CHAPTER 3

The Research Design

3.0 Introduction

The previous chapter dealt with the notions of Content-Based Instruction and issues related to the theoretical framework of materials construction and evaluation. This chapter principally focuses on the description of the research design, which includes the objectives of the study along with the research questions, research methodology, research instruments for data collection and the details of the pilot study. It also discusses how the ‘lessons’ learned from the pilot study in order to understand how it could inform the main study.

3.1 Objectives of the study

The goals of the present study are to enhance the IT students’ language competence with the help of the materials that could fulfill language learning needs as well as real-world needs. Thus, the objectives of the study aimed to construct a sample set of content-based language materials for IT students and to seek the effectiveness of the constructed materials in terms of capability of enhancing the students’ content knowledge and second language learning. To achieve this aim, the study addressed the following questions:

1. Can the materials foster students’ high order thinking skills?
2. Do the tasks enhance language learning?
3. Do the tasks enhance content learning?
4. How do students feel about the constructed materials in terms of difficulty and interest?

3.2 Sample

The study sample consisted of 33 first-year students of Information Technology at the Diploma level equivalent to Associate Degree at Chiangmai Technical College, Thailand. There were 18 males and 15 females, aged between 18 and 19 years. They had studied English for 12 years with a minimum number of 960 language-learning hours. However, based on the data derived from the language
proficiency test, it was found that their language ability is at the beginner level. More details of the students can be found in Section 4.1.2 of Chapter 4 where the students’ needs and interests are discussed.

3.3 Research design

As stated earlier, the present study primarily aimed at developing a sample of language materials for IT students at the Diploma level in Vocational Education. To contextualize students’ learning as well as to develop their cognitive ability, this set of materials was purposefully developed within the framework of the theme-based model in conjunction with the adjunct model to CBI approach in which the subject matter was incorporated to the language materials. Accordingly, IT course content was utilized in the language materials. In addition, a learner-centred approach was also adopted as a basis for materials development in the study, which necessitated students’ involvement during different development stages, i.e. from the task planning to the evaluation process.

The research procedure was visualized in two major phases: materials construction and its evaluation. The materials construction process will be first explained in the following section.

3.3.1 The process of materials construction

As mentioned in Chapter 2, language materials for IT students at the Diploma level in Vocational Education were constructed within the CBI theoretical framework. To successfully achieve this aim, three major steps were undertaken.

A) Step I: It involved data collection from different sources viz. language syllabus, IT students and IT specialists. Such detailed information as language syllabus for the IT programme, students’ needs and interests, their language ability and appropriate-graded IT content were required. At this stage, it thus entailed the researcher to study the 2003 curriculum for Diploma of Vocational Education (IT program) in relation to language course objectives or course content to have an overall idea about the language skills and functions the students have to achieve. Moreover, consultation with IT specialists was also required to identify the thematic topics that should be covered in the developed materials. Concurrently, the
researcher was also required to develop and administer the following research instruments.

i) **Questionnaire for students’ needs assessment:** It was designed to collect information relating to students’ identity, educational background, exposure to English, self-perception of language skills/functions, motivation to language learning and topics of interests that would throw light on the characteristics of the IT students (See Section 3.4.1 A for details of the questionnaire for students’ needs assessment). This tool also served as a set of guidelines for an informal interview that was immediately carried out after the completion of the survey to get more detailed information.

ii) **Language proficiency test:** The purpose of the test was to find out students’ level of language ability and that of IT content knowledge simultaneously. These two types of information could facilitate the researcher to design language tasks that were most likely appropriate for the students. The test comprised four sections: reading comprehension, writing, grammar and speaking (See Section 3.4.1 B for details of the language proficiency test).

iii) **Questions for the IT specialist interview:** It aimed to obtain information relating to types of IT knowledge, which IT students have to learn at their grade level, types of task to be completed and the sources of materials etc. This type of information could provide the language teacher information on IT topics and language functions/skills to be incorporated to the CBI materials as well as where to get relevant materials (See Section 3.4.1 C for details of an interview with an IT specialist).

B) **Step II:** It was concerned with the administration of the questionnaire to gather information about the students’ needs and of the language proficiency test to ascertain the level of the students’ language proficiency. Subsequently, the information derived from (1) the 2003 curriculum for Diploma of Vocational Education (IT program), (2) needs assessment questionnaire (3) the discussion with IT specialists on the IT course content and (4) the language proficiency test were analyzed quantitatively and qualitatively that led to materials development.
C) Step III: It dealt with the actual construction of content-based language materials. At this step, a sample of CBI materials was constructed based on the framework outlined in Section 2.4.2 of Chapter 2. Consequently, three units of thirteen tasks with a total of 20 learning hours were constructed. They consisted of both 60- and 120-minute tasks. The description of tasks is given in Appendix B.

The process of materials construction involved three major stages: (A) identifying content, (B) administration of research tools, conducting interviews and analyzing the information, and (C) constructing CBI materials. Figure 3.1 illustrates the entire process of CBI materials construction.

![Figure 3.1 Process of CBI materials construction](image)

3.3.2 Methodology of materials evaluation

Materials evaluation was considered at the second stage of the study after the completion of its construction. At this stage, the effectiveness of developed materials was sought by means of predictive evaluation and retrospective evaluation. Since the newly developed materials had to be first evaluated for their intended...
effectiveness prior to implementation in the actual classroom, predictive evaluation was conducted. The constructed materials were evaluated by three external evaluators with the help of materials evaluation form. The findings of this type of evaluation were taken into consideration in order to improve the appropriateness of the developed tasks. Subsequently, retrospective evaluation was also carried out to investigate the effectiveness of the materials in the actual classroom of IT students. Process-oriented approach was adopted for this type of evaluation. The primary focus of data analysis was on students’ learning process, which took place during the course of instruction rather than the end product produced by the students on the completion of the instruction. The information derived from classroom observation would be analyzed to yield the answers to research questions as mentioned in Section 3.1. A detailed discussion of these two types of evaluation is given in the following section.

