CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter introduces and describes the methodological approach and procedures including the research design best suited to address the research hypotheses posed in this study. The first section of the chapter includes a review of the purpose of the study and a restatement of the research hypotheses. An overview of the research design then follows. An experimental design has been proposed to arrive at the answers to the research hypotheses. Given the importance of design and validity in choice of the research instrument, justification of the design has been provided. This is followed by a section on the description of the participants of the research study. The subsequent section includes an illustration of the instrument for data collection, followed by data validity measures and data reliability measures for various aspects of the research, and finally an overview of the procedures used for data collection and analysis.
3.1 Purpose of the study

The purpose of this study was to establish the effectiveness of a technology-enabled language enhancement program for written communication skills of ‘English as a Second language’ (ESL) learners at tertiary level. The following null hypotheses guided the study:

i. There will be no significant difference between the mean scores on the pre-test and post-test of the students who underwent the technology-enabled language enhancement program to develop written communication skills.

ii. There will be no significant differences among the mean scores on the pre-tests and post-tests of the students who underwent the technology-enabled language enhancement program to develop written communication skills in the various components of written communication skills.
3.2 Overview of research design

In order to examine the effectiveness of the technology-enabled language enhancement program on the written communication skills of ESL learners at the tertiary level, a research which tested the given hypotheses in a controlled context such as an experiment was required. Seliger and Shohamy (1989) point out that “Experimental research is carefully constructed so that variables can be controlled and manipulated.” In other words, an experimental research design involves manipulating the independent variable and observing the change in the dependent variable(s). The goal of this genre of design is that researchers try to control changes in variance of the independent variable(s) without allowing intervention of other unwanted variables (Perry, 2005). An experiment type of research consists of three basic characteristics, the presence of a control group, random selection and assignment to groups, and an administration of a pre-test to capture the initial differences in between the groups. However, when conducting research for language learning or applied linguistics, for all practical purposes, the feasibility of carrying out a true experiment which fulfils the criteria of all the three basic characteristics may not always be viable, especially when it comes to the random selection and assignment of subjects. It is not realistic to limit out research to true experimental designs only. In other words, the concept of experimental design is an idealized
abstraction. As Hatch and Farhady explain “the reason is that we are dealing with the most complicated of human behaviours, language learning and language behaviour” (1982). So, while it may still be desirable to proceed with the study, it would be practicable to conduct a pre-experiment instead of a true experiment (Nunan, 1992). Nunan (1992) further describes that a pre-experiment research design has pre- and post-treatment tests, but lacks a control group. The present study uses the one group pre-test post-test pre-experimental research design which can be represented as follows,

\[ X_1 - T - X_2 \]

where, \( X_1 \) is the pre-test, \( T \) is the treatment, that is, the technology-enabled language enhancement program, and \( X_2 \) is the post-test used to measure the written communication skills of the subjects.

The one-group pre-test post-test design “attempts to use the subjects as their own controls and to eliminate the need for a control group design. This design is sometimes referred to as a ‘repeated measures’ design because subjects are observed or measured twice on the dependant variable. The design is efficient because it controls a number of extraneous variables which can affect the homogeneity of subjects when more than one group is involved. To some degree, the design also controls for attrition or loss of
subjects. Since the same group is used for both pre-test and post-test, it does not need to be matched to another group.” (Sheligar and Shohamy, 1989)

Thus, the present study has adopted the one group pre-test post-test design experimental research method.

**3.3 Variables**

The independent variable can be defined as the major variable that the researcher hopes to investigate. It is the variable which is selected, manipulated, and measured by the researcher. The independent variable in this research study is the treatment which was given to the participants by means of the technology-enabled language enhancement program for written communication.

On the other hand, the dependent variable can be defined as, the variable which the researcher observes and measures to determine the effect of the independent variable. The dependent variables therefore in this study are the pre-test and post-test scores that measure the writing skills of students.
3.4 Participants

As mentioned in the previous section, for a true experiment to take place, a random selection and assignment of subjects is important for causal claims resulting from the research. However, in classroom research, neither random selection nor random assignment is possible since students have already been assigned on the basis of some principle such as test scores, course requirements, or merely through self-selection of courses by students. In such circumstances, the researcher is required to work with an established class of students. This is called an intact group. Thus, in classroom research where researchers wish to see the effects of a teaching/learning treatment, the design often uses the intact group. Hatch and Lazarton (1991), state that “While, such designs will not allow us to make causal (cause-effect) statements about the findings, they will allow us to give evidence in support of links between variables for these particular cases.”

The present study therefore uses intact groups of subjects. Since the groups were intact, the sample for the study is considered to be convenience sample. “A convenience sample is a group of individual who conveniently was available for study.” (Fraenkel and Wallen, 2003, p.103). The intact group of subjects or the convenient sample was formulated by students taught by the researcher. To further define the group, the participants
constituted first-year university students who took the common English course, English for Communication II in the second term of the academic year at Lingnan University in Hong Kong, as a required course on their degree programs. Thus, all the participants undertaking this course had taken the first course of the two common courses for English in the previous semester. A total of 41 students participated in the study. Twenty one were females and twenty were males within the age group of eighteen to twenty three years with the average age being twenty years. Students belonged to various degree programs mainly classified into Business Administration majors and Arts or Social Sciences majors. For the present study, the Business Administration majors shall be denoted as BBA majors, and the Arts and Social Sciences majors shall be denoted as Non-BBA majors. Of these participants, twenty six participants were BBA majors and fifteen were non- BBA majors. The native tongue of all the participants who were either from Hong Kong or Mainland China was Cantonese or Putonghua. Participants took the technology-enabled language enhancement program for written communication skills during the course of the semester for the writing section of the course over a period of ten weeks. Thus, the sample, that is, the participants for the present study were controlled in terms of belonging to an intact group and having similar linguistic and educational backgrounds.
3.5 Instruments for data collection

All experimental approaches involve the control of manipulation of the three basic components of the experiment: the sample, the treatment, and the measurement of the treatment (Seligar and Shohamy, 1989). The current study therefore involves the control of the three components namely, the sample, that is the participants as described in 3.4, the treatment, that is the technology-enabled language enhancement program, and the measurement of the treatment, that is the pre-test and the post-test.

The primary instruments used to determine the effectiveness of the technology-enabled language enhancement program include the treatment, the pre-test and the post-test and finally a questionnaire to evaluate the program. A detailed description of each instrument is given below.

