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Ellipsis in science and technology textbooks in English: Implications for Thai students

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**Ellipsis in Science and Technology
Textbooks in English:
Implications for Thai Students**

By

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B. Ed., M. Ed., Dip. Applied Ling.

**A thesis submitted to Edith Cowan University,
Faculty of Community Services, Education and Social Science
for the degree of Doctor of Philosophy
in Applied Linguistics
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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

Abstract

This is an analytical study which attempted to investigate Thai students' ability to interpret elliptical sentences and to recover and recognise ellipted elements in a science and technology context in English. Students' awareness, understanding, perceptions, problems and strategies in relation to ellipsis were also examined. The subjects for the study were 60 first year students from King Mongkut's Institute of Technology North Bangkok (KMITNB) who had enrolled in two compulsory English courses in KMITNB, Bangkok, Thailand. The instruments for this study were three 20 item ellipsis tests based on 5 ellipsis types classified by Quirk, et al. (1985). Items of the test were based on short passages extracted from three English science and technology textbooks commonly assigned for students to read during their study at KMITNB: physics, mathematics, and computer textbooks. The content of all tests was the same but different tasks were required to be done. The subjects were asked to interpret the elliptical sentences and rated the level of difficulty of each item in the first test, the interpretation test. After each item, they were requested to tape-record or write their answers to the questions why they interpreted that way and what helped them to do so. For the second test, the recovery test, students were asked to supply the English ellipted elements in the blanks provided and to tape-record or write their responses to the questions why they supplied such word(s) and what helped them to do so. The third test, the recognition test, was the same as the second but multiple choice answers were provided. Students also had to say why the choice they had made was suitable. The collected data was analysed quantitatively and qualitatively. Arithmetic mean, percentage, Man-Whitney *U* test, median and correlation were employed to analyse the data, using SPSS software.

The study reveals that the students could score best in the interpretation test as they were allowed to answer in L1 and a variety of answers that conveyed the right or close meaning were acceptable. The recognition test was scored the second best while the recoverability test was scored the lowest. However, no mean score of any test reached half of the total. Moreover in counting the correct number, they averaged at 7.90, 3.88, and 7.45 out of 20 items in tests 1, 2, and 3 respectively. Ellipsis type 5, structural ellipsis without precise recoverability, was found to be the most difficult

for Thai students. The quantitative findings indicated that the students in the field of science and technology in Thailand were poor at ellipsis employed in science and technology textbooks.

The qualitative investigation confirmed that the students were neither aware of nor capable of understanding most elliptical sentences. Difference between L1 and L2 was the major problem found hindering students' ability to handle ellipsis. Low English proficiency, insufficient and in-complete L2 grammatical knowledge, insufficient L2 vocabulary, incomplete recall of L2 instruction, inability to access deep structure, misreading of anaphora, pragmatic misreading and incomplete background knowledge of subject matter were found to be internal factors causing students' difficulty in dealing with ellipsis. Transfer of training leading to students' overgeneralisation, language transfer resulting in interlanguage, conceptual influence across cultures, conceptual difference across sub-cultures, ambiguity of some structural cues, English hyponyms, and lack of intensive ellipsis instruction were external factors causing students' inability to solve ellipsis problems.

Apart from the obstacles, two factors were found to support students in doing ellipsis tests. They were similarity of L1 and L2 and some L1 unclippable words equivalent to English clipped elements.

The analysis also revealed some strategies students employed in handling ellipsis. Among these, structural and contextual cues, and word for word translation were frequently used.

The findings of the study supported the first hypothesis which was that the students' difficulties in interpreting elliptical sentences and recovering clipped elements can be related to (a) L1 transfer (b) reading strategies. But they did not support the second hypothesis which was that degree of difficulty in retrieval of ellipsis, based on Quirk, et al's (1985) principles, relates to degree of difficulty in interpretation. Constraints due to students' test fatigue and boredom may partially have affected students' ability in doing the tests.

Declaration

" I certify that this thesis does not, to the best of my knowledge and belief :

- (i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;*
- (ii) contain any material previously published or written by another person except where due reference is made in the text."*
- (ii) contain any defamatory material*

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Chapter 1

Introduction

Growth in the number of international contacts and a growing trend towards globalization have affected language study in many parts of the world. English has reached the status of an international or global language as it is used globally to communicate academically, economically, politically, commercially and socially. It is now the most widely taught foreign language in over 100 countries, such as China, Russia, Germany, Spain, Egypt, Brazil and Thailand, and in most of these countries it is emerging as the chief foreign language to be encountered in schools (Crystal 1997).

English has also become the major dominant world language of science and technology because it is used to disseminate knowledge and innovation globally in this field (Grahe 1988). Many multi-national companies carry out their business activities on an international scale and need to address their worldwide customer base through advertising in the mass media in English (Moody 2000).

Furthermore, computers and the Internet have played a very important role in everyday life. They seem to be the most popular channels for everyone to access and attain what they want, such as information, jobs, sales, service, advertisements, etc. English is also the most prominent language on the Internet. Iyer (2000) claims that in 1995-96, 80% of 50 million computers sold worldwide had an English version of Windows 95. Additionally 92% of 200 million Internet users surf the net using the English language.

English continues to hold a monopoly as the language of higher learning. Ninety-four percent of all papers presented in emerging and frontier technology and computer software are exclusively in the English language. For the remaining six percent, simultaneous translations in English are available (Iyer 2000)

In many fields of employment, including science and technology, English and computer literacy are becoming mandatory requirements for career advancement. Obviously the 200 million Internet users are not native speakers of English. No country can, therefore, afford to ignore the important role English plays in information access as well as in the transfer of science and technology, especially if it still expects to compete professionally and economically (Grabe 1988). That is to say people, specifically students, require new information and explicit input about the English language so that they can acquire more knowledge to access and achieve whatever they need.

English as an international language has been studied worldwide in relation to several different academic disciplines. Each discipline defines its own set of problems and has its own methods for addressing them (Allen 1995). In the area of science and technology, students are supposed to learn English in order to be able to gain more knowledge from the English language textbooks of their field. In some countries, especially the developing ones, science and technology transfer is essential because most of these countries have to import innovation from the developed or industrialised nations. Such transfer is also one of the prime targets for countries like Thailand in order to boost the economy and to raise standards of living.

Even though some technologies can be initiated by Thai engineers and technicians, most innovation has to be imported from other countries. English, an international language, is therefore indispensable as a means of transferring knowledge. King Mongkut's Institute of Technology North Bangkok (KMUTNB) is a Thai public tertiary institute responsible for training students to create, access and transfer science and technologies. Hence English is taught as a compulsory subject so that students have a means of accessing knowledge from English textbooks, the Internet or other sources.

Unlike in some other countries, in Thailand, English is taught as a foreign language, not a second language, since Thai people throughout the country communicate in their own native national language, which is Thai. Thai children are

exposed to English at least by grade 4 in public primary schools and by kindergarten in private schools. Therefore, before entering university, students have generally been exposed to 9 years of English. However, many students still find it difficult to understand English textbooks and this can even be after completing two courses in their first year of studying at KMITNB.

Problems relating to English language learning exist in most parts of the world even where it is a second language, as in the case of Zimbabwe. Love (1990) notes that in Zimbabwe, university students continue to have problems with scientific communication despite the fact that English is a widely-used second language and students have received most of their formal science instruction in English. However, according to Love (1990), the problems differ from those of both students of English as a foreign language and students studying their first language, in that they mainly relate to the requirements of scientific discourse as it embodies scientific method. Love (1990), therefore, suggests that English for science and technology be taught as an extension of science education.

In terms of scientific English, Halliday (1989) claims that the same features of scientific English can cause difficulty for both native and non-native English speakers even though they may approach scientific English differently. According to Halliday (1989), the difficulties generally occur more with grammar and the complex relationships between terms than with vocabulary. Such difficulties may be classified into seven categories; interlocking definitions, technical taxonomies, special expressions, lexical density, syntactic ambiguity, grammatical metaphor, and semantic discontinuity.

Chellapan (1985) notes that while the need to strengthen the transfer of language skills across disciplines and to integrate language instruction with other components of the curriculum is recognized, it must also be recognized that the language of science has a set of symbols that are different from those that are learned for daily life, and the structures of the two systems are not always the same. In

addition, the language of printed materials in science is not always the same as that of the classroom.

Collins (1994) claims that knowledge of text structure is critical for reading to learn; it is prerequisite for the efficient use of study time. By detecting the organisational patterns or structures of texts, students can observe how authors arrange ideas and determine which kinds of structures are used to interrelate ideas. Reading comprehension is an important skill that every student needs in order to be successful. It is directly influenced by how readers construct a representation of the information that they are taking in (Kelly and Neal 1998). Most foreign language reading specialists view reading as interactive because the reader interacts with the text to create meaning (Barrett 1988). According to Taylor (1989), when people read, they bring background knowledge and assumptions to the text and use them to construct a meaning for the text. He believes that a dialogue or negotiation of meaning between the reader and the writer takes place in the reading process.

Part of understanding a foreign language text involves the ability to solve lexical ambiguities that are not found in the first language. A problem faced by readers when dealing with a text in a foreign language is that the different range of meanings that a word represents and the structures of sentences in a new language are not identical to those in the first language. Non-native readers find that it is hard to choose the meaning that fits the context. This happens with most words and sentences (Lessa 1998). Writers' style is sometimes partially responsible for this difficulty.

Ellipsis is a technique that is employed in every kind of communication including writing. Writers of scientific, technical, or professional prose are among those who apply this technique to their writing. Skilful writers take advantage of this facility. They routinely decide what to state and what to suppress or leave as implied. To the extent that they can, readers instinctively and obligingly fill in ellipses left by

writers in their mind, whether at the syntactic or semantic level. Technical writing obviously makes use of elliptical language, which sometimes becomes a problem to readers (Grant-Davie 1995). The problem of interpretation of ellipsis is related to recovering the parallel elements that are missing in the target language (Dalrymple, Shieber, and Pereira 1991). To recover ellipted elements or to know what is ellipted is not easy if the writers do not leave any evidence for the readers to use for this purpose. Fortunately, almost every ellipted word is recoverable on the basis of presupposition. Nevertheless, many readers especially non-native speakers cannot understand elliptical sentences. This can become one of the critical problems for readers or learners of another language when comprehending whatever they are reading.