A) **Predictive Evaluation:** To seek a comprehensive view of the effectiveness of the newly constructed materials, it was realized that the whole set of thirteen content-based tasks needed be evaluated. Predictive evaluation was conducted in three steps:

i) **Step I:** A task evaluation form was developed to evaluate the constructed materials prior to task trialling in the actual classroom. It contained the same set of criteria for materials construction (See 2.4.2 for a framework for materials construction and 2.5.3 for a framework for materials evaluation). They embrace the following features:

- **Objectives:** The task should be able to develop students’ second language competence as well as content learning. The objectives of the task thus should be stated in a way that the students were able to perform the language task as well as to acquire more information of their course content simultaneously.

- **Methodology:** It needs to be ensured that the task provides students opportunities to take a pro-active role in their own learning while the teacher takes the role of a consultant or a facilitator. More importantly, it should be again noted that the language task should mainly reflect on the eventual use of the
language and, therefore, language focus activities may be included as secondary activities.

- **Content authenticity:** In response to the objective needs, content should be taken from the students’ course content. It is believed that authentic materials would be able to cater for the students’ real-world needs.

- **Language learning:** The materials taken from the course content should contain a variety of language components, functions or skills.

- **Task sequencing:** Recognizing the silent period at the initial stage of learning, the sequence of activities is determined by the type of students’ responses progressing from a no overt response to that which involved discussion.

- **Coherence of tasks:** Cohesiveness of the sequential task can be seen in a way the completion of the preceding task automatically led to the next task.

**ii) Step II:** Evaluation forms were sent to three external evaluators, who were language specialists involved in technical education for over ten years. (See Appendix H for a list of the external evaluators). The evaluators were asked to indicate the effectiveness of materials by responding to a three-point rating scale: 3, 2 and 1 respectively, after which the mean average score was calculated and translated to measure the level of effectiveness as follows.

<table>
<thead>
<tr>
<th>Score Card</th>
<th>the extent of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.00</td>
<td>very effective</td>
</tr>
<tr>
<td>2.00</td>
<td>effective</td>
</tr>
<tr>
<td>1.00</td>
<td>not effective</td>
</tr>
</tbody>
</table>

* Note that when the level of score is .5 then the score is interpreted as marked on the next level.

In addition to the numerical data, the evaluators were also asked to articulate the strengths of the developed materials and offer suggestions for further modification. Moreover, interviews with each evaluator were conducted to obtain deeper information.

Finally, data were analyzed quantitatively and qualitatively. This led to some modification to the constructed materials. Figure 3.2 illustrates the process of predictive evaluation of the present study.
B) Retrospective Evaluation:

After the constructed materials were evaluated by the evaluators and found effective, some modification was made according to the evaluators’ suggestions. At this point, empirical validation of constructed materials also needed to be sought. Therefore, two specific tasks were chosen for trialling. A systematic scrutiny of the teaching-learning process took place in the actual classroom to determine how the students benefited from the task and to examine their perception of the tasks. Qualitative and quantitative data relating to the research questions were gathered by means of classroom observation, video recording, the students’ and teacher’s reflections and teacher-observer conference. This was carried out in two main phases.

i) Phase I: It involved piloting two interesting tasks on 29 first-year students of Information Technology at the Diploma level equivalent to Associate Degree, Chiangmai Technical College, Thailand during the second semester of 2009 academic year. This pilot study aimed to obtain information regarding how well the constructed tasks worked in class, how students felt about the tasks in terms of their...
difficulty and interest and what modification they needed. To carefully collect the relevant information the following steps were undertaken.

• *Step I:* Two language tasks were selected for implementing in the actual classroom: ‘Network topology’, one of the tasks in Unit 1 and ‘Surfing the Net’, another task in Unit 2. The major reason for selecting these two tasks was that they were the main inputs of the units while the remaining tasks of respective unit served as warm-up activities or follow-up activities

• *Step II:* Two tasks were implemented in the language class for IT students. During the course of instruction, data of learning process were gathered by means of classroom video recording, observation, teacher’s notes and teacher-observer conference and students’ reflection. Classroom video recording was conducted to provide archive of students’ classroom behaviors while the teaching-learning process was observed by a regular language teacher of the college. Here, the observer received orientation for classroom observation and practiced observing one class prior to actual observation of the trailing task. Details for observation orientation could be found in Section 3.4.2 B. The observer had to reflect on some questions relating to the use of the constructed materials (See Appendix F for a copy of the classroom observation sheet). In addition, the teacher was needed to reflect her own opinion about teaching/learning process as well. Immediately after the completion of each task, a teacher-observer conference was held to discuss such issues as the extent to which the tasks could interest students, their difficulty, strengths and constraints of the tasks and possible modification to be made. In addition, students also had to reflect on the learning tasks instantly after each learning class session (See Appendix G for the students’ reflection sheet).

• *Step III:* It involved analysis concerning how the tasks worked in class, how students felt about them in terms of their difficulty and interest and what modifications were needed.

• *Step IV:* Results of the analysis obtained led to the revision to the constructed tasks (See Section 3.5 for the pilot study).