3.5.1 Treatment: technology-enabled language enhancement program

The technology-enabled language enhancement program was administered to the participants during the second term of the academic year 2009-2010 to students undertaking the English for Communication II course. The program was divided into 5 units of 6 hours each totaling to 30 hours. Each unit
focused on a particular form of writing such as describing, reporting, experience sharing, summarizing, and expressing opinions or responding. Each unit also focused on specific language skills such as vocabulary, accuracy in grammar, unity and cohesion, and other soft skills such as comprehension, organization, planning, researching, and processing information. The units mostly followed a uniform structure which included the following sections,

i. unit introduction;
ii. warm-up task 1;
iii. warm-up task 2;
iv. discussion forum;
v. set of activities such as fill-in-the-blanks, error correction, formation of sentences, etc. related to the unit,
vi. guided writing section; and finally,

vii. main task of free writing based on the type and form of writing described the unit with the specified language focus.

Since each form of writing was unique, and could not be prioritized over the others, the units did not follow any particular hierarchal level of difficulty. Nonetheless, as each unit progressed, the level, number, and complexity of
skills to be used for an activity kept increasing. The units were based on a similar sequence of activities, such as,

i. researching and evaluating online material;
ii. reading/watching/listening to the online material;
iii. making notes from the materials as part of the warm-up task 1;
iv. doing exercises based on the materials in the warm-up task 2;
v. discussing and sharing the researched and collated ideas based on the warm-up material via an online discussion forum;
vi. organizing the discussed and shared ideas with the incorporation of input or feedback from the forum, if any;
vii. writing a paragraph based on the warm-up tasks;
viii. exchanging and peer-reviewing classmates’ work; and finally,
ix. incorporating feedback and revising and finalizing the written paragraph.

The units also followed a progression in the activities from controlled writing to guided writing to free writing. All activities in each unit involved sharing and exchanging of ideas and information among peers. The submission of tasks varied in terms of the number of people involved in the task submissions. Units entailed submission of tasks which involved
individual work or pair-work or group-work. The 30 hour program was administered over a period of eight weeks.

The entire writing program was administered in an online teaching and learning environment via the e-learning platform WebCT Campus Edition 8 (WebCT CE8). Several online materials and resources available on the Internet were used. The materials varied in several forms ranging from resources containing textual input, auditory input, and visual input, to a combination of all the three. The online resources used included, news reports which provided the textual input, audio interviews which provided auditory input, video links of reports which provided visual input, web sites and web pages, which provided a combination of textual, auditory as well as visual input. The administered program also took into consideration various pedagogical aspects of teaching and learning. The entire processing of information was done via technology. The process involved in the pedagogy incorporated the following steps:

i. logging onto the e-learning platform;

ii. accessing the program;

iii. reading the materials, tasks and instructions online;

iv. researching the web to search required materials;
v. processing information by checking online dictionaries, thesaurus, or any other online sources;
vi. conducting peer-reviews, evaluations and giving feedback online;

vii. interacting with group members online via email or discussion or chat forums;

viii. using a word processor to type, revise, edit, proof-read tasks via a word processor; and

ix. submitting the required tasks electronically

3.5.2 Pre-test

Another significant instrument used for the data collection was the pre-test administered at the beginning of the experiment. The pre-test measured various aspects of the written language in terms of logical sequencing of ideas, grammar and accuracy, unity and cohesion, comprehension of ideas with vocabulary, summary writing, and paragraph writing. The 45-item test was divided into logical arrangement of sentences, error-correction, fill-in-the-blank exercises, multiple-choice responses, matching exercises, and free writing in the form of summary writing and paragraph writing. The responses to the test items for logical sequencing of ideas, error-correction, gap-fill exercises, multiple-choice responses, and matching exercises were measured against a set mark for each while the free writing responses were
measure against a specially constructed rubric of criteria for evaluating various aspects of writing. The 50-mark test consisted of five major questions.

The first question consisted of items for logical arrangement of sentences in a paragraph. The given two paragraphs for logical sequencing carried 5 marks each with each paragraph consisting of four test items. The second question which tested language accuracy consisted of a paragraph for proof-reading and error-correction. Ten items carrying 1 mark each were required to be identified and corrected. The third question, a gap-fill exercise for unity and cohesion consisted of ten items. The fourth question was a reading and comprehension exercise where students were required to read an article and answer questions based on the article in three parts. The first part constituted five questions which included multiple-choices responses and matching exercises that tested the vocabulary skills of students carried 1 mark each. The second part of the question was a summary writing exercise based on the article where students were required to summarize the article in not less than seventy five and not more than one hundred words. The response to the question assessed the summary writing skills of students based on the specifically constructed rubric consisting of set criteria.
The rubric carrying a total of 5 marks divided the components of the summary writing into two major categories namely, a) Content and Organisation and b) Language Use. Each category was assigned three levels in the order of a) Exceeds Standard, b) Acceptable Standard, and c) Below Standard. For the Content and Organization category, the ‘Exceeds Standard’ level bearing 2.5 marks was described with the following criteria: ‘All three main ideas from the article covered; All ideas are logically sequenced and with appropriate unity and coherence’ The ‘Acceptable Standard’ level bearing 2 marks was described with the following criteria: ‘Only two main ideas from the article covered; Most ideas appear logically sequenced with minor lapses in unity and coherence’ And finally the ‘Below Standard’ level bearing 1.25 marks was described with the following criteria: ‘Only one main idea from the article covered; Ideas are not logically sequenced with inconsistencies in unity and cohesion’ Under the Language Use category, the ‘Exceeds Standard’ level bearing 2.5 marks was described with the following criteria: ‘A wide variety of sentence structures; Very few syntactic or grammatical errors even in complex sentences; Wide range of vocabulary always correctly used’ The ‘Acceptable Standard’ level bearing 2 marks was described with the following criteria: ‘A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used’ And finally the ‘Below Standard’ level bearing 1.25 marks was described with the following
criteria: ‘Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary’ Thus, the total mark for the response to the summary writing question equalled to 5 marks.