As a teacher of English for science and technology, the present researcher is concerned to know what causes her students' inability to communicate in English and to comprehend the textbooks they are reading. The causes of their difficulties may be many. But one of these difficulties, ellipsis, according to Grant-Davie (1995), is harder to identify because it is above the syntactic level. Placencia (1995, p. 132) also notes that, for non-native speakers, reading texts even with no ellipsis consumes time and energy. If the texts contain a considerable amount of ellipsis, readers have to spend much more time and energy on an intensive searching of the meaning as well as problem solving.

Ellipsis is usually used to avoid repeating the words previously mentioned or to avoid using the words that can be inferred. Even though ellipsis is a significant means of preventing language from being tediously repetitive, there is also a disadvantage for learners of English.

According to the Longman Dictionary (1993, p. 509), grammatical ellipsis can cause problems. Ambiguity arises when it is not clear which item has been omitted, as in:

(i) *<I left some tools on a table, but I can't remember which>* (which tools? Or which table?).

There is also a problem of producing constructions in which a word or a phrase that is grammatically necessary is omitted such as in:

(ii) <All instruments will or have been repaired>

The full form of the first clause will not be grammatically correct if its ellipted element is recovered, basing on the parallel structure rule or the exact copy rule, as shown below:

'All instruments will been repaired.'

As the two clauses are joined by 'or,' the ellipted elements in the first clause should be parallel with the elements in the second clause. The correct sentence should read:

<All instruments will be or have been repaired>

so that it can be recovered as:

<All instruments will be repaired or have been repaired.>

Longman Dictionary (1993, p. 509) designates the sentence as in (ii) as 'false ellipsis.' An example sentence of 'false ellipsis' given in Longman Dictionary (1993) is cited below:

<The boss never has and never will allow it.>

With respect to the parallel structure rule, readers may recover the sentence as:

<The boss never has allow it and never will allow it>.

which is grammatically wrong. So it would be better if the above sentence were written as:

<The boss never has allowed and never will allow it.>

Only the word 'it' should be omitted in the first clause. However, according to Longman Dictionary (1993, p. 509), it is usually acceptable to omit a verb form following another verb, although the two do not match as in:

<The boss never has allowed it, and never will [allow it]>

<My son knows, but I don't [know]>

<I am Thai, and my husband [is] Chinese>

Other common types of false ellipsis are shown in:

<He can work as well or better than you>, where the second 'as' of 'as well as' needs to be restored;

<They were pleased and appreciative of the work>, where *with* needs to be added after *pleased*; and

<Like his brother, his smile is attractive>.

where *his brother* and *his smile* are wrongly compared, so that it is better to have either *like his brother's*,, or to recast the sentence as:

<Like his brother, he has an attractive smile.>

These are some simple examples illustrating that ellipsis can be somewhat confusing. "For native speakers, ellipsis might not be a problem because they can use their intuition or encyclopedic common-sense knowledge to help retrieve what is clipped" (Kato 1986, p. 415). But for non-native speakers such as Thai students who need and are required to learn English, ellipsis can be a big problem. It can lead to the misinterpretation of or inability to interpret elliptical sentences correctly especially those in the science and technology contexts from which students need to acquire knowledge about their field of study. This has prompted the researcher to find out whether or not ellipsis is a cause of such difficulty.

As mentioned above, ellipsis is generally approved of and employed by writers of scientific, technical, and professional prose. An investigation of whether it is related to students' poor performance in comprehending their science and technology textbooks will be carried out in this study. If ellipsis is found to make a significant difference, this issue will be raised with teachers of English to find ways to solve the problem. This should then enable the revision of materials for the teaching and learning of English in Thailand.

KMITNB Students' English Language Background

Since this study involves students of King Mongkut's Institute of Technology North Bangkok, Thailand, it is necessary to give some details of their background. Before coming to KMITNB, students have been previously exposed to English instruction for many years because English is a compulsory subject for them from grade four upwards. Some students will even have been studying English since kindergarten. When to start learning English and what to teach depends on government policy makers.

Currently, listening and speaking skills are emphasised while reading and writing are somewhat ignored. Students are supposed to be able to communicate with foreigners outside class. Generally three to six hours of English are arranged weekly for students in primary, secondary and high schools. High schools are divided into three streams; namely, arts, science and vocational. Arts students learn more English, science students less, and vocational students the least.

Theoretically, students should be able to communicate, read and write in English after completing high school as they have been exposed to English for quite a long time, but in practice they are not able to do so. One reason for this is the lack of English contexts outside class where students can practise what they have learned. There is also the fact that most KMITNB students are from the vocational stream. Their English is rather poor not only because they have studied it less but also because they do not generally have any aptitude or motivation for language learning. When admitted to KMITNB, they are required to take two English courses in their first year. Four skills: listening, speaking, reading and writing, are taught to assist students to communicate in English, to read English textbooks in their field as well as to write in English. Science and technology contexts are emphasised and integrated into each skill area. Within two courses, students are to learn the skills of reading, including how to use a monolingual English dictionary, how to guess the meanings of words, how to find the main idea and supporting details of the selections, skimming, scanning, predicting, contextual reference, inference etc. A number of reading selections are provided for them both in class and in their self-access centre. For writing skills, all grammar points are reviewed beginning with words, phrases, clauses, sentences, articles, prepositions, tenses, modals, phrasal verbs, through to how to combine sentences, etc. Students are given a test at the middle and at the end of each semester. Statistical T-scores are applied to grade the students based on the normal curve. After these two courses, students are assumed to be equipped in almost every aspect of the English language and ready to handle the texts of their specialisation.

However, in spite of this instruction, according to the researcher's experience, many students cannot grasp the meaning of, or interpret correctly, many sentences,

especially those which contain ellipsis. They do not understand what they mean and why such sentences are written the way they are. This has inspired the researcher to investigate this problem with the hope that the outcome will be taken into consideration by the Thai government policy makers, educators, educational administrators, and English language teachers when planning for the teaching of English in Thailand. Ideally, the research would facilitate the development of materials with more emphasis on reading and writing so that teachers of English can be made more aware of the importance of ellipsis.

Purposes of the Study

This research aims:

1. to survey what types of elliptical sentences frequently occur in the scientific and technical textbooks read by students at KMITNB,
2. to investigate students' performance in interpreting elliptical sentences,
3. to check students' understanding of elliptical sentences,
4. to find out whether students can recover and recognise the elided elements,
5. to investigate what promotes or obstructs students' ability to interpret and recover elliptical sentences,
6. to find out which particular types of elliptical sentences are more difficult for Thai students, and
7. to examine students' perception on elliptical sentences.

This thesis consists of seven chapters. The present chapter has attempted to introduce the field of study and to provide a rationale for the research which has been undertaken. Chapter two will review the state of knowledge relevant to this investigation through a survey of the literature. This will embrace the study of ellipsis in both the English and Thai languages, as well as language transfer, interlanguage, reading comprehension and learner strategies. The research questions and hypotheses as well as the definition of terms will be put forward in this chapter

Chapter three deals with the methodology adopted for the present research and will provide the details of the research design, the test paper preparation, subjects of the study, testing and scoring procedures, and data analysis.

Chapter four reports on and discusses the students' performance and perceptions in relation to the ellipsis test items administered. Data on how many items each student scored and how many points were scored for each item in each test will be tabulated. The arithmetical mean scores of each group will also be calculated. Correlations between the ellipsis tests and the classroom English test will be made. Students' perceptions on test items will be discussed in relation to the points they scored.

Chapter five reports on and discusses students' performance and perceptions in relation to the ellipsis types incorporated in the testing. A comparison of mean scores between the high scoring and the low scoring student groups is made with respect to every ellipsis type to see with which ellipsis types and in which test students were able to succeed. The strategies that students employed in doing the test items will also be reported.

Chapter six describes the qualitative analysis of each item in detail, test by test. The students' performance, perceptions, strategies, reasons for their answers, problems in handling ellipsis are presented and interpreted.

Chapter seven is the conclusion of the study. It will show the extent to which the hypothesis presented in chapter two has been supported and will raise a number of further issues arising from the qualitative aspects of the research. Implications of the findings for the field of English for science and technology instruction and suggestions for further study are presented.

Chapter 2

Literature Review

1. Introduction

This chapter will discuss aspects of ellipsis which have been investigated by linguists, researchers and language teachers. A review will be provided of research on ellipsis and other issues related to the present research. The chapter is divided into 7 main parts; 1) introduction, 2) ellipsis, 3) literature review on ellipsis, 4) language transfer, 5) interlanguage, 6) reading comprehension and learner strategies, and 7) conclusion. The research questions of the present study as well as the research hypotheses will be stated.

2. Ellipsis

So far not many linguists, researchers and language teachers have paid much attention to ellipsis in relation to language teaching. Most linguists dealing with the subject describe ellipsis as part of syntax but do not attempt to account for it in detail. Notable exceptions to this are Quirk, Greenbaum, Leech, and Svartvik (1985, pp. 883-913), and Halliday and Hasan (1976, pp. 142-225) who, from different perspectives, describe the phenomenon in depth. This chapter attempts to bring together as many aspects of ellipsis as possible that have been addressed and investigated by those who are involved with this area of study. Their theories, principles, findings, including points of view in relation to ellipsis will be used as guidelines for this study.