**ii) Phase II:** This was considered the main evaluation of effectiveness of the developed materials. Steps similar to the pilot study were
repeated in the main study. However, different criteria for task evaluation were used in the third step in order to address the research questions. This phase was concerned with validating the effectiveness of the materials after some revisions for appropriateness were made in the previous phase. As the content-based tasks were closely linked to the enhancement of the cognitive ability, the revised version of Bloom’s taxonomy as discussed in Section 2.5.1 was adopted for data analysis. This analysis aimed to investigate three learning impacts of the developed task: (1) how the students cognitively engaged in the learning tasks, (2) how they benefited from the tasks in terms of content and language enhancement and (3) their perception towards the tasks. Within the CBI framework, it is recommended that language and content specialists should work collaboratively and keep the same pace of teaching process to help students cope with the task difficulty in both content and language classes. Here, it was important to note that IT topics used in the language materials would only be taught at the beginning of the second semester. The tasks, thus, had been tried out in the following year, the second semester of 2010 academic year with a new batch of the 33 first-year students of Information Technology at the Diploma level, Chiangmai Technical College. To methodically gather relevant information, following steps were carried out.

- **Step I:** As suggested by the results of Task 1 in Section 3.5.1 D, some terminology or difficult words should be introduced prior to the main tasks (the analyzed tasks) to reduce linguistic demand from the students. It thus was appropriate to implement a complete set of tasks in Unit 1 and 2 as detailed in Table 3.1. It was also important to note that the constructed materials (3 units: 13 tasks) lasted 20 hours however the allotted time to carry out the main study was the first half of the semester, which was 18 hours. It was thus possible to implement only 2 units of the constructed materials (15 hours).
### Table 3.1 A complete set of the implemented tasks

<table>
<thead>
<tr>
<th>Unit 1</th>
<th>Task</th>
<th>Objectives</th>
<th>Time</th>
</tr>
</thead>
</table>
| **Network topology** | 1 Phonetic symbols | - To learn the phonetic symbols  
- To pronounce words correctly | 2 hrs. |
| | 2 - in continuation | - To identify syllable breaks and word stress  
- To pronounce the words correctly | 1 hr. |
| | 3 IT terminology | - To learn some new IT terminology and be able give its definition | 1 hr. |
| | 4 Network topology | - To compare the differences of the topologies  
- To talk about the network topology | 2 hrs. |
| | 5 Advantages of the topology | - To evaluate the effectiveness of the topologies  
- To create a network system for an organization | 2 hrs. |
| | 6 It is important to... | - To ask for opinion and answer the questions | 1 hr. |
| **2. IT specialist** | 7 Surfing the Net | - To learn new IT skills  
- To perform IT instructions | 2 hrs. |
| | 8 - in continuation | - To give IT instructions in a written form | 1 hr. |
| | 9 - in continuation | - To verbally give IT instructions  
- To perform IT instructions | 2 hrs. |
| | 10 You need to... | - To give advice using phrases like: ‘You need to/should+v1’ | 1 hr. |

The first three tasks in Unit 1 served as warm-up activities. They dealt with pronunciation practice and terminology as well as some difficult words while the fourth task was the main reading on the network topology. Subsequently Tasks 5 and 6 were regarded as the follow-up activities. For Unit 2, Task 7 involves reading comprehension. It served as the main task of the unit. The students were required to comprehend the IT instructions. The following tasks (Tasks 8, 9 and 10) were the follow-up activities. Though ten tasks were implemented in the main study, only two tasks (Tasks 4 and 7) were critically analyzed. This is because they were considered the main inputs of the respective unit. Given below is the sequence of task implementation.

![Figure 3.3 Sequence of task implementation.](image-url)
Step II: The two revised tasks were again implemented during the second semester of the following year (2010) in a language class of 33 first-year students of Information Technology at the Diploma level in Vocational Education at Chiangmai Technical College, Thailand. The major reason for this was that the content topics used in the constructed materials would be taught only in the second semester. This was to contextualize students’ learning so that students perceived the task as relevant and meaningful. During the course of instruction, the process of data collection took similar steps as described in Step II of the piloting phase. Here, it is important to note that the same observer was invited for classroom observation.

Step III: This stage involved analyzing four aspects of the obtained data: higher order thinking skills, content learning, language learning and the students’ perception of tasks concerning their difficulty and interest as discussed in Section 2.5.3. B.

Step IV: Data derived from the previous step were carefully scrutinized to address the four research questions as already presented in Section 3.1 in the following manners.

Question I: The discussion would place emphasis on the way the learning activity was introduced during the course of instruction: pre-task, during task and post-task activities. Data thus were qualitatively analyzed in terms of cognitive engagement based on the revised version of Bloom’s Taxonomy.

Question II: As stated earlier, the present study adopted a process-oriented approach focusing on students’ content knowledge. Extracts of student-teacher exchange were closely analyzed based on four types of knowledge elicitation suggested by Mehan (1979): Choice elicitation, Product elicitation, Process elicitation and Metaprocess elicitation. Each of these elicitations draws different kinds of information. Choice elicitation calls upon students to agree or disagree with statements/questions provided by a questioner like yes-no questions. Product elicitation is used to draw factual information such as a name, a place, date, or a color etc. Process elicitation involves students in expressing their opinion or interpretation based on the given information. The fourth type, Metaprocess elicitation, aims at asking students to reflect on the process by which they have arrived at answers.
Question III: This focused on students’ language learning. Information on successful task performance was given as evidence of language learning. Moreover, some students’ reflections were also quoted to fully support the analysis.

Question IV: It was concerned with students’ perception about the tasks in terms of their difficulty and interest. Data derived from students’ reflection sheet were quantitatively analyzed. In addition, some of students’ opinions were also presented to show their perception on their own learning.
1. Identifying tasks
   • Unit 1: 1 task (2 hrs.)
   • Unit 2: 1 task (2 hrs.)