Table 3.1 provides a structured view of the rubrics used for summary writing in the pre-test.
### Table 3.1 Criteria for Summary Writing for Pre-test

<table>
<thead>
<tr>
<th>Level and Marks</th>
<th>Category -&gt;</th>
<th>Content and Organization</th>
<th>Language Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exceeds Standard – 2.5</strong></td>
<td>-</td>
<td>All three main ideas from the article covered. All ideas are logically sequenced and with appropriate unity and coherence.</td>
<td>A wide variety of sentence structures. Very few syntactic or grammatical errors even in complex sentences. Wide range of vocabulary always correctly used.</td>
</tr>
<tr>
<td><strong>Acceptable Standard – 2</strong></td>
<td>-</td>
<td>Only two main ideas from the article covered. Most ideas appear logically sequenced with minor lapses in unity and coherence.</td>
<td>A variety of sentence structures. Some noticeable syntactic or grammatical errors in complex sentences. Good range of vocabulary mostly correctly used.</td>
</tr>
<tr>
<td><strong>Below Standard – 1.25</strong></td>
<td>-</td>
<td>Only one main idea from the article covered. Ideas are not logically sequenced with inconsistencies in unity and cohesion.</td>
<td>Restricted to basic sentence structures. Frequent syntactic and grammatical errors even in basic sentences. Errors even in basic vocabulary.</td>
</tr>
<tr>
<td>Applicable mark (to be circled)</td>
<td>2.5</td>
<td>2</td>
<td>2.5</td>
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<td>2</td>
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<td>2</td>
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<td></td>
<td>1.25</td>
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<td>1.25</td>
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</table>
Finally, the fifth question was a free writing exercise where students were required to write a paragraph in response to the question posed to them on an issue discussed in the article given for the section on reading and comprehension. The question carried a total of ten marks and the response to the question was evaluated against a specifically designed rubric which consisted of set criteria that measured various writing skills of students.

The rubric divided the components of the paragraph writing into two major categories specifically, a) Content, Organization, and Development of Ideas and b) Language Use, Grammar, Sentence Structure, and Vocabulary. Each category was assigned five levels in the order of a) Exceeds Standard, b) Acceptable Standard, c) Slightly Below Standard, d) Below Standard, and e) Unacceptable Standard.

For the Content, Organization, and Development of Ideas category, the ‘Exceeds Standard’ level bearing 5 marks was described with the following criteria: ‘Content relevant throughout; Ideas developed and explained adequately; All ideas are logically sequenced and with appropriate unity and coherence’. The ‘Acceptable Standard’ level bearing 4 marks was described with the following criteria: ‘Content contains lapses in relevance; Most ideas developed and explained adequately; Most ideas appear logically sequenced with minor lapses in unity and coherence’. The ‘Slightly Below
Standard’ level bearing 3 marks was described with the following criteria: ‘Content contains omissions and irrelevances; Ideas not adequately developed and explained; Ideas appear less logically sequenced with lapses in unity and coherence’. The ‘Below Standard’ level bearing 2 marks was described with the following criteria: ‘Obvious omissions and lapses in relevance of content; Ideas are not developed and explained at all; Ideas are not logically sequenced with frequent lapses in unity and coherence’.

Finally, a response which did not meet any of the criteria in mentioned in any of the levels for the Content, Organization, and Development of Ideas category was awarded a zero mark under the ‘Unacceptable Standard’ level.

Under the Language Use, Grammar, Sentence Structure, and Vocabulary category, the ‘Exceeds Standard’ level bearing 5 marks was described with the following criteria: ‘A wide variety of sentence structures; Very few syntactic or grammatical errors even in complex sentences; Wide range of vocabulary always correctly used’. The ‘Acceptable Standard’ level bearing 4 marks was described with the following criteria: ‘A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used’. The ‘Slightly Below Standard’ level bearing 3 marks was described with the following criteria: ‘Limited range of sentence structures; Incorrect use of complex sentences and syntactic or grammatical errors even in basic sentences;
Complex vocabulary rarely used or sometimes wrongly used’. The ‘Below Standard’ level bearing 2 marks was described with the following criteria: ‘Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary’. Finally, a response which did not meet any of the criteria mentioned in any of the levels for the Language Use, Grammar, Sentence Structure, and Vocabulary category was awarded a zero mark under the ‘Unacceptable Standard’ level.

The total mark for the paragraph writing question thus, equalled to 10 marks. Therefore, the entire pre-test carried a total of 50 marks. Table 3.2 provides a structured view of the rubrics used for paragraph writing in the pre-test.
<table>
<thead>
<tr>
<th>Level and Marks</th>
<th>Category -&gt;</th>
<th>Content, Organization, and Development of Ideas</th>
<th>Language Use, Grammar, and Sentence Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeds Standard – 5</td>
<td>Content relevant throughout. Ideas developed and explained adequately. All ideas are logically sequenced and with appropriate unity and coherence.</td>
<td>A wide variety of sentence structures. Very few syntactic or grammatical errors even in complex sentences. Wide range of vocabulary always correctly used.</td>
<td></td>
</tr>
<tr>
<td>Acceptable Standard – 4</td>
<td>Content contains lapses in relevance; Most ideas developed and explained adequately; Most ideas appear logically sequenced with minor lapses in unity and coherence</td>
<td>A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used</td>
<td></td>
</tr>
<tr>
<td>Slightly Below Standard – 3</td>
<td>Content contains omissions and irrelevances; Ideas not adequately developed and explained; Ideas appear less logically sequenced with lapses in unity and coherence</td>
<td>Limited range of sentence structures; Incorrect use of complex sentences and syntactic or grammatical errors even in basic sentences; Complex vocabulary rarely used or sometimes wrongly used</td>
<td></td>
</tr>
<tr>
<td>Below Standard – 2</td>
<td>Obvious omissions and lapses in relevance of content; Ideas are not developed and explained at all; Ideas are not logically sequenced with frequent lapses in unity and coherence</td>
<td>Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary</td>
<td></td>
</tr>
<tr>
<td>Unacceptable Standard – 0</td>
<td>Does not meet the above criteria.</td>
<td>Does not meet the above criteria.</td>
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<tr>
<td>Applicable mark (to be circled)</td>
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<td>5</td>
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</table>
3.5.3 Post-test

In addition to the pre-test, another significant instrument used for the data collection was the post-test provided towards the end of the experiment. A similar pattern of questions that was used in the pre-test was adopted for the post test. The post-test measured various aspects of the written language in terms of logical sequencing of ideas, grammar and accuracy, unity and cohesion, comprehension of ideas with vocabulary, summary writing, and paragraph writing. The 45-item test was divided into logical arrangement of sentences, error-correction, gap-fill exercises, multiple-choice responses, matching exercises, and free writing in the form of summary writing and paragraph writing. The responses to the test items for logical sequencing of ideas, error-correction, gap-fill exercises, multiple-choice responses, and matching exercises were measured against a set mark for each while the free writing responses were measure against a specially constructed rubric of criteria for evaluating various aspects of writing. The 50-mark test consisted of five major questions.