2.1. Definition of Ellipsis

In general, ellipsis is defined as the grammatical omission of one or more words in the sentence. The listener or reader can understand the omitted part with the

help of the remaining or previous clause or sentence. Different linguists have looked at ellipsis from different angles. For example, Matthews (1981), Quirk, et al. (1985), and Allen (1995), view it in terms of recoverability whereas Halliday and Hasan (1976) are interested in what clause components are capable of being ellipted and how ellipsis occurs in relation to cohesion. Matthews (1981, p. 38) states that the ellipted elements can be recovered using the previous or presupposed sentence. He says that some ellipted words can be the exact copy of the presupposed words while some are not. Some of his elliptical sentence examples are as follows:

i) <They were drunk. Certainly I was ^.> (Matthews, 1981, p. 38)

The second sentence here is elliptical. A word after the verb 'was' is omitted and it can be recovered using the presupposed sentence. Since the patterns of the two sentences are parallel, it can be assumed that the missing word is the same as that in the same position in the previous sentence, which is 'drunk'. Another example reads:

ii) <Don't you think we were driving too fast? Certainly I was ^.>

(Matthews, 1981, p. 38)

There are two clauses in the first sentence. Its second clause is parallel with the second sentence. So the missing elements can be recovered as 'driving too fast'.

Quirk, et al. (1985, p. 883) also describe 'ellipsis' as grammatical omission of words and emphasise that this kind of omission is different from the others such as omission of phonological units, morphological units, and grammatical units in that there are always some evidences from which elliptical elements can be recovered whereas there are no such evidences for those three kinds of omission. According to Quirk, et al. (1985), the meaning of the second sentence in sentences i), and ii) has to be inferred, in each case, from its context. In i), it might mean that the speaker was also drunk. The adjective 'drunk' must be inferred using the previous clause "They were drunk." But in the case of other omissions, there is scarce evidence to recover, to refer to or to infer; as, for example, where the word 'cos' or 'cuz' is used for 'because' whose syllable 'be' is omitted and the remaining syllable is spelled differently from the original word 'because,' and where the word 'influenza' is clipped as 'flu' or the sentence 'Honestly, he is dismissed' that might be used as a reduced form of 'I'd like to tell you honestly that he is dismissed' or 'I'm telling you honestly that he is dismissed.'

Quirk, et al. (1985) claim that some elements which are missing from the construction of a sentence can be called an 'ellipsis,' depending on constraint by rules, which can result in a variety of ellipsis constructions. This supports Huddleston's (1984, p. 284) claim which is that ellipsis constructions are of many different kinds, "depending on what elements are omitted, on the conditions under which the ellipsis is permitted, on whether the interpretation is determined anaphorically, non-anaphorically or in either way."

Allen (1995, p. 449) agrees with those linguists that ellipsis is related to the use of syntactically incomplete sentences of which some parts are missing and the omitted parts can somehow be recovered by using the previous clause. He adds that almost any parts of the sentence can be ellipted. One of his examples of an elliptical sentence is cited below:

Tony made a new chair and Bob did too. (Allen 1995, p. 449)

He refers to this kind of ellipsis as ellipsis across conjunctions and claims that it is frequently found. Allen (1995) seems to follow Quirk, et al.'s (1985) recoverability principle. But in the case of the above example, the other linguists such as Halliday and Hasan (1976) treat it as a substitution, not as an ellipsis. Halliday and Hasan's (1976) proposition would seem to be acceptable because no word is ellipted in the sentence; instead 'did too' is substituted for the presupposed 'made a new chair' and it means 'made a new chair too.' If there is any elliptical element at all, the sentence should read:

Tony made a new chair and Bob ^too, which is not grammatical.

It is not grammatically correct to omit two functional words, the verb 'made' and the object 'a new chair,' at the same time. One way to make this sentence elliptical is to omit the verb 'made' and change the object to something else, 'a new table,' for example.

Tony made a new chair and Bob ^a new table.

But this changes the meaning of the original sentence.

Halliday and Hasan (1976, p. 142) define ellipsis as "something left unsaid... but understood nevertheless". Their claim (above) that ellipsis is similar to substitution is based on the observation that both processes involve the same

fundamental relation between parts of a text. The difference lies in that in substitution some word(s) is(are) inserted for what is presupposed while in ellipsis nothing replaces the presupposed elements. So they regard ellipsis as a substitution by zero.

Another group of linguists which includes Salkie (1995), Grant-Davie (1995), Quirk and Greenbaum (1973), Leech and Short (1981), and Placencia (1995) focuses on the phenomenon of why some words have to be omitted and on the functions of ellipsis rather than on how to recover them. Quirk and Greenbaum (1973), Leech and Short (1981), and Placencia (1995) agree that one of the functions of ellipsis is to avoid repetition. Leech and Short (1981) discuss the use of ellipsis in fiction in relation to what they call 'the principle of reduction' whereby language allows us to condense our messages to avoid redundancy. Repetition of ideas or expressions in fiction would be boring. So ellipsis is required. Salkie (1995, p. 56) claims that it is better to leave out a word or phrase in some contexts than to repeat it. He calls this mechanism 'ellipsis' while Grant-Davie (1995) defines ellipsis the other way round, which is that ellipsis is a construction opposite to redundancy. For Grant-Davie (1995), ellipsis is the omission of material that listeners or readers might expect to encounter and might therefore be able to infer as missing. Alternatively, listeners might just be aware that something has been left out, and be able to relate the missing element to the remaining parts using their own knowledge, i.e. they might be able to bridge the gap using their knowledge.

In regard to elliptical form, Biber, Johansson, Geoffrey, Conrad, and Finegan (1999, p. 751) investigated elliptical clauses and complementisers and found that various forms of ellipsis can be used for post-predicate clauses when the content of a complement clause is clear from the preceding discourse. With *to*-clauses and *wh*-clauses, the complement clause itself can be ellipted, while the complementiser ('*to*' or a *wh*-word) is usually retained. Biber, et al. (1999) gives an example of ellipsis with the complementiser '*to*' as follows:

A: Are we having that tonight too?

B: If you want to $\hat{\text{c}}$ (have that tonight) (Biber, et al. 1999, p. 751)

The preceding clause articulated by A, *Are we having that tonight too?* is so clear that B does not have to repeat the phrase *'have that tonight'* in his response to A's question.

With respect to writing, Grant-Davie (1995) says that ellipsis has two main functions. Firstly, it makes reading more efficient if the reader has enough background knowledge of what he/she is reading and is able to infer what has been omitted. Secondly, as ellipsis requires readers to make inferences, it provides a challenge to writers to make their writing more engaging, more intellectually or aesthetically stimulating. It is suggested that ellipsis be used in writing because it will help invite the reader to participate in finding meaning from the context. A bond of respect and shared assumption between the author and the reader can be created with the help of ellipsis, making both parties become collaborators in the discourse. Nonetheless, if readers do not have any background knowledge to infer, it might be hard for them to get the meaning of the elliptical text. The elliptical text is, therefore, not designed for all readers, but for those who can infer the meaning or bridge the gaps within the text. The intended readers are those who the author assumes can supply missing information or assumptions that support an argument in the text. In this way, to read elliptical texts, readers should draw on their own beliefs or knowledge so that they can find texts more meaningful.

It can be concluded from the linguists' perspectives mentioned above that ellipsis is an omission of words, usually presupposed, contextually recoverable, and employed to avoid repetition of the word(s) or situation(s) already mentioned.

2.2. Types of Ellipsis

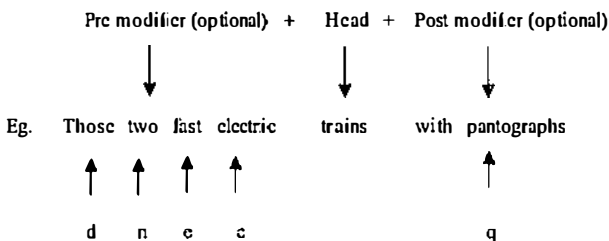
Two influential approaches to an overall classification of types of ellipsis have been those of Halliday and Hasan (1976) and Quirk, et al. (1985). Halliday and Hasan (1976) handle ellipsis in terms of how it occurs or is made possible while Quirk, et al. (1985) emphasise how ellipted elements can be recovered. So both groups propose and name the types of ellipsis differently. The classification of

ellipsis by Halliday and Hasan (1976, pp. 142-225) and by Quirk, et al. (1985, pp. 883-913) will be investigated and compared in this study.

For Halliday and Hasan (1976) ellipsis of a word or words is, as it were, an emptiness that replaces the word/s instead of repeating it/them. They classify ellipsis or the substitution by zero into three main types, nominal, verbal and clausal ellipses, each of which is sub-categorised and given detailed elaboration while Quirk, et al. (1985) present 9 types of ellipsis based on their recoverability, namely, strict ellipsis, standard ellipsis, quasi-ellipsis, situational ellipsis, ellipsis with short of criterion of unique recoverability, structural ellipsis, structural ellipsis without precise recoverability criterion, nonfinite clause with ellipsis of the relative pronoun and the verb 'be', and semantic implication. Some of the main concepts and categories of both schools are summarised and then compared as follows:

Halliday and Hasan (1976) recognize that ellipsis can occur within sentences, but this is not their concern, since their focus is on textual cohesion. Their description of the three main types of ellipsis (1976, pp. 142-225) is reviewed selectively (for the purposes of this research) below:

(1) Nominal ellipsis refers to ellipsis within the noun phrase or nominal group. Generally, a noun can be modified by a pre and/or post modifier. The structure of the nominal group, according to Halliday and Hasan (1976) looks like this:



(Halliday and Hasan, 1976, p. 147)

They point out that the modifier “consists of the elements Deictic (d), Numerative (n), Epithet (e), Classifier (c), and Qualifier (q) represented here by *those, two, fast, electric, and with pautographs* respectively” (1976, p.147). The Deictic is normally a determiner such as *this, that, these*, the Numerative a numerical or other quantifier such as *three, four a small amount of*, the Epithet an adjective like *good, green, beautiful* and the Classifier any noun that distinguishes the head it modifies from the other noun such as the word *electric* above. The qualifier is usually a prepositional phrase (like the one in the example above), a participial phrase or a relative clause.

Under certain circumstances the head noun may be omitted, causing one of the pre-modifiers to function as a Head word.