2. Implementing tasks
   • Classroom Observation
   • Classroom video taping
   • Teacher-observer Conference
   • Students’ reflection

3. Analyzing tasks 4 & 7
   Criteria for analysis
   • Appropriacy: difficulty & interest

4. Revising tasks
   • Modification of tasks (if any)

1. Identifying tasks
   • Unit 1: 6 tasks (9 hrs.)
   • Unit 2: 4 tasks (6 hrs.)

2. Implementing tasks
   • Classroom Observation
   • Classroom video taping
   • Teacher-observer Conference
   • Students’ reflection

3. Analyzing tasks 4 & 7
   Criteria for analysis
   • High order of thinking skills
   • Content learning
   • Language learning
   • Satisfaction: interesting

4. Addressing research questions
   • Can the materials foster the students’ high order of thinking skills?
   • Do the tasks enhance language learning?
   • Do the tasks enhance content learning?
   • Are the students satisfied with the constructed materials in terms of difficulty and interesting?

Figure 3.4 Process of retrospective evaluation: pilot and main study
Figure 3.5 Summary of CBI materials development

1. Collecting information
   - Identifying: language syllabus, students & IT specialists
   - Developing & administering tools: questionnaire for needs assessment & language proficiency test
   - Conducting interview: students & IT specialists

2. Analyzing information
   - Language syllabus
   - Student's needs & interests
   - Students' language proficiency
   - IT specialists' suggestions

3. Constructing materials
   - 3 units of 13 tasks lasting 20 hours with the following features:
     - Two types of objective: content and language
     - Fostering thinking skills
     - Catering for objective and subjective needs
     - Authentic content
     - Communicative tasks
     - Sequencing tasks by means of responses

4. Developing evaluation form
   - Criteria for evaluation
     - Objectives
     - Methodology
     - Content authenticity
     - Content as a source of language learning
     - Task sequencing
     - Task coherence

5. Collecting data
   - Administering task evaluation form to external evaluators
   - Conducting an interview

6. Analyzing data
   - Analyzing data
   - Modifying materials (if any)

7. Identifying tasks
   - Unit 1: Network topology
   - Unit 2: Surfing the Net

8. Implementing tasks
   - Classroom Observation
   - Classroom video taping
   - Teacher-observer Conference
   - Students’ reflection

9. Analyzing data
   - Criteria for analysis
     - Appropriacy: difficulty & interesting

10. Revising tasks
    - Modification of tasks (if any)

11. Identifying tasks
    - Unit 1: Network topology
    - Unit 2: Surfing the Net

12. Implementing tasks
    - Classroom Observation
    - Classroom video taping
    - Teacher-observer Conference
    - Students’ reflection

13. Analyzing data
    - Criteria for analysis
      - High order of thinking skills
      - Content learning
      - Language learning
      - Satisfaction: difficulty & interesting

14. Addressing research questions
    - Can the materials foster the students’ high order of thinking skills?
    - Do the tasks enhance language learning?
    - Are the students satisfied with the constructed materials in terms of difficulty and interesting?
3.4 Research Instruments

In order to develop CBI materials for any language classroom, a materials writer or a teacher as a developer needs to have some aspects of the students’ background such as needs and their interest, level of language proficiency, level of content knowledge or reasons to learn second/foreign language and so on. For gathering these kinds of in-depth information in this present study, it required various kinds of instruments to collect information for two different purposes: materials construction and evaluation. The instruments constructed for data collection during the materials construction phase consisted of a questionnaire for students’ needs and interests assessment, a language proficiency test and an interview with IT specialist. At the materials evaluation stage, this included materials evaluation form, a classroom observation sheet, a classroom video tape, a teacher’s notes, teacher-observer conference and the students’ reflection sheet. A description of the tools for materials construction will be given first.

3.4.1 Instruments for materials construction

This section describes three types of the research instruments used to obtain information for materials construction.

A) Questionnaire for students’ needs and interests assessment

The fact that in CBI, content and language have a supportive interrelationship, the course content serves as a point of departure for language learning. In turn, language skills are employed to achieve content learning. Consequently, selection of content topics will result in language functions or elements of grammar to be developed. Accordingly, it is crucial that a CBI teacher as a course/materials designer needs to have a thorough idea about course content background and language proficiency of the learners. This type of information will immensely exert an influence on the selection of language course content and its level of complexity in the designed materials. The type of information to be gathered will vary depending upon the educational contexts. Particularly, in CBI, where the focus of instruction is on both the subject matter and language learning, more specific information on students’ needs to be included. Not only information about
students’ level of language proficiency is required, but also their background knowledge of the course content.

The questionnaire was administered to the IT students at the beginning of the study as well as an interactive session to obtain a deeper understanding of the students’ prior language and content learning experiences. This also included information on students’ identity, educational background, exposure to English, self-perception of language skills/functions, motivation to language learning and topics of interest. The questionnaire, developed by the researcher, employed multiple types of questions to yield necessary information. It consisted of open-ended and yes-no questions, a checklist and a rating scale (See Appendix C for the questionnaire for students’ needs and interests assessment). Given below were the kinds of issues included in the questionnaire.

i) **Personal information:** This was the first section of the questionnaire. It required the students to supply the details of name, age, gender, course of study, year of study and college.

ii) **Educational background:** This section dealt with the students’ educational background in terms of types of school, private or government and types of schooling, secondary school or vocational college. It was felt that both factors, namely, types of school and schooling could largely affect the amount of the second/foreign language exposure as well as that of IT content exposure.

iii) **Exposure to English:** Questions in this section covered the details regarding types of language activity that students took part in. In addition, they were also asked to rate the frequency of engagement on a three-point scale from ‘never’ to ‘frequently’.

iv) **Self-perception of language skills/functions:** This section aimed to elicit the students’ self-perception of language competence. They were asked to rate the extent to which they could perform in all four basic language skills of communication on a three-point scale ranging from ‘very well’ to ‘not at all’. Additionally, they were required to identify whether they could perform some kinds of task which they should achieve either in IT or language class.
v) **Reasons for learning the language:** This section intended to elicit the reasons why students were learning the language. They were also asked to indicate whether English was important for different purposes.

vi) **Topics of interest:** It was an open-ended question that asked students to identify some of the topics of their own interest they wished the language teacher to focus on in the language classroom.

vii) **Exposure to IT content:** This section dealt with students’ exposure to IT content. They were asked to identify whether they read any IT guidebooks published in English and the extent to which they were able to comprehend them.