The first question consisted of items for logical arrangement of sentences in a paragraph. The given two paragraphs for logical sequencing carried 5 marks each with each paragraph consisting of four test items. The second question which tested language accuracy consisted of a paragraph for proof-
reading and error-correction. Ten items carrying 1 mark each were required to be identified and corrected. The third question, a gap-fill exercise for unity and cohesion consisted of ten items. The fourth question was a reading and comprehension exercise where students were required to read an article and answer questions based on the article in three parts. The first part of five questions which consisted of multiple-choices responses and matching exercises that tested the vocabulary skills of students carried 1 mark each. The second part of the question was a summary writing exercise based on the article where students were required to summarize the article in not less than seventy five and not more than one hundred words. The response to the question assessed the summary writing skills of students based on the specifically constructed rubric consisting of set criteria. The rubric carrying a total of 5 marks divided the components of the summary writing into two major categories namely, a) Content and Organisation and b) Language Use. Each category was assigned three levels in the order of a) Exceeds Standard, b) Acceptable Standard, and c) Below Standard.

For the Content and Organization category, the ‘Exceeds Standard’ level bearing 2.5 marks was described with the following criteria: ‘All three main ideas from the article covered; All ideas are logically sequenced and with appropriate unity and coherence’ The ‘Acceptable Standard’ level bearing 2 marks was described with the following criteria: ‘Only two main ideas from
the article covered; Most ideas appear logically sequenced with minor lapses in unity and coherence’ And finally the ‘Below Standard’ level bearing 1.25 marks was described with the following criteria: ‘Only one main idea from the article covered; Ideas are not logically sequenced with inconsistencies in unity and cohesion’.

Under the Language Use category, the ‘Exceeds Standard’ level bearing 2.5 marks was described with the following criteria: ‘A wide variety of sentence structures; Very few syntactic or grammatical errors even in complex sentences; Wide range of vocabulary always correctly used’ The ‘Acceptable Standard’ level bearing 2 marks was described with the following criteria: ‘A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used’ And finally the ‘Below Standard’ level bearing 1.25 marks was described with the following criteria: ‘Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary’ Thus, the total mark for the response to the summary writing question equalled to 5 marks.

Table 3.3 provides a structured view of the rubrics used for summary writing in the post-test.
Table 3.3 Criteria for Summary Writing for Post-test

<table>
<thead>
<tr>
<th>Level and Marks</th>
<th>Category -&gt;</th>
<th>Content and Organization</th>
<th>Language Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeds Standard – 2.5</td>
<td></td>
<td>All three main ideas from the article covered. All ideas are logically sequenced and with appropriate unity and coherence.</td>
<td>A wide variety of sentence structures. Very few syntactic or grammatical errors even in complex sentences. Wide range of vocabulary always correctly used.</td>
</tr>
<tr>
<td>Acceptable Standard – 2</td>
<td></td>
<td>Only two main ideas from the article covered. Most ideas appear logically sequenced with minor lapses in unity and coherence.</td>
<td>A variety of sentence structures. Some noticeable syntactic or grammatical errors in complex sentences. Good range of vocabulary mostly correctly used.</td>
</tr>
<tr>
<td>Below Standard – 1.25</td>
<td></td>
<td>Only one main idea from the article covered. Ideas are not logically sequenced with inconsistencies in unity and cohesion.</td>
<td>Restricted to basic sentence structures. Frequent syntactic and grammatical errors even in basic sentences. Errors even in basic vocabulary.</td>
</tr>
<tr>
<td>Applicable mark (to be circled)</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Finally, the fifth question was a free writing exercise where students were required to write a paragraph in response to the question posed to them on an issue discussed in the article given for the section on reading and comprehension. The question carried a total of ten marks and the response to the question was evaluated against a specifically designed rubric which
consisted of set criteria that measured various writing skills of students. The rubric divided the components of the paragraph writing into two major categories specifically, a) Content, Organization, and Development of Ideas and b) Language Use, Grammar, Sentence Structure, and Vocabulary. Each category was assigned five levels in the order of a) Exceeds Standard, b) Acceptable Standard, c) Slightly Below Standard, d) Below Standard, and e) Unacceptable Standard.

For the Content, Organization, and Development of Ideas category, the ‘Exceeds Standard’ level bearing 5 marks was described with the following criteria: ‘Content relevant throughout; Ideas developed and explained adequately; All ideas are logically sequenced and with appropriate unity and coherence’. The ‘Acceptable Standard’ level bearing 4 marks was described with the following criteria: ‘Content contains lapses in relevance; Most ideas developed and explained adequately; Most ideas appear logically sequenced with minor lapses in unity and coherence’. The ‘Slightly Below Standard’ level bearing 3 marks was described with the following criteria: ‘Content contains omissions and irrelevances; Ideas not adequately developed and explained; Ideas appear less logically sequenced with lapses in unity and coherence’. The ‘Below Standard’ level bearing 2 marks was described with the following criteria: ‘Obvious omissions and lapses in relevance of content; Ideas are not developed and explained at all; Ideas are
not logically sequenced with frequent lapses in unity and coherence’.

Finally, a response which did not meet any of the criteria in mentioned in any of the levels for the Content, Organization, and Development of Ideas category was awarded a zero mark under the ‘Unacceptable Standard’ level.

Under the Language Use, Grammar, Sentence Structure, and Vocabulary category, the ‘Exceeds Standard’ level bearing 5 marks was described with the following criteria: ‘A wide variety of sentence structures; Very few syntactic or grammatical errors even in complex sentences; Wide range of vocabulary always correctly used’. The ‘Acceptable Standard’ level bearing 4 marks was described with the following criteria: ‘A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used’. The ‘Slightly Below Standard’ level bearing 3 marks was described with the following criteria: ‘Limited range of sentence structures; Incorrect use of complex sentences and syntactic or grammatical errors even in basic sentences; Complex vocabulary rarely used or sometimes wrongly used’. The ‘Below Standard’ level bearing 2 marks was described with the following criteria: ‘Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary’. Finally, a response which did not meet any of the criteria mentioned in any of the levels for the Language Use, Grammar, Sentence Structure, and Vocabulary
category was awarded a zero mark under the ‘Unacceptable Standard’ level.

The total marks for the paragraph writing task thus, came to 10 marks.

Therefore, the entire post-test carried a total of 50 marks.