*Eg. <Five volunteer divers jumped into the river to find the body and
yet another ten (volunteer divers).>*

Nominal ellipsis is, therefore, any phenomenon in which a word functioning as any one of Deictic, Numerative, Epithet or Classifier is upgraded from the status of a modifier to the status of a Head. The main focus of Halliday and Hasan's attention is on the upgraded element which substitutes for the Head in the elliptical expression. This contrasts with the focus of Quirk, et al (1985), which is on the element which is missing, and how it can be recovered.

Regarding recovering the elliptical element, Halliday and Hasan (1976) suggest two ways of doing so:

- 1) simply push down the element functioning as Head, making it a modifier and add the missing Head in its place.
- 2) Keep the elliptical group as it is and add a partitive Qualifier.

(Halliday and Hasan 1976, p. 148)

Halliday and Hasan (1976)'s two suggestions to retrieve ellipted elements do not give much information in relation to the presupposed elements. By contrast, with reference to Quirk, et al.'s (1985) recoverability criteria and ellipsis types to be mentioned later, the ellipted word in the example sentence above can be retrieved as *'volunteer divers'* by looking at the preceding elements *'Five volunteer divers.'* The

clipped word is the exact copy of the element that comes before. Using Quirk, et al.'s (1985) principles of recovery, one can recover the omitted word right away, not having to keep in mind what part of speech the clipped word is or what each word preceding the noun is called.

Within Nominal Ellipsis, Halliday and Hasan (1976) propose 5 subtypes. They list the words under each subtype for use as the head when the noun head is clipped. The five subtypes of nominal ellipsis are 1) specific deictics, 2) non-specific deictics, 3) post deictics, 4) numeratives, and 5) epithets. Followings are some examples of each subtypes:

i) <The children got out of the house and locked the door. Both ^
forgot to bring the key with them.>

ii) <Which one do you want? Either ^>

iii) <I've used up these two diskettes you gave me. Can I use
the other ^?>

iv) <Have another chocolate? No thanks; that was my third ^.>
(Halliday and Hasan 1976, p. 161)

v) <Apples are the cheapest ^ in autumn.>
(Halliday and Hasan 1976, p. 164)

(2) Verbal Ellipsis. According to Halliday and Hasan (1976, pp. 167-196), verbal ellipsis occurs systematically, either leftward or rightward of the verbal group.

Eg i) <Have you been painting? Yes, I have ^.>

ii) <What have you been doing? ^ Painting ^>

Example i) is an ellipsis on the right or lexical ellipsis as called by Halliday and Hasan (1976). The lexical verb 'painting' which is on the right of the verbal group 'have been painting' is omitted in the answer 'yes, I have.'

In example ii) the auxiliary verbs or verbal operators, 'have been' which should have been on the left of the verbal group 'have been painting,' are clipped. Verbal ellipsis as in example ii) is referred to by Halliday and Hasan (1976) as operator ellipsis. By operator, they mean the initial component(s) of the verbal group

that operates the polarity, finiteness, modality, or tense of the sentence. In example *ii)* the operators of the verbal group are left out and the lexical verb remains intact or in the sentence.

The answers *'Yes, I have.'* and *'Painting'* do not fully express the semantic features of their own sentences. To recover both sentences, one must look at the presupposed sentences. The full form of the sentences should be retrieved as *'Yes, I have been painting.'* and *'I have been painting.'* Short or elliptical answers like these are normally used to ease the conversation. The interlocutors can understand each other without any trouble.

Halliday and Hasan (1976) say that the presupposition system of verbal ellipsis involves polarity, finiteness and modality, voice, and tense. By polarity, they refer to negative or positive polarity of the sentence. It usually remains intact in every verbal ellipsis.

E.g. <Were you studying? No, I wasn't. ^.>

(Negative pole)

<Dogs love bones. They don't ^, do they ^?>

(Negative and positive poles)

<Yes, they do ^ - Well some do ^ and some don't ^.>

(Positive, positive and negative poles)

For finiteness and modality, Halliday and Hasan (1976, p. 180) refer to the first word of the verbal group that expresses its finiteness or tense. For example, *'am, is, are, was, were'* are the finite forms of the verb *'be,'* and *'have, has, had'* are the finite forms of the verb *'have'* while *'shall, will, can, and so on'* represent their modality (called by Halliday and Hasan (1976, p. 180) modal operators). The first word, either a finite or a modal can be left intact in elliptical sentences.

E.g. <Has she finished writing the letter? Yes, she has ^.>

<Will they come? Yes, they will ^.>

In terms of voice, Halliday and Hasan (1976, p.182) say that it is expressed towards the end of the verbal group. Any verbal group containing some form of the verb 'be' or 'get' with the lexical verb in the past participle form expresses passive voice. If not, it is in active voice.

eg: *Was burnt, has been postponed, being seen, get caught* are in passive voice.

Burns, postponed, saw, catches are in active voice.

Ellipsis can be made possible with the different voices in the case that the subject of the presupposed sentence is the same as that of the elliptical one.

Eg <John has loved Mary for a long time- Or at least ^ been loved by her> (Halliday and Hasan 1976, p.183)

In the above example, the subjects of both sentences are the same which is 'John' but the voice is different. The first one is in the active while the second is in the passive. Under this condition, the subject and the first part of the verbal group can be ellipted, leaving a form of the verb 'be' and the lexical verb intact.

In regard to tense, Halliday and Hasan (1976, p. 190) claim that "a verbal group with lexical ellipsis must have either a tense that is fully explicit even in the elliptical form, or one in which lexical verb can be carried over unchanged from the presupposed group." The tense in the presupposed and in the elliptical sentences can be the same or different.

Eg.	Presupposed sentence	Elliptical sentence
i)	<i>I play badminton regularly.</i>	<i>Do you ^?</i>
	Present	Present
ii)	<i>He comes everyday.</i>	<i>But he didn't ^ yesterday.</i>
	Present	Past
iii)	<i>Has she met him yet?</i>	<i>No, but she will ^ soon.</i>
	Past in Present	Future
iv)	<i>Have you discussed it yet? -</i>	<i>No, we are ^ now.</i>
	Past in present	Present in present

v) *You have been forgetting every morning.*

Today you have ^ again.>

Present in past in present past in present

(Halliday and Hasan 1976, p. 189)

(3) Clausal Ellipsis. Some clauses that are presupposed can be ellipted. Halliday and Hasan (1976) discuss this type of ellipsis in terms of constraints on ellipsis most of which are basically concerned with oral interactive discourse and, since this is not relevant to the present study, which is concerned with the language of textbooks, it will be discussed briefly.

According to Halliday and Hasan (1976), the constraints embrace 1) modal and prepositional ellipsis, 2) no ellipsis of single element, 3) ellipsis in question-answer and other rejoinder sequences, 4) ellipsis in 'reporting-reported' sequences, and 5) clausal ellipsis and clause complexes, all of which are related to presupposed questions and elliptical answers.

Modal and prepositional ellipsis actually refers to operator and lexical ellipses which are verbal ellipsis. Halliday and Hasan (1976, p. 197) in treating these under clausal analysis are looking at them from another angle. They believe that these ellipses affect other elements in the structure of the clause. They say that English clause structure normally consists of two parts; a modal element and a propositional element.

Eg. <The Duke was | going to plant a row of poplars in the park .>
(Modal element) | (Propositional element)

(Halliday and Hasan 1976, p. 197)

When one asks for the information in the above sentence with the following:

i) <What was the Duke going to do?>

or ii) <Who was going to plant a row of poplars in the park?>

the answer clause can be ellipted as:

i) < ^Plant a row of poplars in the park >

ii) < The Duke was ^.>

Halliday and Hasan (1976) treat the answers *i)* and *ii)* as a modal/operator ellipsis and propositional/lexical ellipsis respectively both of which presupposed by the preceding questions. This is an overlap between verbal and clausal ellipsis.

Halliday and Hasan (1976) split the modal element from the propositional element right after the modal 'was' and in front of the lexical verb 'plant'. They see the modal element as consisting of the subject 'the Duke' in the example sentence plus the finite element 'was' in the verbal group, and they see the propositional element as consisting of the residue of the sentence (*going to plant a row of poplars in the park*). They claim that 'going to' is neither a finite operator nor lexical verb, so it can be omitted in both answers. On the basis of this explanation, it would be hard for anyone to retrieve such ellipted elements.

Modal ellipsis, according to Halliday and Hasan (1976, p. 198) occurs in response to a Wh-question while propositional ellipsis in responses to statements and yes/no questions.

With respect to 'no ellipsis of single element,' Halliday and Hasan (1976) attempt to explain the phenomenon in which some single elements cannot be presupposed or omitted.

Eg <Has she taken her medicine?>, (Halliday and Hasan 1976, p. 202)

We can answer neither:

<She has taken her.>

nor:

<She has taken.>

Rather we should say:

<She has taken it.>

or just:

<She has>

Halliday and Hasan (1976, p. 205) say in this case that "it is not possible to omit single elements from the structure of the clause. If a single element of a clause is to be presupposed, it might be expressed by a reference item" in the elliptical sentence.

That is to say, substitution may be required as in the answer <*She has taken it.*> So they do not treat this as a subtype of clausal ellipsis.

Regarding 'ellipsis in question-answer and other rejoinder sequences,' Halliday and Hasan (1976, pp. 206-208) define a rejoinder as "occurring when any statement by one speaker, whether it is a question or not, is followed by a cohesive or related rejoinder by another speaker." A rejoinder which follows a question is termed a 'reponse.' Both rejoinders and responses can be elliptical.

For ellipsis in 'reporting-reported' sequences, Halliday and Hasan (1976, pp. 219 - 222) say that the reporting or reported clause can be elliptical and the elliptical form can be zero.

In regard to 'clausal ellipsis and clause complexes,' Halliday and Hasan (1976, pp. 222-225) do not treat this matter in full. They propose that the clause that is presupposed by another clause in a paratactic clause complex (compound sentence) or a hypotactic clause complex (complex sentence) can be ellipted. There are a number of restrictions and limitations on this principle, as well as ambiguity. It needs some factors to help interpreting this ellipsis.