It is also important to note that the above aspects were used in a class discussion after the completion of administering the tool to gain a deeper understanding of the particular issue.

**B) Language proficiency test**

The language proficiency test (See Appendix D) was specially designed for the study. It was administered to the students at the beginning of the study. Its primary purpose was to find out the students’ level of English proficiency and that of IT content simultaneously. The test comprised four sections:

i) **Reading Comprehension:** The passage dealt with a kind of virus programme ‘A Logic Bomb’. Its aim was to assess some commonly used vocabulary in IT content and reading comprehension strategies: referencing, making inferences and using context clues for guessing meaning. It consisted of ten items in the forms of four ‘True or False’ statements, three referencing items and three definition-matching items.

ii) **Writing:** This section aimed to examine to what extent students possessed background knowledge in IT. They were asked to write a 50-word paragraph about computer network or network topology, which was always included in the introductory course in IT. Some of the pictures of network topology were given as a guide for writing. They could choose to explain one of them or any other topic related to computer network. Primarily, they were asked to write in English to demonstrate the extent to which they possessed language ability in terms of sentence
structure or word choice. In case they could not communicate it in English, they were allowed to write it in their mother tongue to determine whether they had this basic knowledge of IT.

iii) Grammar: There was a possibility that the students did not have enough language to work on the writing and speaking parts. They were allowed to use their mother tongue to communicate what they knew about IT. However, in this way it would be difficult to examine their linguistic ability. Given that students had spent some years in the compulsory language courses, this section, thus, dealt with the exploration of students’ linguistic competence in the form of multiple choice items. Its focus was mainly on subject-verb agreement of the frequently used verbs and sentence structure in science and technology, that is, mainly the passive voice.

iv) Speaking: The purpose of this section was to find out how effectively students could speak English. It was reasonable to assume that the IT students knew some basic instructions associated with IT. A task was set for them to give one of the basic IT instructions such as copying pictures from the web, arranging picture to the left or right side of the text or arranging pictures side by side. They were allowed to explain any other basic instructions with which they felt comfortable to talk about.

C) Interview with an IT specialist

An informal interview with an specialist was conducted to obtain information on three major aspects.

i) IT content: The discussion on course content provided information on what type of the IT topics could be incorporated in the language materials as well as their complexity. This was to ensure that the topics were not too easy or too cognitively challenging for the first-year students at the level of Diploma in Vocational Education.

ii) Task types: This type of information is beneficial to the language teacher in a way that s/he can select and teach the language functions/skills or linguistic elements that can facilitate the IT students to accomplish the tasks they engage in their course content.
iii) Sources of information: It is important to know a variety of sources where the language teacher can seek the relevant information for the language class.

Here, some questions revolving around those issues were prepared i.e. what type of course content they have to learn in their first year, what are the task types they have to perform in the content class or where do they get information from. The answers derived from the specialist led to further the discussion.

3.4.2 Instruments for materials evaluation

The focus of this section is on detailed description of the research instruments used for materials evaluation. This includes

A) Task evaluation form

This type of the research tool was used in the predictive evaluation. Prior to the implementation of CBI materials in the actual classroom in the second semester of 2009 academic year, the newly constructed materials had to be first evaluated for its effectiveness.

Predictive evaluation determines whether materials are appropriate in terms of objectives, methodology, task sequencing, coherence, content authenticity and content as a source of language learning. A task evaluation form (See Appendix E) was accordingly developed which contained twenty-two open-ended statements to be rated in a three-point rating scale. External evaluators (See Appendix H for a list of the external evaluators) were requested to give descriptive feedback on the developed materials as well as to respond to the three-point rating scale: 3, 2 and 1 that was translated as ‘very effective’, ‘average’ and ‘not effective’ respectively. Detailed questions of the evaluation form are given below

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Question no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>Methodology</td>
<td>5, 6, 7, 8, 9, 10</td>
</tr>
<tr>
<td>Content authenticity</td>
<td>11, 12, 13</td>
</tr>
<tr>
<td>Language Content</td>
<td>14, 15, 16, 17, 18</td>
</tr>
<tr>
<td>Task sequencing</td>
<td>19</td>
</tr>
<tr>
<td>Coherence</td>
<td>20</td>
</tr>
</tbody>
</table>
Moreover, an interview with each evaluator was held to learn the strong and weak points of the constructed materials as well as to gain specific comments/suggestions to improve the materials.

B) Classroom observation sheet

Classroom observation served as one of the research tools and helped to investigate students’ learning process during the class. A regular language teacher was requested to observe the following aspects during the session.

i) Students’ participation during the course of instruction
ii) The extent to which the task could facilitate their learning
iii) The difficulty of the task
iv) The extent to which the task was successfully implemented
v) Modification of tasks (if any)

The classroom observation sheet (See Appendix F) comprised seven open-ended questions. They were also recycled as points for discussion in the teacher-observer conference. Data derived from the discussion served as a means to test the reliability of those collected from other types of the instrument. It was appropriate to note that prior to actual classroom observation, the regular teacher as an observer received an observation training in one of the language classes prior to the actual observation. The following steps were taken.