Table 3.4 provides a structured view of the rubrics used for paragraph writing in the post-test.
Table 3.4 Criteria for Paragraph Writing for Post-test

<table>
<thead>
<tr>
<th>Level and Marks</th>
<th>Category -&gt;</th>
<th>Content, Organization, and Development of Ideas</th>
<th>Language Use, Grammar, and Sentence Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceeds Standard – 5</td>
<td>Content relevant throughout. Ideas developed and explained adequately. All ideas are logically sequenced and with appropriate unity and coherence.</td>
<td>A wide variety of sentence structures. Very few syntactic or grammatical errors even in complex sentences. Wide range of vocabulary always correctly used.</td>
<td></td>
</tr>
<tr>
<td>Acceptable Standard – 4</td>
<td>Content contains lapses in relevance; Most ideas developed and explained adequately; Most ideas appear logically sequenced with minor lapses in unity and coherence</td>
<td>A variety of sentence structures; Some noticeable syntactic or grammatical errors in complex sentences; Good range of vocabulary mostly correctly used</td>
<td></td>
</tr>
<tr>
<td>Slightly Below Standard – 3</td>
<td>Content contains omissions and irrelevances; Ideas not adequately developed and explained; Ideas appear less logically sequenced with lapses in unity and coherence</td>
<td>Limited range of sentence structures; Incorrect use of complex sentences and syntactic or grammatical errors even in basic sentences; Complex vocabulary rarely used or sometimes wrongly used</td>
<td></td>
</tr>
<tr>
<td>Below Standard – 2</td>
<td>Obvious omissions and lapses in relevance of content; Ideas are not developed and explained at all; Ideas are not logically sequenced with frequent lapses in unity and coherence</td>
<td>Restricted to basic sentence structures; Frequent syntactic and grammatical errors even in basic sentences; Errors even in basic vocabulary</td>
<td></td>
</tr>
<tr>
<td>Unacceptable Standard – 0</td>
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3.5.4 Questionnaire for program evaluation

In order to evaluate the effectiveness of the technology-enabled language learning program, a program evaluation technique was adopted in the form of a questionnaire. Collecting data through the use of a questionnaire has the advantage of ensuring stability of response across a range of questions of interest to researchers. As Sheligar and Shohamy (1989) point out, questionnaires have a number of advantages: a) They are self-administered and can be given to large groups of subjects at the same time. They are therefore less expensive to administer than other procedures such as interviews. b) When anonymity is assured, subjects tend to share information of a sensitive nature more easily. c) Since the same questionnaire is given to all subjects, the data are more uniform and standard. d) Since they are usually given to all subjects of the research at exactly the same time, the data are more accurate. Questionnaires have been recommended to collect data for phenomena that are not easily observed such as attitudes. For the current research, the questionnaire aimed at collecting descriptions, attitudes, and perceptions of the participants about the program.

Sheligar and Shohamy (1989) mention that structured questionnaires are considered to be more efficient than open ones. Thus, a high degree of
explicitness was maintained through the questionnaire that was provided to the participants towards the end of the treatment as it was structured in a way that the subjects marked responses to check agreements and disagreements. The questionnaire was sent out to the participants through the university’s online course teaching and learning evaluation platform electronically. A range of questions based on the literature available on the use of technology in learning were developed in the structured questionnaire as a means for evaluating the technology-enabled language enhancement program.

The first part of the questionnaire collected descriptive data of the subjects for easier identification during the analysis stage which consisted of questions related to the degree program major, year of study, age, gender, country of origin, and mother tongue. The remaining part of the questionnaire consisted of eight major areas of evaluation such as overall program enjoyment, accessibility, comprehension, time, resources enjoyment, interactivity and feedback, self-perception of language achievement, and attitudes towards technology. Each area of evaluation comprised of a set of related items. Each item was evaluated on a five point Likert-type scale consisting of responses such as strongly agree; agree; not sure; disagree; and strongly disagree.
The *overall program enjoyment* area, had the items, ‘I enjoyed the program overall.’ The *accessibility* area consisted of items, ‘I accessed the program on WebCT from Computer Lab on Campus’, ‘I accessed the program on WebCT from Hostel Room’, ‘I accessed the program on WebCT from Home’, ‘I accessed the program on WebCT from Elsewhere on Campus’, ‘I accessed the program on WebCT from Another place’.

The *comprehension* area included items such as, ‘The instructions provided in the units were easy to follow’, ‘The questions given in the different sections of the unit were easy to follow’, ‘I could incorporate all the requirements of each of the activities’. The item related to time was, ‘I could finish the tasks in the given time-frame’.

The *resources enjoyment* area consisted of questions such as ‘The resources that I enjoyed using during the activities the most were: Movie / TV show related web site’, ‘The resources that I enjoyed using during the activities the most were: Travel/ Holiday related web site’, ‘The resources that I enjoyed using during the activities the most were: Online News related web site’, ‘The resources that I enjoyed using during the activities the most were: Current issues related audio’, ‘The resources that I enjoyed using during the activities the most were: Controversial issue related video’, ‘The resources used in the activities provided me with an opportunity to enhance my
English language proficiency’, ‘I was comfortable with searching for information/resources on the Internet as required by various tasks’ and ‘I enjoyed the process of searching for various resources (online news reports, videos, etc.) that were required for the given tasks’.

The *interactivity and feedback* component had items such as ‘I enjoyed reviewing my classmates' work online / electronically’, ‘The feedback I received from my classmate(s) was useful in improving my work before submission’, and ‘I incorporated the feedback received from my classmate(s) into my work online as required’.

The *self-perception of language achievement* item was ‘I could produce a reasonably good piece of written text at the end of each activity’.

And finally, the *attitudes towards technology* area consisted of items such as, ‘I was comfortable with using different forms of technology for studying English’, ‘I enjoyed doing the technology-based tasks’, ‘The technology-based activities in the program provided me with an opportunity to enhance my Writing Skills in English’, and ‘I would like to continue using various forms of technology to enhance my English Language Skills’.
Thus, the questionnaire covered items that evaluated various features of the program, thereby eliciting the opinions on the technology-enabled language enhancement program administered to them as part of the treatment.