Quirk, et al.'s (1985) categorization of ellipsis is independent of the overall framework used by Halliday and Hasan (1976) to study cohesion. In their system, each type of ellipsis is distinguished from the others systematically using the criteria they have set out from their in-depth investigation of ellipsis phenomena. Their criteria are based on the principle of what they call "verbatim recoverability." They are as follows:

Criterion (a). The ellipted words are precisely recoverable either because they are the exact copies of the presupposed elements or because the same lexical word as that which is missing is presupposed. By the same lexical word, it means the same word but not necessarily the exact copy of it.

Eg. <*She cant sing tonight, so she wont ^.*>

(Quirk, et al.1985, p. 884)

This sentence can be recovered as:

<She can't sing tonight, so she won't sing tonight.>

(Quirk, et al.1985, p. 884)

The exact copy of the presupposed word 'sing' is precisely recovered. Compared with the above example, the one below is also precisely recovered but the retrieved word is not necessary exactly the same as the presupposed one.

Eg. *<She rarely sings. so I dont expect that she will ^ tonight >*

<She rarely sings, so I dont expect that she will sing tonight >

(Quirk, et al.1985, p. 887)

The presupposed word is 'sings' but the recovered is 'sing' without 's'. So under this criterion Quirk, et al. (1985) must have placed emphasis only on the precise or unique (lexical) recovery not on only the exact copy (including grammatical morphemes), which is different from criterion (c).

However, Quirk, et al. (1985) say that omitted words under this criterion can sometimes be ambiguously recoverable.

Eg. *<If he comes, I wont have to ^ >*

(Quirk, et al. 1985, p. 884)

It is certain that 'comes' is omitted, and 'come'' without 's' should be recovered. But in a case like the one below, such recovery can be false, though the correct words are still precisely recoverable.

A: You have to solve this problem.

B: If he comes, I wont have to (solve this problem).

Only the presupposed elements were not enough to infer the meaning. It is necessary to look at the context to assist the recovery So Quirk, et al. (1985) propose criterion (c) to solve this problem.

Criterion (b). The elliptical construction is grammatically 'defective.' If the recovering of the exact copy of the presupposed element is made, the sentence will be grammatically awkward, twisted or wrong.

Eg. *<Visit me tomorrow, if you wish ^.>*

(Quirk, et al. 1985. p. 885)

The recovered sentence will be:

<Visit me tomorrow, if you wish visit me tomorrow>

if the exact copy is applied. And so it is grammatically wrong. But in grammatical sentence it should be recovered as:

< Visit me tomorrow, if you wish to visit me tomorrow>

(Quirk, et al.1985, p. 884)

'to' must be inserted between *wish* and *visit* to make it grammatically correct.

Criterion (c). The insertion of the ellipted element results in the grammatical sentence with the same meaning as the original sentence. That is, if the missing words are inserted, the sentence will be grammatically correct and the meaning of the inserted sentence will remain the same as its original one.

Eg. *<He always wakes up earlier than I[^]>*

(Quirk, et al.1985, p. 886)

When the ellipted wake up is inserted, the sentence is grammatically correct.

<He always wakes up earlier than I wake up>

(Quirk, et al.1985, p. 884)

Compared with the above example, even though the sentence below is also grammatical, it does not seem to involve ellipsis.

<He always wakes up earlier than me[^]>

<He always wakes up earlier than me wake up>

(Quirk, et al.1985, p. 886)

It needs some change in order to be grammatically correct with the elliptical words. 'me' should be changed into 'I,' However this criterion does not allow any change.

Criterion (d). The missing word(s) are textually recoverable. The text or context can help the readers or interlocutors to recover the ellipted words.

Eg. *<In the confusion of the evacuation, many lifeboats left the Titanic half empty. This was partly because Captain Smith and his crew found it difficult to persuade people to leave the unsinkable Titanic*

Many ^ were terrified at the idea of being lowered
down into the sea in a tiny lifeboat.>

(Oxenden and Latham-Koenig, 2000, p. 107)

The ellipsed word in the underlined sentence is 'people.' Even though the word 'lifeboats' seems to be one of the alternatives for the ellipsed word since the omitted word also follows the word 'many.' But when reading through the text, readers can figure out that the omitted word is 'people' not 'lifeboats.' So the full form of the sentence is

< Many people were terrified at the idea of being lowered
down into the sea in a tiny lifeboat >

Criterion (c). The missing words are the exact copy of the presupposed ones. Actually, for this criterion, Quirk, et al. (1985, p. 887) say "the missing words are present in the text in exactly the same form." In criterion (a), it is said in their explanation of the first example that "the ellipsed words are precisely recoverable (Quirk, et al.1985, p, 884). So both criteria (a) and (c) seem to cover much the same ground. But they distinguish (a) from (c) in that criterion (a) subsumes criterion (c). Criterion (c) is more specific than (a) in that the recovered element must be an exact copy (including grammatical morphology) of the antecedent. So the example below would best illustrate criterion (c).

Eg. < She can't sing tonight, so she won't ^.>

It can be recovered as:

< She can't sing tonight, so she won't sing tonight .>

(Quirk, et al.1985, p. 887)

On the other hand, the following example satisfies criterion (a) but does not satisfy criterion (c), since the exact copy is not grammatical.

Eg. <She rarely sings, so I don't think she will sing/*sings tonight.>

Quirk, et al. (1985) use these 5 criteria to classify ellipsis into 9 types as follows:

(1) Strict Ellipsis: In this kind of ellipsis, all five criteria are required. That is, 1) the omitted element must be precisely recoverable; 2) the sentence is defective when supplying the missing element, 3) the insertion of the missing expression results in a grammatical sentence with the same meaning as the elliptical sentence, 4) the omitted element can be recovered from the context, and 5) the missing element is an exact copy of the antecedent.

Eg. <I'm happy if you are ^.>

(Quirk, et al. 1985, p. 888)

This sentence can be retrieved as:

<I'm happy if you are happy.>

The omitted word is exactly the same as the presupposed word 'happy'.

(2) Standard Ellipsis. The elliptical sentence of this type can be recovered with the help of the presupposed element, but the ellipted word is not an exact copy of the presupposed. Only 4 criteria are satisfied for this type. Criterion (e), the 'exact copy' criterion, is not compulsory.

Eg. <She sings better than I can ^.>

(Quirk, et al. 1985, p. 889)

The sentence cannot be expanded as:

<*She sings better than I can sings.>

since only the infinitive verb can follow the modal verb 'can.' So 'sing' is the correct word to be recovered. 'sing' is not an exact copy of the presupposed element, which is 'sings.'

(3) Quasi-ellipsis. This ellipsis is, according to Quirk, et al. (1985), less strict because the full form of the sentence can be recovered on the condition that some

changes must be made. Quirk, et al. (1985, p. 889) prefer to treat this ellipsis as a case of substitution rather than ellipsis, and it should be called as such.

Eg. <She works harder than him ^.>

(Quirk, et al. 1985, p. 888)

We have to change object pronoun 'him' to 'he' first to recover the elliptical word. So the full form is:

<She works harder than he works.>

It cannot be:

< *She works harder than him works.>

It can be assumed from Quirk, et al.'s (1985) point of view that 'him' is a substitution for 'he works.' They, therefore, agree to push the sentences of this kind into a substitution group.

(4) Situational Ellipsis. This type of ellipsis does not satisfy criteria (d) and (c). The recovery of the ellipted element can be made only with the help of the situation at the moment of speaking.

Eg. <^Glad to see you.>

(Quirk, et al. 1985, p. 888)

The above sentence can be retrieved as:

<I'm glad to see you.>

if it is known that that one party is talking to another one.

(5) Quirk, et al. (1985) do not have a name for this type. They explain that **this type is "short of the criterion of unique recoverability (a), because various conjunctions, or alternatively a non-finite verb, could be inserted"** (1985, p. 889). This type of ellipsis cannot be recovered by using structural words.

Eg. <^Angry, he stalked out.>

The recovered elements can be either:

<Since he was angry, As he was angry, or Being angry etc.>

(Quirk, et al. 1985, p. 889)

(6) Structural Ellipsis. This type of ellipsis can be recovered with the help of the structure of the sentence.

Eg. <I believe ^ you are wrong >

The sentence can be recovered as:

<I believe that you are wrong >

(Quirk, et al. 1985, p. 888)

Structurally the word 'that' is a conjunction combining the sentences:

I believe something and *You are wrong* together

(7) Structural Ellipsis without Precise Recoverability Criterion. This ellipsis can be recovered structurally but the ellipsed word can be either one from the particular structural set. In this type, the ellipsed word must be the relative clause conjunction only

Eg. <The man ^ I saw was half asleep >

An alternative relative pronoun, *that*, *who* or *whom*, could be used to obtain the full form of this sentence as shown below:

<The man that / who / whom I saw was half asleep >

(Quirk, et al. 1985, p. 888)

(8) Nonfinite Clause with Ellipsis of the Relative Pronoun and the Verb 'Be.' This type of ellipsis occurs when a noun is modified by a relative clause containing a form of 'be' (is, are, was, were) as an auxiliary verb. Then the relative pronoun and the auxiliary 'be' are omitted.

Eg. <Houses ^ owned by Mr Smith are very luxurious.>

The recovery can be:

< Houses (that/which are) owned by Mr Smith are very luxurious >

(9) Semantic Implication. Quirk, et al. (1985, p. 889) say that this type of ellipsis is "the endpoint of the ellipsis gradient." They claim that it does not really fit

any kind of ellipsis and should not be placed in any category at all. It is rather a case of semantic implication.

Eg. <The door opened and ^ Mary entered.>

It may be retrieved as:

<The door opened and then / after that / Mary entered.>

(Quirk, et al. 1985, p. 888)

Quirk, et al. (1985) give some examples to summarise how to apply the criteria they set to classify elliptical sentences systematically as illustrated in the table below.