- During the pre-observation meeting: She was informed the main goal of the unit and the learning objectives of the specific task. Information on the activities on the day of observation was also given. This included, for example, what would happen in the warm-up, during main activities and the follow-up.

- Observation: The observer was asked not to focus on teaching skills or classroom management but the way students interact with the materials: whether the majority of the students were on-task, what they did to accomplish the task, the sequence of activities and what to be done to improve the quality of learning process. The observer should also look for evidence to show that learning
took place. More importantly, information recorded should be descriptive rather than evaluative.

- Post observation: A teacher-observer conference was held to share information gathered during the course of instruction and reach the consensus on students’ participation, evidence of content and language learning, task difficulty, strong and weak points of the trialling tasks.

C) Video recording

The purpose of video recording was to provide an archive for substantiating and revisiting the classroom dynamics during trialling tasks. It captured many details of a lesson that could not easily be observed such as the actual language used by the teacher and students during a lesson, students’ gestures and overall classroom atmosphere.

D) Teacher’s notes

It aimed to gain information on the teacher’s teaching experience of the trialling task. The researcher as a teacher had to reflect on the similar aspects of the trialling task the observer did, that is,

i) Students’ participation during the course of instruction
ii) The extent to which the task could facilitate their learning
iii) The difficulty of the task
iv) The extent to which the task was successfully implemented
v) Modification of tasks (if any)

This note was used to share with the observer to reach the teacher-observer consensus of trialling tasks.

E) Students’ reflection sheet

Students’ Reflection Sheet was adapted from the learner questionnaire developed by Ellis (2008). It was administered to the students immediately after the completion of each trialling. The purpose of students’ reflection was to examine their opinion towards the language task. It consisted of a set of questions in a three-point scale and open-ended format as follows.
Question nos. 1-3 aimed to elicit their perception towards the language task on a three-point scale.

Question no. 4 was an open-ended type that attempted to raise students’ awareness of what they had learned.

Question nos. 5-7 attempted to identify what students liked/did not like about the task and ways to improve their effectiveness.

Described above were the instruments constructed for data collection during the materials construction and evaluation stages. To have an overall picture of the tools, Table 3.2 summarizes the complete set of instruments used at different stages in the present study.

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Table 3.2 Instruments used for materials construction and evaluation

In conclusion, the instruments for the present study classified according to purposes comprised those for materials construction and for evaluation. The instruments for materials construction were 2003 Language Curriculum for the Diploma in Vocational Education (IT program), needs assessment, language proficiency test, IT students’ and IT specialist’s interviews. For the evaluation part, it consisted of task evaluation form, classroom observation, video transcripts, a language teacher-observer conference, students’ reflection.
3.5 The pilot study

As stated earlier, the pilot study aimed to obtain information regarding the appropriateness of the CBI task in terms of content learning, language learning, difficulty and interesting. These criteria derived from the significant principles of CBI materials that would help the researcher as a materials developer to determine whether the tasks or texts needed any modification and how students felt about the learning tasks. After the tasks were evaluated by the language experts, a pilot study was conducted during the second semester of 2009 academic year. Two main tasks (‘Network topology’ and ‘Surfing the Net’) were tried out with 29 first-year students of Information Technology at the Diploma level equivalent to associate degree, Chiangmai Technical College, Thailand. The study aimed to obtain information regarding the appropriateness of the CBI task to determine whether the tasks or texts needed any modification and how students felt about the learning tasks. Data derived from classroom observation and teacher-observer conference, students’ reflection and videotape were analyzed and yielded the following results. They are discussed taskwise below.

3.5.1 Results of Task 1: Network topology

A) Task description

It aimed to enable students to discuss five types of network topology and its functions. Jigsaw reading technique was used in the task. Students were assigned to so-called ‘expert’ groups in which each group was given one part of the text to work independently. Here, they had to ensure that each member of the group clearly comprehended his/her part in terms of both vocabulary and content and was able to explain it to their peers. Then they were reassigned to ‘home’ groups in which there was at least one representative from the ‘expert’ group. Each member of a ‘home’ group then taught the rest of the group about what s/he just read. Finally, they engaged themselves in a discussion and some follow-up exercises.

B) General consensus of the teacher-observer conference

After the teacher assigned students to a group of 5-6, each group worked with at least one laptop with internet connectivity to comprehend the given topic. Members of the groups took on different roles. In most of the groups,
members working with a laptop were busy with a translation programme in order to get the meaning of the reading text while others tried to comprehend the text with the help of a dictionary. One of the groups searched the Thai version of the assigned topic from the different online sources. Later, some other groups took the idea and looked for the relevant topics online. At this point, both the teacher and the observer agreed that the IT topics used in this task could capture students’ attention. The observer commented on this point

Most of the students work collaboratively; they try to get more information on the topic from other sources than what is given. Only three or four students seem to be off-task.

After reading, each group was required to discuss an assigned issue. It appeared that they could clearly understand and talk about the content. The teacher mentioned

I tried to be part of every single group while they were discussing. I think that they can explain the given issue clearly.

After the students shifted to the new groups, each member of the group had to explain what they had learned about their respective topic to the group. It was found that some students could give detailed information while some of them could give general ideas. The observer talked about this point in the following way.

The students have grasped the main idea of the reading. What needed to be added here is to give prompt questions and/or more practice on articulating ideas.