3.6 Data validity measures

Validity is an important criterion for assuring the quality of the data collection procedures for any piece of research. Validity provides information on the extent to which the procedure really measures what it is supposed to measure. Hatch and Farhady (1982) note that the internal validity of a research study, is the extent to which the outcome is a function of the factor that has been selected by the researcher, rather than other factors that the researcher hasn’t controlled. In other words, the extent to which extraneous variables affect the change in the dependent variable is the extent to which the internal validity is influenced (Perry, 2005). Factors that could influence the internal validity of a research study are usually related to the participants and the instrumentation. The current research has ensured internal validity of the study for various aspects of the study.
3.6.1 Participants

Hatch and Farhady (1982) point out that the internal validity of the participants in a research study could be affected by various factors such as history, maturation, differential selection, and attrition. The history factor refers to the influence if events that take place at different points in time on the dependent variable other than the independent variable. Any study that takes considerable amount of time to complete can be affected by this if care is not taken (Perry, 2005). The current study was conducted over a period of ten weeks which included the 30-hour program and therefore the threat due to the history factor did not exist. The threat related to the maturation of participants is similar to that posed by history, but deals with natural changes taking place over time in the participants such as emotional states, physical coordination and strength, or cognitive structures. Studies that take place over longer periods of time are potentially subject to this interference.

However, this potential threat was avoided in the current study because it spanned a period of ten weeks. The third factor, differential selection could occur whenever a researcher does not randomly select the samples when forming different groups for comparisons (Perry, 2005). Since the current study was an intact one group pre-experimental study, the issue about pre-existing differences among different groups of participants did not arise.
Finally, the factor related to subject attrition or *experimental mortality* could occur when there is a loss of participants during a research study. The number of participants (41) for the current study was retained throughout the period of the study. Thus, the threats to internal validity of participants were carefully considered and consequently avoided by the researcher.

### 3.6.2 Design and treatment of the study

The technology-enabled language enhancement program was designed and developed by the researcher in consultation with experts from the field. In addition, comments made by the experts were incorporated into the design. Thus, experts’ comments also helped validate the design of the program. As a result, the validation through experts’ comments was useful in establishing validity of the design as well as the treatment used in the current study.

### 3.6.3 Tests

An important factor which needs to be considered for the validity of the tests as a data collection instrument is *content validity*. In order to find out if the data collection procedure is a good representation of the content which needs to be measured, evidence of content validity needs to be accumulated (Seligar and Shohamy, 1989). An acceptable level of content validity was
established for both the pre-test as well as the post-test by having them reviewed by an expert to determine if the tests thoroughly and accurately measured various aspects covered in the technology-enabled language enhancement program.

In addition to content validity, as pointed out by Hatch and Lazarton (1991) a factor that might influence the validity of a research is test effect. They further explain that if the research begins with a pre-test, that test could affect performance on future tests since the test alerts students as to what teachers expect them to learn. As a result, the pre-test could influence the final outcome. However, for the current study, while the pre-test and the post-test followed a similar pattern, the items on the post-test were different from those in the pre-test. As a result, while the students may have been alerted to the format of the post-test through the administration of the pre-test, the different items on the post-test did not provide a scope for students to predict the actual items on the post-test. Moreover, the level of difficulty for the items was also maintained on the lines of the pre-test. In addition, the time span between the pre-test and post-test was that of ten weeks. In view of these points, it can be stated that the validity of the instruments was maintained in a satisfactory manner.
3.6.4 Questionnaire

An established means to ascertain the validity of a questionnaire is conducting an item analysis. As pointed out by Sheligar and Shohamy (1989), an important procedure used to examine the quality of items or questions on an instrument questionnaire is *item analysis*. By using this procedure, the researcher can obtain information on whether the items are well phrased and easily understood by the respondents. For the current study, an item analysis was conducted and the items were modified and revised thus ensuring that the questions provided varied and meaningful information through its items.

In addition to the item analysis, a pilot run of the questionnaire was carried out for determining the quality of the questions in terms of comprehension and eliciting of responses, after a pilot run of the technology-enabled language enhancement program. As Sheligar and Shohamy (1989) indicate that the main advantage of assessing the quality of the data collection procedures *before* the real data are collected, that is, in the pilot or the try-out phase, is that it is still possible at that stage to change, revise, and modify the procedure on the bases of new information. Thus, the item analysis and the pilot run of the questionnaire were carried out to ensure an acceptable of the questionnaire.
3.7 Data reliability measures

Like validity, reliability is an important criterion to establish the quality of data collection procedures. Reliability provides information on the extent to which the data collection procedure elicits accurate data. The criterion on reliability provides information on whether the data collection procedure is consistent and accurate. (Sheliger and Shohamy, 1989). The current research ensured reliability of the study for various aspects of the study.

3.7.1 Design and treatment of the study

In order to ensure reliability of the technology-enabled language enhancement program, a finalised version of the program was prepared for a pilot run. As suggested by Seliger and Shohamy (1989), before an instrument can be administered to the research subjects, it needs to be tried out. As part of the pilot study, the researcher collects the information about the instrument, its items, and the criteria for scoring and rating its items, and this provides the bases for improving the instrument. Assessing the quality of the data collection procedure in the pilot phase allows the researcher to revise and where necessary, modify the instruments on the bases of new information, thus improving the reliability of the procedure. (Seliger and Shohamy, 1989).
For the present study, reliability of the treatment was established with the pilot run of the experiment. The feedback received from the pilot run helped the researcher to incorporate changes and make revisions to the program. Thus, the pilot run was useful in establishing reliability of the design as well as the treatment used in the current study.

3.7.2 Tests

The reliability of the tests was also ensured in the study. According to Hatch and Lazarton (1982), “reliability can be defined as the extent to which a test produces consistent results when administered under similar conditions.” Thus, consistency of results is the basic concept of reliability of a test. Since most methods of test reliability require two administering of the test instrument to the research group, and since issuing the same test twice to the experimental groups in this study is not feasible or appropriate, and internal consistency method of estimating reliability was utilized.

The Kuder-Richardson 21 approach, a method to calculate the reliability from an examination of the internal consistency of a test, was used to demonstrate the internal consistency for the pre-test and post-test that were designed and developed by the researcher.
The following formula was utilized for the Kuder-Richardson 21 method:

\[
KR-21 \ r_k = \frac{K}{K-1} \left[ 1 - \frac{M(K-M)}{Ks^2} \right]
\]

Here, \( K \) is the number of items in the test, \( M \) is the mean of the sample and \( s^2 \) is the variance of the sample. The benchmark used to evaluate the reliability coefficient is .70. As Sheligar and Shohamy (1989) suggest, “In general, one would expect reliability to be at least .70 or .80. Reliability is expressed as a coefficient ranging from 0.00 to 1.00. The higher the coefficient, the more reliable the procedure is.” The reliability coefficient for the pre-test in the current study was 0.72562 and that of the post-test was 0.827. Hence, both the tests fulfilled the criteria of reliability fairly well.
3.7.3 Questionnaire