Table 1: Application of the criteria to classify elliptical sentences

(a)	(b)	(c)	(d)	(e)	
+	+	+	+	+	(1) I'm happy if you are (happy).
+	+	+	+	-	(2) She sings better than I can (sing).
+	?	-	+	(+)	(3) She works harder than him (*works).
+	+	+	-	0	(4) (I am) Glad to see you.
-	+	+	+	-	(5) [(Since he was) Angry, he stalked out. (Being) }
+	'?	+	-	0	(6) I believe (that) you are wrong.
-	+	+	-	0	(7) The man (that/who/whom) I saw was half asleep.
-	?	+	-	0	(8) Houses (that/which are) owned by Mr. Smith
-	-	+	-	0	(9) The door opened and (then, after that) Mary entered.

(Quirk, et al. 1985, p. 888)

Nine sentences in Table 1 represent 9 ellipsis types accordingly. The number in front of each sentence, [(1), (2), (3), and so on.] indicates the ellipsis type while the bracketed letters (a), (b), (c), (d), and (e) at the above left of the table represent the criteria as follows:

- (a) The missing expression is precisely recoverable.
- (b) The elliptical construction is defective.
- (c) The insertion of the missing expression results in a grammatical sentence with the same meaning as the elliptical sentence.
- (d) The missing expression is recoverable from the neighbouring text (rather than from the structural or situational context).
- (e) The missing expression is an exact copy of the antecedent.

(Quirk, et al. 1985, p. 888)

In Table 1, there are also symbols or marks +, -, ?, (+), and 0 under each column of criteria in front of each elliptical sentence indicating whether or not each criterion is satisfied. The symbols are to be interpreted as follows:

- + criterion satisfied
- criterion not satisfied
- ? doubt as to satisfaction of criterion
- (+) criterion satisfied subject to some grammatical change
- 0 criterion not applicable (Quirk, et al. 1985, p. 888).

It can be seen from Table 1 that the ellipsis in sentence type 1 satisfies every criterion, all of which are marked with +. In type 2 elliptical sentence, criterion (c) is not satisfied because the retrieved word 'sing' is not an exact copy of its antecedent. For elliptical sentence type 3, according to Quirk, et al. (1985), there is doubt about the satisfaction on criterion (b) which is that the elliptical construction is 'defective.' It is uncertain whether the exact or the inexact copy should be recovered as there is no grammatical sentence as such (*She works harder than him *works*). That is why Quirk, et al. (1985) prefer to treat this kind of ellipsis as a substitution. They, therefore, leave a slot in doubt. And for criterion (c), they put (+) in, indicating that the criterion would apply if a grammatical change is made. If 'him' is changed to 'he,' criterion (c) would be applicable because the exact copy of the antecedent 'works' will be inserted.

The example sentence of ellipsis type 4 in Table 1 satisfies criteria (a), (b), and (c), but not (d) because the ellipsed element cannot be recovered from the neighbouring context. Instead the situation helps the retrieval. As to criterion (c), Quirk, et al. (1985) view it as inapplicable.

Type 5 example sentence $\left\{ \begin{array}{l} \text{(Since he was)} \\ \text{(Being)} \end{array} \right\}$ *Angry he stalked out* according to Quirk, et al. (1985), satisfies criteria (b), (c), and (d), but not (a), and (e). The ellipsed expression cannot be recovered precisely, since there is no antecedent. Actually the situation is almost the same as that of the previous example, although for it, but not for Type 5, they give 0 to criterion (c). It could be argued that they should treat these two sentences equally. But they do not. It is possible that the Type 5 example contains 2 clauses and that the ellipsed expression can partially be assumed structurally using the following clause. In addition, the element recovered is not the exact copy of the supposition. So it does not satisfy criterion (c).

Type 6 sentence in Table 1, which reads "*I believe (that) you are wrong,*" satisfies criteria (a) and (c) because the omitted element can precisely be retrieved, using a structural word. The recovered construction is grammatically correct. But for criterion (b), Quirk, et al. (1985) put ? in, indicating that there is doubt whether supplying the ellipted element will result in a defective construction or not. And for criterion (e), 0 is given as there is no antecedent. So the criterion is not applicable.

The example sentence of ellipsis type 7 in Table 1 satisfies criteria (b) and (c) but not (a) and (d). The sentence reads "*The man (that / who / whom) I saw was half asleep.*" The recovered construction, according to Quirk, et al. (1985), is defective and the insertion of the ellipted word does not make the sentence grammatically wrong. Since there is no antecedent, the omitted element cannot be found in the neighbouring context. That is why it does not satisfy criterion (a). In addition, criteria (d) and (e) are not applicable.

With respect to the example sentence of ellipsis type 8 (Table 1), the marks or remarks given are almost the same as those of sentence 6 except for that of criterion (a). The retrieved element does not satisfy criterion (a) because it cannot precisely be recovered in spite of using structural word. There are more than one group of words that can be inserted.

The last sentence in Table 1 satisfies only one criterion (c), i.e. "the insertion of the missing expression results in a grammatical sentence with the same meaning as the elliptical sentence" (Quirk, et al. 1985, p. 888). This sentence is not considered a case of ellipsis but of semantic implication (p. 889).

Regarding the similarities and differences in the treatments of ellipsis described by Halliday and Hasan (1976), and by Quirk, et al. (1985), it was found that both of them try to cover a wide range of ellipsis phenomena. Both agree that ellipsis is the omission of some words in sentences and realise that ellipsis occurs in a variety of forms. They attempt, however, to classify ellipsis on different criteria derived from their particular interests, assumptions and purposes.

Halliday and Hasan (1976, p. 146) are "interested in ellipsis as a form of relation between sentences, where it is an aspect of the essential texture." They recognize that ellipsis can occur within sentences, but this is not their concern, since their focus is on textual cohesion. On the contrary, Quirk, et al. (1985) are interested in the recoverability of ellipsis and they set out precise criteria to show how this may be achieved. This limitation of Halliday and Hasan's (1976) treatment to inter-sentence cohesion, while relevant to their purpose, makes their analysis less applicable to the present research which is concerned with both ellipses either inter-sentential or intra-sentential, which may occur in textbooks.

Halliday and Hasan (1976, p. 143) treat ellipsis as a kind of substitution and classify it as substitution by zero, which is appropriate to their attempt to provide a unified account of cohesive features. Quirk, et al. (1985) treat ellipsis in its own right and attempt to show how it operates from the point of view of the listener or reader. Halliday and Hasan (1976, p. 144) pay attention only to instances where the ellipsis is anaphorically presupposed rather than exophoric, whereas Quirk et al (1985) do include consideration of exophoric (situational) ellipsis.

Taking Quirk, et al.'s (1985) criteria, classification and explanation of ellipsis types, and examples of how to apply the criteria to classify elliptical sentences into consideration, the researcher found that Quirk, et al.'s (1985) principles are very systematic in terms of classification by recoverability. As this study is mainly focused on the students' ability to recover elliptical elements in the textbooks, not on how ellipsis occurs as such, the researcher chose to follow Quirk, et al.'s (1985) principles because it would serve the purposes of the study, which were to investigate the students' ability to interpret and recover elliptical sentences as well as ability to recognise elliptical elements. Furthermore this study attempted to find out which kind of elliptical sentence was most / less / least problematic to students so that assistance in the matter could be provided for students in their English language classes. Consequently, Quirk, et al.'s (1985) is most appropriate framework to use as a basis for this study.

With respect to the types of ellipsis to be studied, the researcher will do a preliminary examination to find out the frequency of 7 ellipsis types; namely, strict ellipsis, standard ellipsis, situational ellipsis, ellipsis with short of criterion of unique recoverability, structural ellipsis, structural ellipsis without precise recoverability, nonfinite clause with ellipsis of the relative pronoun and the verb be. Quasi ellipsis and semantic implication are excluded from the study because, according to Quirk, et al. (1985), they are not treated as ellipsis. If any type of ellipsis is found very rare as some types may occur in situations other than in the textbooks of science and technology, the researcher restricted herself to investigate fewer types but more items up to 30.

2.3. Ellipsis in the Thai Language

As the subjects of this research are students whose mother tongue is Thai, it is essential to include a review of literature on ellipsis in the Thai language in this thesis. It is to be expected that the respective ellipsis systems of L1 and L2 will have some features in common and some different, probably affecting students' ability to understand L2 ellipsis. So this part will present the main features of Thai ellipsis according to Thai scholars and the researcher herself.

Before going into details, it is necessary to give a brief overview of some characteristics of the Thai language. Thai is a tonal language. There are five tones; SAMAN (middle tone), EK (falling tone), TO (rising-falling tone), TREE (rising tone), and JATAWA (falling-rising tone) (Gandour 1979). Only four tone markers are applied above the initial or the second consonant (if clustered) of a word. Those markers are MAI~ EK, MAI~ TO (the vowel 'o' of the word 'TO' is pronounced almost the same as that of the English word 'so'), MAI~ TREE (t-unaspirated) and MAI~ JATAWA. The word MAI~ here literally means a marker. SAMAN tone does not need any marker. In this thesis, the four tone markers are represented by ', ~, *, and + respectively, each of which will be placed at the end of the syllable or word with the tone in the Romanised Thai.

With respect to ellipsis in the Thai language, Bandhmedha (1982) is the only Thai linguist who has attempted to classify it. According to her, ellipsis is divided into 3 types, nominal, verbal and clausal ellipsis. (c.f. Halliday and Hasan (1976)).

(1) Nominal Ellipsis. This type of ellipsis refers to the omission of the repeated noun, noun phrase, or noun with preposition in the front or pronoun which is presupposed. Some examples of nominal ellipsis in the Thai language cited by Bandhmedha (1982) are provided below. They are Romanised (RT) and translated by the researcher. The Romanised Thai is provided to facilitate the reading of those interested in this research who are not able to read phonetic symbols. Apart from the RT, the interlinear gloss (IG) and literal translation (LT) with ellipsed portions bracketed where necessary are provided. Following are some examples of Thai nominal ellipsis. Due to the length of some sentences, two lines may be needed to complete each sentence.

Example 1

RT: Nid bok wa' ja pai rongrien tac' kmi

IG: Nid say that will go school but who

RT: ja i u- wa' ja pai rue mai' pai

IG: will know whether will go or not go

LT: Nid said that (she) would go (to) school but who knows whether (she) will go or not.