Subsequently, the students were assigned to do a follow-up exercise, ‘True or False’, which contained eight inferential statements and two factual statements. It required them to think critically in order to correctly respond to those statements. It appeared that the students became involved in the task. They looked for more information online and critically discussed the statements. Both the teacher and the observer agreed that it was another evidence of students’ active engagement in the language activity. The teacher and observer finally concluded that the task was responsive to students’ interest and that it could actively involve students in the
learning process that sequentially resulted in content learning. This could also be evidence that the materials were not too cognitive demanding for the students.

C) Feedback from the students

As regards task difficulty, the findings as graphically shown in Figure 3.6 demonstrated that majority of the students (62%) pointed out that they needed to make some effort to complete the task. Almost a quarter of the group (21% of the students) indicated they found no difficulty to work with the tasks whereas the smallest number of them (17%) accepted that the activity was too difficult to deal with.

![Figure 3.6 Students’ perception of task difficulty](image)

In addition to rating task difficulty, students also provided some feedback on the level of task interest in relation to the topics of interest as showed in Figure 3.7.

![Figure 3.7 Students’ perception of task interest](image)
It can be seen that all the students (100%) were interested in the topic introduced to the class at different degrees. Two-thirds of them (66%) were very interested and a smaller proportion or one-third (34%) was interested.

Furthermore, the students were also asked to reflect their views on task difficulty and interest. They were allowed to express their opinion in their language. Subsequently, they were translated into English by the researcher. Some of them are presented below.

The reading was quite difficult. It had a lot of new words. But it was good to learn some more IT content area.

Yes, it was a bit tough. But I liked the topic. I read it both in Thai and in English.

Working with peers can make a tough job easier. I felt comfortable working in a group.

The students also provided some feedback relevant to their own learning. They articulated it in the following ways

I learned about the installation of Star, Bus, Tree, Mesh and Ring topologies.

The malfunction on any set of Star in Tree does not affect the other sets. However, if its backbone fails to operate properly, the entire network will collapse

The main cable in Bus is called backbone. It needs to be connected to the terminators at the two ends.

Here are some words that I learned: to terminate= to end, regenerate= to grow strong again, neighbor= person or thing standing next to another, a node= a computer and a repeater= a device for regenerating signal.

I practiced how to pronounce ‘identify’ and ‘problem’. I also looked up ‘protect’ and ‘function’ online.

A new word I learnt today was ‘connect’. It means to join something to another piece of equipment.
Students’ reflections in relation to the difficulty and interest of the topic and what the students benefited from active participation in terms of content and language knowledge presented above corroborated to the teacher’s and observer’s views. It, thus, can be seen that it provided a strong validation to the teacher’s and observer’s claim. That is, the task was able to capture students’ interest that resulted in active engagement in the learning process and content and language learning.

D) Some important considerations for modification

As illustrated in the previous section, ample evidence of how the task worked in the language classroom of IT students could greatly assert the effectiveness of the CBI materials. With insights gained from the teaching and learning process, it was realized that some modifications to the task and teaching procedure were needed. The following points should be taken into consideration.

i) The teacher and the observer agreed that some words and terminology were difficult to the students. It was necessary to discuss those words prior to assigning to main reading. This would ease linguistic demand on the students.

ii) It was recognized that students could gain content knowledge through reading and discussion within the ‘expert’ group. When they were reassigned to the ‘home’ group in which they had to share their knowledge they learned with their peers, it was found that some of the students were not be able to articulate it. It was thus, recommended that students should be given some time to rehearse as well as prompt questions.

iii) The video showed that students worked sincerely. They were on task most of the time. Particularly, it was found that those who worked with laptops appeared to be more focused. They spent more time on task than other members of the groups did. It was, therefore, advisable to utilize more computers as one of the instructional tools.

iv) Students’ reflections revealed that almost every student liked working in groups rather than individually. They stated that they felt more comfortable and learnt from each other. However, grouping in jigsaw technique
made some students irritated. One of them indicated that he was annoyed at being asked to form groups repeatedly from the ‘home’ to the ‘expert’ group and then go back to the ‘home’. It was suggested that the students should be first assigned to the ‘expert’ and then the ‘home’ group. This would reduce one step of assigning students to groups.

For this task, it can be clearly said that there was evidence to show that students gained some new knowledge. During group activity, some students were able to express their understanding to their peers. Students indicated that they learned some IT content and some new vocabulary. Majority of the students felt that the task was interesting and not too difficult. Moreover, both the teacher and observer agreed that the task was found appropriate to this group of IT students. It could potentially keep the students on-task. In addition, some of the suggestions were provided to create an opportunity for maximizing students’ learning viz. discussion of some difficult words related to the given topic prior to the reading task or more laptop utilization.

**3.5.2 Results of Task 2: Surfing the Net**

**A) Task description**

It aimed to enable students to comprehend IT instructions and to perform IT tasks accordingly. In pairs, students were required to access either the websites dedicated to IT instructions or any other sources of authentic materials such as IT manuals, books, pamphlets or magazines. In pairs, they could choose any preferred topic. They needed to visualize each step and be able to perform the learned instruction. Finally, they were required to share their knowledge with others.

**B) General consensus of the conference**

After having been informed of what the students were going to do and the expected outcome of the task at the end of class, the students logged on to [http://www.computeractive.co.uk/workshops/](http://www.computeractive.co.uk/workshops/). The site contained over a hundred readable IT instructions. Although initially, the students were expected to work in pairs as there were enough computers for every single student, they were allowed to work individually. However, it was found that some students preferred to work in
pairs. The task was truly responsive to students’ interest. It could successfully keep the students on task. On this point, the observer stated

Almost every single student was on-task throughout the class time. Only some students were occasionally off-task. They were busy in search of their preferred topics and tried to make sense of it

Both the teacher and the observer agreed that another circumstance to show that they were on-task was their questioning. Students kept asking questions for clarification throughout the session. Based on the video, following were some of the questions asked by different students:

- Can I take this topic?
- What do you think about this topic?
- What does it mean?
- Does this mean…?
- Do I need to submit Thai version of the instruction?
- Can I read the instruction instead of giving it orally?
- Can I only show how it work and explain in Thai?