While an *item analysis* and pilot run of the questionnaire helped establish validity, the internal reliability of the questionnaire was determined through statistical procedure of Cronbach’s alpha coefficient of reliability. Perry (2005) suggests the use of the Cronbach’s alpha on rating scales, where participants are asked to indicate on a multi-point scale - also referred to as a Likert-type scale – the degree to which they agree or disagree. The Cronbach’s alpha for the entire questionnaire administered after the experiment was 0.818. In addition to establishing the internal reliability of the entire questionnaire, the internal reliability all items that were clubbed together under several components of the questionnaire, was also determined. The Cronbach alpha for the *comprehension* component was 0.828, whereas that for *resource enjoyment* was 0.722, that for *interactivity and feedback* was 0.818, and that for *attitudes towards technology* was 0.774. Thus, all the items as well as components on the questionnaire had a higher coefficient nearing towards 1.00 and therefore the questionnaire ensured a higher value of internal reliability.
3.8 Data collection and analysis procedures

The researcher for this study was also the primary instructor of the English for Communication classes used for this research study. The researcher/instructor was responsible for instructing the groups of the research participants, delivering to students an introductory narrative describing the study, issuing the pre-test and the post-test, conducting the experiment with the administration of the technology-enabled language enhancement program, and delivering the questionnaire at the end of the program.

A T-test was used to determine if there was any significant difference between the mean scores on the pre-test and post-test of the students who underwent the technology-enabled language enhancement program to develop written communication skills. A one-way analysis of variance (ANOVA) was used to determine if there were any significant differences among the mean scores of the students who underwent the technology-enabled language enhancement program to develop written communication skills of the various components of written communication skills in pre and post tests.
The null hypotheses formulated for this study were:

i. There will be no significant difference between the mean scores on the pre-test and post-test of the students who underwent the technology-enabled language enhancement program to develop written communication skills.

ii. There will be no significant differences among the mean scores on the pre-tests and post-tests of the students who underwent the technology-enabled language enhancement program to develop written communication skills in the various components of written communication skills.
3.8.1 Pilot study

Glesne and Peshkin (1992, p. 30) suggest that the aim of a pilot study is to learn about the research process, observation techniques, and to get a general sense of the nature of the research setting. A pilot study should therefore be carried out in situations and with people as close to the realities of the actual study as possible (Glesne and Peshkin, 1992). In other words, the aim of the try-out (or pilot), is to assess the quality of the data collection instruments, in this case, the treatment, which is the technology-enabled language enhancement program while it can still be revised and improved and before it is used with the actual subjects in the research. The type of information collected by the researcher in the pilot phase relates to the practical aspects of administering the data collection tool, such as time needed to administer the instrument and the clarity of the instructions (Seligar and Shohamy, 1989).

For the current study, after the design, development, validation, and finalization of the technology-enabled language enhancement program by the researcher, a pilot study of the program was conducted through the WebCT CE8 e-learning platform. The pilot study was conducted with a group of 20 students undertaking the English for Communication I course in the first term of the academic year. The students were briefed about the
study and a show-and-tell of the program was carried out in the class. A computer laboratory session was also booked for a detailed hands-on experience of the program for two hours. The computer laboratory session gave the students an opportunity to have a look at the technology-enabled language enhancement program so that they were aware of what they were required to do as part of the pilot study. Five individual groups of three or four students were created using the e-learning platform. Each group was assigned a different unit from the technology-enabled language enhancement program by the researcher. For instance, the first group was allocated the first unit which focussed on the written communication skill of describing. The second group was presented with the second unit that had a central focus on written communication skill of reporting, the third group was given the third unit which focussed on the written communication skill of experience-sharing, the fourth group was given the fourth unit on the written communication skill of summarizing, and finally, the fifth group was given the fifth unit which focused on the written communication skill expressing opinions or responding an idea in the written form.

A set of written instructions was provided as part of the description under the link provided for each unit in the technology-enabled enhanced program. After the briefing session in the classroom and the hands-on computer laboratory session, the students were required to start working on the
respective units assigned to them. The pilot study thus, ran over a period of a week and a half as a result of the simultaneous distribution of units of the program among five groups.

After the pilot run of the program, the participating students were provided with a questionnaire for evaluation of the technology-based tasks in the program that were assigned to them as part of the study. The delivery of the questionnaire served two purposes: firstly, it was useful to gauge the quality of the questions and ease of understanding within the questionnaire, and secondly, the feedback on the tasks and activities of the program that was elicited through the items on the questionnaire ensured a useful evaluation of the program for the current study.
a) Feedback

The pilot study of the program was useful in getting information about various aspects of the experiment. While classroom briefing session and a hands-on session about the program were conducted before the access to the program, the set of written instructions provided to the participants under the program link also proved quite useful to the participants. This could be seen from the outcome of the group interactions and submission of the tasks by the participants. However, the estimated time for completion of each unit needed to be increased since participants were not able to meet the deadline of a week and a half. Moreover, the researcher also felt a need for an oral explanation and reminder about the due dates for completion and submission of the tasks for the unit assigned to each group.

b) Revisions

While the value of the briefing session and the hands-on session along with the written set of instructions provided on the e-learning platform was recognized in the pilot study, the researcher decided to retain the same for the actual research. It was observed that although pilot study was conducted over a short span of time by the simultaneous distribution of units among groups, with each group having only one unit to complete instead of five,
the participants could not submit the work by the given deadline. To ensure that the actual research study did not go through the dearth of time, the estimated time that was given for each unit was increased to two weeks per unit. Moreover, the researcher ensured that a verbal explanation and reminder about the due dates for completion and submission of the tasks for the unit assigned to each group would be provided at regular intervals during the course of the study.

Thus, the value of the pilot study remained in the knowledge gained concerning specific items in the research design and problems that could be eradicated before the actual research study was conducted (Fraenkel and Wallen, 2003). After each of the problems identified in the pilot study were addressed, the actual research study on technology-enabled language enhancement program began.

### 3.8.2 The experiment

Before the experiment was conducted, the researcher that is, the instructor of the classes for the English for Communication II course in the second term of the academic year had to inform the participants about the study and brief them about various aspects of the technology-enabled language enhancement program. A link of the finalised version of the technology-
enabled language enhancement program was created on the WebCT CE8 e-
learning platform. Since the participants were enrolled in the course taught
by the researcher, the researcher ensured that each participant had access to
the e-learning platform via their student’s account provided to them by the
university. Since the program was uploaded on the university’s e-learning
platform, it could be accessed from anywhere by the participants as long as
they had an Internet connection.