The subject '*she*' in the two embedded clauses refers to the presupposed *Nid*. It can be omitted because listeners can understand automatically who would go to school. If the subject of the clause is not *Nid*, ellipsis is impossible. In Thai the preposition '*to*' is not required after the verb '*pai*' (*go*), but it is required for some other verbs such as *send*, *give*, *deliver*, *talk* or *speak*, and its meaning varies. We say '*go school*' instead of '*go to school*.' Unlike English, Thai verbs do not undergo any change of tenses and plurality. There is only one form of each verb. Tenses are operated by inserting more words, such as an auxiliary verb '*ja*' (=will) before the lexical verb in the sentence to indicate the future tense, a post verb "*um*" or "*laew*" to indicate the past tense, etc.

Example 2

RT: panha pu~ oppayop pen panha yai' yang
IG: problem refugee is problem big yet
RT: mai' mee krai samart kac'kai dai~
IG: not have who can solve
LT: Refugee is (a) big problem. No one can solve (it) yet.

The object 'it' after the verb 'solve' is ellipted. In the Thai language, adjectives are placed after a noun they modify and punctuation marks are not required.

Example 3

RT: Chan ja mai' hai~ Noy~ yuem pakka kongchan iklaw~
IG: I will not let Noy~ borrow pen my any more
RT: kaw tam kongchan haiy pai lai~ dam~ lacw~
IG: She has mine/my lost many already
LT: I will not let Noy~ borrow (or lend Noy~) my pens any more.
She has lost many of mine (or my pens).

The word '*pens*' in the second sentence is ellipted. In counting anything, a classifier is needed after the number. Different nouns have different classifiers. In this sentence '*dam~*' is a classifier of a pen.

Example 4

RT: kon tee' kaw chob mai' ma ma tee' tee'
IG: one that she like not come come only whom
RT: mai' chob
IG: not like
LT: (The) one whom she likes did not come. Only (the one) whom (she does) not like come.

There is no article in the Thai language. In example 4, 'the one' and 'she' in the second sentence can be ellipted as they were presupposed in the preceding sentence.

Example 5

RT: pai tam dekdek ma chan ja jak ngem
IG: go fetch children I will give money
LT: Fetch (the) children. I will give (them) money.

The word *ma'* in Thai is a post verb used in this case to modify the verb indicating the direction towards the speaker, *ma'* is also a post verb indicating the past tense as mentioned above but not in this sentence.

Example 6

RT: kaw nang' kaw-ee~ tua yai'
IG: He sit chair big
LT: He sits (on a) big chair.

Example 7

RT: kaw hai~ ngem nong-chai puen'
IG: He give money brother friend
LT: He gave (his) money (to his) friend('s) brother.

The ellipted elements can be understood with the help of the context preceding or following the verbs. The relationship between a word in the sentence and the ellipted element can also indicate what is ellipted. In example 7, the possessive adjectives, 'his' in two places and 's', and the preposition 'to' are ellipted. This sentence can be ambiguous in Thai because it may mean 'he gave his friend's brother's money to someone.' And the word to someone is omitted. So in this case, it is rather certain that he gave his money to his friend's brother. The word 'to', meaning 'kae'' or 'wae'' in Thai is ellipted. Whether the possessive 's' or 'of' which means 'kong' in Thai is ellipted or not depending on the speaker. Actually the full form of this sentence in Thai should read:

RT: kaw hai~ ngem kongkaw kae' nong-chai kong puen'
IG: He gave money his to brother of friend
LT: He gave his money to his friend's brother.

Example 8

RT: Dang tuk jab

IG: Dang he arrest

LT: Dang was arrested (by the police)

The word 'tuk' is equivalent to every form of the auxiliary 'be' in an English passive voice sentence. Thai passive voice with the auxiliary 'tuk' is always used with something unsatisfactory such as 'was arrested, was caught, was punished, was scolded, was killed, etc. For the above example, according to Bandhmedha (1982), it is understood that the omitted part is 'by the police.' However, ambiguity can occur in Thai elliptical sentences in spite of the presence of the surrounding context. '*Dang tuk jab*' may mean '*Dang was caught by some bandits*,' depending on the situation and interlocutors' knowledge of the situation. But in this case, it should be generally inferred that Dang was arrested by the police. Thus this sentence may not be called elliptical sentence because the operator of this sentence can be inferred from the verbal group. This, according to Quirk, et al. (1985) would rather be considered as semantic implication. Or it may be called ston passive.

Example 9

RT: Pan kid wa' bok Toom' laew~ wa' dai~ rangwan

IG: Pan think that tell Toom' already that get reward

LT: Pan thought that (he) had already told Toom' that (Pan/Toom)
had got (a) reward.

The subject of 'had got a reward' is ellipted causing an ambiguity of who had got the reward, Pan or Toom'.

(2) Verbal Ellipsis. Bandhmedha (1967) said Thai finite verbs cannot be omitted, but later in her 1982 study, she found out that they could in certain cases. Phukbhasuk's (1980) research relating to verbal ellipsis in Bangkok people's conversation revealed its existence. However, verbal ellipsis is very rare and less common in the Thai language than in other languages (Bandhmedha 1982). It can occur only when a verb is mentioned in the first sentence. The same verb in the

second sentence can be omitted but its auxiliary, adverb or adverbial phrase must be retained.

Example 10

RT: Pom~ kuey kin persinunou tac' Lek mai kuey

IG: Pom~ used to eat persimmons but Lek not used to

LT: Pom used to eat persimmons but Lek (did) not use to (eat persimmons.)

(3) Clausal Ellipsis. Clausal ellipsis can be most understood from the context but sometimes it can cause ambiguity.

Example 11: A conversation between A and B

RT: A: Pai kin kao kantue B: tee' nai

IG: A: go eat rice let's B: Where

LT: A: Let's go (to) eat. B: Where (shall we go to eat?)

Example 12: A conversation between a mother and a daughter

RT: Mom: doolac ban doiy~na mac' ja k'rab cha~

IG: Mom: Take care of house mother will come back late.

LT: Mom: Take care of (the) house. I will come back (home) late.

RT: Daughter: ru laew~

IG: Daughter: know already

LT: Daughter: (I) already know (that I have to take care of the house / that you will come back home late)

Example 11 is certainly not ambiguous while example 12 is. I know what? - that I have to take care of the house or that the mother will come back home late.

It can be seen that many elliptical sentences in Thai are different from those in English. A lot more words can be omitted such as the pronoun subjects representing both interlocutors. Our typical greeting in Thai best illustrates this claim. Thai people always greet each other when they meet while walking 'pai nai

ma" (Where have you been?) without expecting any particular answer. *'jai'* means 'go,' *'nai'* means 'where' And *'ma'* is the post verb indicating the past tense. The subject of the sentence is ellipted since it is understood that the listener is asked. Another greeting is *'pai nai (a/ja/ka/krab)'* (=Where are you going?). *'a, ja, ka, or krab'* is sometimes inserted to make the sentence more polite or softer. *'a'* (with a falling tone) and *'ja'* (with a rising tone) is informal and can be used by both men and women while *'ka'* must be used by women and *'krab'* by men. Both are in rising tone. They are more formal. Again this greeting contains no subject. A typical answer to the first question is *"plaw, pai talad ma"* [No, (I haven't gone anywhere) I've been to the market, (or wherever the person has gone)], and the answer to the second question is *"plaw, pai talad"* [No.(I'm not going anywhere.) I'm going to the market.] *'talad'* means 'market.' People usually go to the market. So we can always hear such an answer. Nevertheless it can be replaced with any nouns indicating places. Most Thai people like to start answering most questions with the *'plaw'* which is equivalent to the English word 'no.' But by *'plaw'*, the speaker does not mean to deny what he / she has done. It does not mean anything but showing some reluctance to answer the question. With any kind of answers, the subject of the sentence is usually ellipted.

However, as a result of the influence of western cultures, the form of greeting in Thai has been changed among some groups of people, especially, educated people, businessmen, and officers. They greet, *"sawat dee ka' /krab"* (This can be used for greeting any time we meet) first followed by *"sobai dee rue"* (Are you fine? It is equivalent to 'How are you?'). *'Sobai dee'* means fine. And *'rue'* is a yes/no question word. The subject of the sentence is omitted. It can be concluded that in Thai the pronoun subject for the speaker and listener can be ellipted most of the time.

The difference between Thai and English ellipsis is suspected to have interfered with the students' ability to understand English elliptical sentences. According to Ross (1975), understanding ellipsis involves semantics and the encoding of knowledge contained or not contained in them. Thus it is necessary to take the Thai language, especially elliptical sentences into consideration in this study.

3. Research and Articles on Ellipsis

Most research and articles related to ellipsis have investigated the nature of ellipsis in languages from a linguistic perspective. Very few studies have been conducted to find out its effect on listeners' or readers' understanding of the language. The following are some that partially give light on the present study.

Regarding the occurrence and interpretation of ellipsis, Hawkins (1986) found that ellipsis occurs more in the English language than in German and causes more ambiguity. Allen (1995, pp. 450-451) claims that ellipsis may occur in a series of questions. To interpret such ellipsis, structural correspondence between the presupposed sentence and the elliptical sentence must be established. When the relationship between the two is identified, interpretation can be made possible. However, in certain cases, structural correspondence alone may not be enough; background and world knowledge must be induced to achieve correct interpretation. Not all elliptical sentences can be interpreted or recovered even with the help of everything mentioned earlier. Placencia (1995), in her study on explicitness and ellipsis as features of conversational style in British and Ecuadorian Spanish, says that as ellipsis involves reduction of words, the deletion of more words can lead to ambiguity. She agrees with Halliday and Hasan's (1976) proposal that reduction of words can be made as much as possible except for where this may lead to unclarity as it can cause difficulty in interpreting, misinterpretation, as well as misunderstanding. Placencia (1995) found that more anaphoric and exophoric elliptical sentences were used in conversation by English speakers. Only in certain types of interaction, Ecuadorians were fond of a fast and different style. They, therefore, used ellipsis but it seemed too abrupt to the English speakers. Other than this Ecuadorians preferred a less hurried style than the English.