To ensure that the students learned new content from the class, the teacher asked them to only select the topics that were new to them. Given below was a sample of instructions chosen by the students.

- Remove a facebook account
- Personalize you desktop with bespoke icon
- Add a mirror effect
- Upload photos to Flickr quickly
- Burn DVD & CD with window XP
- Add cover art to iTune
- Make snazzy office document: the easy way
- Protect window with a system restore point

Regarding the students’ participation, the observer indicated.

The students kept searching for their preferred topic. Someone get a lengthy but readable topic. With the support of illustration, the students can figure out its meaning. I notice that when they find some difficult words, they consult So Sethaputra, a Thai-English software dictionary and sometimes online Oxford or Cambridge dictionary.


C) Feedback from the students

For task difficulty, the findings as graphically shown in Figure 3.8 demonstrated that majority of the students (62%) pointed out that they found the instructions were not too difficult to understand. 28% of the students indicated that the instructions were readable whereas only 10% of them specified that the activity was too difficult to deal with.

![Figure 3.8 Students’ perception of task difficulty](image)

Most of them also commented that the instructions were quite lengthy. Here are some of their reflections:

- It was not too difficult because many words are commonly used in IT class.
- Most of them were very lengthy. It contained ten steps with long explanations
- I tried to look for a short interesting instruction, but I couldn’t.

Students also provided some feedback on the level of task interest as showed in Figure 3.9.
Figure 3.9 Students’ perception of task interest

It was seen that all the students (100%) were interested in the task. Almost all of them (90%) were very interested and just a smaller proportion (10%) was interested. This is what students said about task interest:

I liked this activity because I like working online and I could choose what I wanted to work on.

It was interesting. A lot of IT information is available including Jargon Buster.

Furthermore, students were also asked to reflect on what they learned from the class. They were allowed to express their opinion in their mother tongue. Subsequently, they were translated into English by the researcher. Some of them are presented below:

I learnt how to create a photo slide in windows vista.

I read how to change the new-style windows and taskbar.

I learnt how to use Office 2003 to open 2007 documents.

D) Some important considerations for modification

Based on the trialling of the task, there were two crucial aspects that needed to be addressed, that is, the utilization of the computers as an instructional tool and the given timeframe to complete the task.

i) Based on the result of the previous task, it was thought that providing enough computers with internet connectivity to every single student would only have a positive effect on the learning situation. This has been proven
true in many situations. For this task, it resulted in two different ways. On the one hand, one computer with a student allowed him/her to work independently at his/her own pace. S/he could choose his/her preferred topic freely. It was also found that they became extremely involved in the task. On the other hand, it was found that a single student working on a computer greatly minimized student-student interaction in which students could negotiate meaning, increase their language store as they listened to their peers and use all they possess of language. However, one-third of the students (10 students) worked in pairs.

ii) As planned, the allotted time for the task was 120 minutes. Students were expected to be able to comprehend one IT instruction and try it out. Their capability to perform IT instruction could serve as a crucial indicator to show that they could clearly comprehend what they read, gain new content knowledge and be skillful. At the end of the class time, it was found that only three pairs of students could submit paperwork (As planned, the paperwork was not required.). This could probably stem from the length of the text, most of which were quite lengthy. Hence, interest should not be the only criterion for topic selection, but whether there is readable or lengthy or whether it is individual or pair work involved.

For this task, it could be said that there was some evidence to show that the task could capture students’ attention. For example, most of them were on task searching for some IT instructions online and some students asked questions for better understanding. Based on the students’ reflection, they indicated that they learned some new IT instructions. Majority of the students agreed that the task was interesting and not too difficult for them. Some suggestions for task modification were concerned with classroom management and the length of the task.

In conclusion, investigation of task appropriacy in the actual language classroom of IT students provided insights into how the constructed tasks influenced students’ learning and their perception towards the tasks. Ample evidence showed that the two implemented tasks ‘Network topology and Surfing the Net’ could capture students’ attention and have a positive effect on students’ participation and involvement. Members of the groups took different roles and worked collaboratively. They made efforts to comprehend the reading texts. Both
the teacher and the observer agreed that another circumstance to show that they were on-task was their questioning. Some questions for clarification were asked by different students. This could be the evidence of the students’ cognitive engagement. The teacher and observer finally concluded that the task was responsive to the students’ interest and could engage involve the students in the learning process.

Nevertheless, at this stage, it might not be easy to demonstrate clear evidence of second language acquisition. However, it is believed that there is a silent period at the initial stage of learning. Students might not be able to articulate their ideas in English. When students are able to comprehend the reading texts, they have already acquired some English. Moreover, based on students’ reflection, they indicated that they learned some IT knowledge as well some new vocabulary. Regarding the difficulty level of two tasks, majority of the students agreed that it was not too difficult to complete the tasks. They also indicated that the tasks were interesting.

Therefore, it could be clearly stated that these two implemented tasks newly developed within the CBI framework were found appropriate to cater to the IT students’ content and language learning as well as their learning interest.

3.6 Summary

This chapter has presented the research design of the study. It began with the research objectives, the sample of the study and research design. This was followed by a detailed description of the research instruments used. Finally, it dealt with the results of piloting that revealed the potentiality of the trialling tasks and some considerations to maximize learning opportunity. The next chapter describes the analysis of data that served as a basis of task development, criteria for task design and the description of the developed tasks.