The participants could therefore, access the program from the computer
laboratory on the university campus, their hostel rooms, classrooms,
desktops at homes, laptops or other portable devices such as smartphones or
touch screen tablets, an internet café, or any Wi-fi (wireless internet)-
enabled area within or outside the university campus. In other words, by
providing a link to the technology-enabled language enhancement program
on the university’s e-learning platform, the researcher eliminated the need
for a fixed physical space for access to the program, and thus ensured the
ease of access to the program. The participants were also briefed about the
schedule of the experiment in terms of administering the several steps for
the current study. The stages included administering of the pre-test, the
classroom demonstration session, the hands-on computer laboratory session,
the technology-enabled language enhancement program, the post-test and
finally the online survey.
a) Pre-test

In keeping with the norms of the pre-experimental design of the research study, a pre-test was administered to the participants as part of the first stage of experiment, in order to gain evidence about the writing skills of participants before they undertook the technology-enabled language enhancement program. Since the cohort of 41 students belonged to two different classes, the pre-test for each class was given separately during their class time. To ensure strict confidentiality, the pre-test was set up as a paper-based test that was administered inside the classroom. Moreover, the pre-test was administered during the same week thereby, giving hardly any leeway for a discussion or giveaway of the questions among the participants of separate classes.

Having provided the background information and purpose of the test to participants, the researcher spent five minutes for explanation of the structure of the test and the instructions provided within the test. The total duration of the test was sixty minutes. After the participants completed the pre-test, the scripts were collected for grading by the researcher. The results of the pre-test were used for gathering information for the statistical data analysis procedures of T-test and ANOVA.
b) Technology-enabled language enhancement program

With the link for the technology-enabled language enhancement program being created on the e-learning platform, an hour of a regular classroom session was dedicated to a demonstration session along with the procedures involved for accessing the program. The students were guided by the researcher/instructor through each electronic page and link within the program which consisted of units, tasks, and various activities. The classroom session, thus provided a show-and-tell experience to the students about the technology-enabled language enhancement program.

After the classroom session, a computer laboratory session was booked for a detailed hands-on experience of the technology-enabled language enhancement program for two hours for each class. These sessions helped participants gain practical familiarity with the program and requirements of the program to be fulfilled in the coming ten weeks. As part of the program, all tasks were required to be accomplished electronically. However, while some tasks and activities required individual work, some were supposed to be done in pairs and groups. The hands-on sessions in the computer laboratory were also used to create pairs and groups for the tasks and activities that required doing so. The e-learning platform facilitated the pair and group creation electronically.
While the program was created in a manner whereby students could access each unit of the program flexibly without any strict adherence to the order of the units, the researcher verbally provided the participants with a provisional timeline as a guideline to be followed. With the participants gaining familiarity to the program and the researcher answering questions from the participants about any doubts and clarifications regarding the same, the hands-on sessions were successful in initiating the participants into the experiment which would be conducted over the next ten weeks.

The administering of the technology-enabled language enhancement program was carried out over a period of ten weeks. Students worked on a major part of the program in a self-access mode. The researcher observed the progress of the students in terms of participation and completion of the task, activities, and units, respectively, by logging onto the e-learning platform and viewing the activities during the course of the unit and the work submitted at the end of each unit. In addition, a formal completion check was conducted at the beginning of every two weeks to ensure the smooth progress of the program. At the end of the fifth week, another computer lab session was booked as a means of collecting feedback, conducting a follow-up on the progress of the participants, and bringing together some observations about the participants’ use of technology-
enabled activities. During the computer laboratory session, the researcher made observations on the participants’ use of the technology-enabled language enhancement program. For the remaining weeks of the program, the researcher conducted both informal and formal completion checks along with the quantity and quality of usage of the technology-enabled language enhancement program.

c) Post-test

In keeping with the norms of the pre-experimental design of the research study, a post-test was administered to the participants as part of the first stage of experiment, in order to gain evidence about the writing skills of participants after they had undertaken the technology-enabled language enhancement program. Since the cohort of 41 students belonged to two different classes, the post-test for each class was given separately during their class time. To ensure strict confidentiality, the post-test was set up as a paper-based test that was administered inside the classroom. Moreover, the post-test was administered during the same week thereby, giving hardly any leeway for a discussion or giveaway of the questions among the participants of separate classes. Having provided the background information and purpose of the test to participants, the researcher spent five minutes for explanation of the structure of the test and the instructions provided within
the test. The total duration of the test was sixty minutes. After the participants completed the post-test, the scripts were collected for grading by the researcher. The results of the post-test were used for the statistical data analysis procedures of T-test and ANOVA.

### 3.8.3 Questionnaire

After the administering of the pre-test, the technology-enabled language enhancement program, and the post-test, the final stage of the experiment constituted the administering of an online questionnaire for an evaluation of the program. The online questionnaire was sent out to the participants via the university’s online course and teaching evaluation system. Participants could access the questionnaire by logging on to their university’s e-learning system, with their student account usernames. The advantage of using the university’s online course and teaching evaluation system for the management of the questionnaire was that the researcher could check the response rate of the questionnaire at regular intervals and send in a reminder if required. The questionnaire was made available to the students after the administration of the post-test for a period of two weeks.

A descriptive analysis of the responses to the items in the questionnaire was conducted for an evaluation of the program. In addition, in order to arrive at
detailed observations between various components of the questionnaire, a correlation analysis was conducted to further examine the effectiveness of the technology-enabled language enhancement program. The access to the online questionnaire was closed after two weeks. This stage marked the end of the experiment. The researcher was now prepared for a detailed data analysis and findings of the results after having collected all the data and required information from the experiment.

3.9 Conclusion

This chapter has outlined the methodological approach and procedures including the research design best suited to address the research hypotheses posed in the current study. The first section of the chapter included a review of the purpose of the study and a restatement of the research hypotheses. This has been followed by an overview of the research design along with details provided for the proposed experimental design to arrive at the answers to the research hypotheses. A justification of the design and methods used has been provided, followed by a section on the description of the participants of the research study. The subsequent section has included various instruments for the data collection, such as the treatment, the technology-enabled language enhancement program, the pre-test, the post-test, and the questionnaire. The following section provides details on the
data validity measures for various aspects of program such as the participants, the design and treatment of the study, the pre-test, the post-test, and the questionnaire. This is followed by the section data reliability measures for various aspects of the research. The final section of the chapter describes the details of various procedures used for data collection and analysis.