It is the user who attributes characteristics to these sites]} \quad 10 \text{ words}
\end{align*}
\]

No. of T-units= 4

In the third T-unit, we see that there is a concord (a defined characteristics*) error.

Therefore there are 3 error-free T-units.

\[
\text{Accuracy}= \frac{\text{Error free T-units}}{\text{Total no. of T-units}} = \frac{3}{4} = 0.75
\]

Syntactic Complexity

\[
\text{MTUL} = \frac{\text{Total number of words}}{\text{Total number of T-Units}} = \frac{21 + 5 + 12 + 10}{4} = 12.25
\]
Syntactic variety (Verb pattern analysis)

Table 3.4 shows the verbs and the verb patterns.

**Table 3.4: Verbs and verb patterns for the extract**

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Verb pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. called social networking</td>
<td>V+NP</td>
</tr>
<tr>
<td>2. is belittled</td>
<td>V+NP</td>
</tr>
<tr>
<td>3. are tools</td>
<td>be +NP</td>
</tr>
<tr>
<td>4. is the user</td>
<td>V+NP</td>
</tr>
<tr>
<td>5. attributes characteristics to these sites</td>
<td>V+NP</td>
</tr>
</tbody>
</table>

\[
SV= \frac{4}{\sqrt{2} \times 6} = 1.16
\]

\[
\sqrt{2} \times \text{Verb pattern tokens}
\]

**Lexical density**

Different content words: *idea, very, purpose, behind, creative, cause, called, social, networking, belittled, thought, moral, policing, sites, tools, defined, characteristics, within, user, attributes, characteristics*- 21

Total content words: *idea, very, purpose, behind, creative, cause, called, social, networking, belittled, thought, moral, policing, social, networking, sites, tools, tools, not, defined, characteristics, within, user, attributes, characteristics, sites, user*- 27

Different function words: *the, and, a, is, by, of, are, as, such, do, have, it, who, to, these* – 15

Total function words: *the, and, the, a, is, by, the, of, are, and, the, as, such, do, have, a, it, it, is, the, who, to, these* – 23
Lexical Variety

Different words used: the, idea, and, very, purpose, behind, a, creative, cause, called, social, networking, is, belittled, by, thought, of, moral, policing, sites, are, tools, as, such, do, not, have, defined, characteristics, within, it, user, who, attributes, characteristics, to, these- 37

Reference Markers

Different reference markers: the, it, such, who, these-5

Total reference markers: the, the, the, it, such, it, it, the, who, these-10

Linkers

Different linkers: and, as-2

Total linkers: and, and, as-3
Coherence

On Likert scale:

- Structure- 4, continuity- 4, thesis statement- 4, ease/ fluency- 4, topic sentence-4, evidential sentences- 4 and closing- 4

Coherence = 4+4+4+4+4+4+4+4+4 = 28

3.8 Statistical Computations

Microsoft Excel spreadsheet was used to enter the data. All statistical analyses (ANOVA and t-test) were carried out using the statistical package EZNOVA for Windows.

Five different kinds of statistical analyses were used in this study:

a. Descriptive statistics, which provides information about means, standard deviation.

b. A repeated measures analysis of variance (ANOVA) used for comparisons between task conditions and production measures.

c. Post hoc Tukey’s HSD comparisons to identify significant difference between groups.

d. Two tailed matched T Test to compare groups.

e. Pearson Correlations to check any correlations existing between production measures and affective variables.
In this chapter, the hypotheses for the four studies (Study 1, Study 2A, Study 2B and Study 2C), methodology, participants; tasks administered, administration procedures and the measures of structural and lexical complexity, accuracy, discourse and cohesion were examined. The details of the findings of the research using the above-mentioned methods will be reported in Chapter Four and Chapter Five.