Difficulty of understanding ellipsis is evidenced by Kato's (1986, pp. 415-444) research which explored and analysed situation ellipsis in which most of his example sentences satisfied Quirk, et al.'s (1985) three criteria which are (a) The missing word is precisely recoverable, (b) The elliptical construction is grammatically defective, and (c) The insertion of the missing expression results in a

grammatical sentence with the same meaning as the elliptical sentence. Even though situation ellipsis was not included in the present study, what has been found in relation to such ellipsis throws light on this study. It deserves to be mentioned.

The sentences Kato (1986) selected are, as he claimed, easily recovered by native speakers with the help of their accumulated knowledge and familiarity with the language. But when they were tested with the non-native speakers, they were found not to be so. Below are some example sentences he proposed.

Mrs Cleveland: All right, ladies, the minutes of the previous meeting have been read. May I have a motion for approval?

Mrs Jones: I make a motion that the minutes be approved.

Mrs Taft: I second it.

Mrs. C: All in favor?

All: Aye

Mrs. C: All opposed? None. Very well. The minutes are approved us read...

(Richard Freeman, *English English*, cited by Kato 1986, p. 422)

The underlined parts of the conversation can be recovered as:

1. *Are you all in favor?* which might have been ellipted from:
All (those who are) in favor (of the motion), (please signify by answering 'aye')
2. *Are you all opposed?* which might have been ellipted from:
All (those who are) opposed (to the motion), (please signify by answering 'no.')

(Kato 1986, p. 422)

However, there are no antecedents or presupposed words in the neighbouring context in the example sentences. According to Kato (1986), the non-native English speakers found it hard to process and recover the elliptical elements especially those that formed collocations. To retrieve such elements, one had to integrate common sense,

linguistic and world knowledge together and exploit all of them to overcome the ellipsis problem (Kato 1986, McAnther 1988, Garnham and Oakhill 1992, Hardison 1992, Grant-Davie 1995). Kato (1986) claims that recoverability of ellipsis is a critical problem especially when non-native speakers have to read authentic materials or listen to native speakers. A number of elliptical sentences cannot be literally interpreted, especially those with antecedents or clues hidden somewhere far away or with none of them. They need some sources or clues to solve the problem. This also be more difficult in the case of a conventional formula, as here.

With respect to the reference sources or clues, distance between them and the elliptical sentences plays a crucial role in the achievement or failure of recoverability and interpretation of ellipsis. Like Kato (1986), Garnham (1987) found in his study on "Effects of Antecedent Distance and Intervening Text Structure in the Interpretation of Ellipses" that an elliptical verb phrase is most easily interpreted if its antecedent is in the immediately preceding sentence. On the contrary, it is harder to interpret elliptical passages with distant antecedents (Fazilatfar 1999, Garnham and Oakhill 1992)).

Momouchi's (1986, pp. 267-285) finding from his study on on-line ellipsis and topic structure in Japanese elementary school textbooks is also in accordance with that of Kato. (1986) in that the students had to integrate information from previous context, structural information about topics in the text, and cohesion of sentences into the process of elliptical element restoration.

With regard to the process of recovering ellipted elements, Shapiro and Hestvik (1995, pp. 517-532) undertook two experiments to investigate the time used in processing verb phrase ellipsis in compound sentences, or coordinated VP-ellipsis as called by them, and in complex sentences, or subordinated VP-ellipsis. They recorded ten sets of spoken paragraphs each of which had a VP-ellipsis construction inserted as the last sentence. The lexical decision probes were given in either positions [1], [2], or [3], in the elliptical sentence for the subjects to decide whether they either "semantically related to their antecedents, were unrelated, or were

orthographically legal non-words." (Shapiro and Hestvik 1995, p. 523) their paragraphs with coordinated VP ellipsis look like this:

Last night there was a fire in a downtown building. One person was injured and there was some question about whether the policeman or the fireman who were both present at the scene were to blame for the injury. The two who were buddies, were being confronted with the charges. The policeman defended himself, and the fire [1] man did [2] (too), according to someone [3] who was there.

(Shapiro and Hestvik 1995, p. 523)

For the subordinated VP ellipsis, the same paragraphs were applied but the word 'and' in the last sentence was changed into 'because.' The experiments revealed that the subjects could choose the probe immediately in the coordinated VP ellipsis. But in the subordinated VP-ellipsis, they had to spend more time. Shapiro and Hestvik (1995, p. 530) concluded "different time courses of activation occur depending on the type of relation between two clauses"; i.e. "gap-filling is immediate when it involves a structural operation, but is delayed when additional semantic factors are involved" (p. 518). Like Allen (1995), Shapiro and Hestvik (1995) treated the phrase like 'and the fire man did too' as ellipsis and called it VP ellipsis while the others like Halliday and Hasan (1976), Quirk, et al. (1985), Huddleston and Pullum (2002) would rather put it in the category of substitution. Nonetheless, Shapiro and Hestvik (1995) revealed the subjects' hesitation in picking up the ellipted element whether it is that the fireman defended himself too, or that the fireman defended the policeman too when the conjunction 'and' is changed. This implies that the recovery of ellipted elements is likely to be more difficult in the complex sentences in which ambiguity is interfered.

As for ellipsis in reading text, one of the main characteristics of textbooks is conciseness (Grant-Davie 1995). To make the text concise, the author usually omits as many words as possible, assuming that readers can realise and recognise that some words are missing but the ideas are still there, by implication. Grant-Davie (1995)

believes that readers' background knowledge of the subject matter is more important than the language when they read technical texts which include heavy ellipsis. In addition, he is also certain that ellipsis at the sentence level is easy to recognize. So far there has been no proof whether his remark is true or not. This study may provide some support or otherwise for such belief

Regarding the strategy to overcome elliptical sentences, Hardison (1992) investigated the roles of structures and pragmatics to find out how ESL learners interpret elliptical verb phrases. He found that listeners tended to recall the surface form of a presupposed element and integrate it into the sentences containing the antecedent. Like Hardison's (1992), Gamham and Oakhill's (1992) research indicates that native speakers of English generally have poor memory for surface details, and that they try to interpret elliptical VPs initially by looking at the sentence structure but when this strategy fails, they turn to pragmatic information as an access for interpretation. In the process of interpretation, Hardison (1992) says that the listeners/ readers initially recognise that an anaphor exists which, in the case of ellipsis, means they recognize some context-dependent deletion of the material. Then this recognition is integrated with the presupposed information or antecedent, and finally the elliptical element is retrieved by means of a copying process. The retrieval as Hardison (1992) claims is just for the elliptical element that is the exact copy of the presupposed element which is equivalent to Quirk, et al.'s (1985) strict ellipsis. In interpreting the deeper anaphors, according to Hardison (1992), a mental discourse model of the situation, which includes inferred information and plausible reasoning, must be used in addition to syntactic or surface details. In the present study, the subjects will be asked how they interpret and recover the ellipted elements in the sentences extracted from their science and technology textbooks. The results will then be compared with those of Hardison (1992).

Ellipsis related to the deletion of relative pronouns has also been a focus of linguists' interest. Norris (2000) investigated why Japanese students find English relative clauses (abbreviated by Norris 2000 as RCs) difficult. His study revealed that the difficulty was mainly caused by the manner of formation of the RCs which is different from that in Japanese, and, in particular, the use of relative pronouns in the

way RCs are formed. In the Japanese language, there is no relative pronoun while in English there are many. Further, they are deletable, resulting in students' difficulty to cope with the RCs. In the Thai language, there are not as many relative pronouns as in English, and they are not deletable. No one has investigated this matter in depth. The present study will look into it and will see whether the difference between the two languages in this aspect affects students' ability to interpret and recover the English relative pronouns.

In regard to anaphors, the difficulty to relate the antecedent to the elliptical sentences is another thing that linguists are interested in. The distance and the ambiguity caused by too many possible antecedents are suspected to be causes of difficulty. This was demonstrated by Fazilatfar's (1999) study which attempted to see to what extent the number of possible antecedents, the different pronoun types, the distance between anaphoric and referent and readers' L2 proficiency level affect processing of anaphoric relations. The subjects were a group of Iranian students who were divided to 4 sub-groups based on their L2 reading levels. The material was a 700-word story, which contained four types of anaphors (reference, ellipsis, substitution and lexical items at distances which were: immediate, medium and remote). Using a research design of four reading skill groups crossed with three distances, it was found that less proficient groups performed poorly for all anaphora types. All groups showed poorer performance as distance increased. Inability to relate the elliptical ties seemed the hardest problem to the Iranian students.

According to Monson (1982), and Allen (1995), ellipsis structure is one of the most difficult problems for all L2 age groups. Elliptical forms that consist of a sequence of constituents like the one below are more complicated for L2 listeners/readers:

A : Did the clerk put the banana on the shelf?

B : Yes.

A : The ice-cream in the refrigerator?

In spite of all the hardship ellipsis can create, its advantage has been found by Brandon (1984) in his study focusing on semantic ellipsis in ideology. It is that ellipsis can promote rationality through the exposure of ideological confusion to which ellipsis is sensitized. An understanding of how this form of ellipsis works can be an intellectual tool.

Apart from literature on ellipsis in foreign languages mentioned above, literature on ellipsis by Thai linguists has been surveyed to investigate what may enhance or hinder the students' ability to handle English ellipsis. Unfortunately, the literature in this area is not extensive. There are studies by Bandhumedha (1967), Phukbhasuk (1980), Chansing (1986), Wimonchalao (1992), Tantulakorn (1997), and Thep-akrapong (1997, 1999), all of whom agree that the structure of the Thai language is unique and is different from English in many aspects including noun, verb, possessive adjective, article, classifier, passive voice, etc. all of which result in the students' difficulty in learning English. The review here will be selective, based on the objectives of the present research.

With respect to nouns, when the number of something is expressed, English puts the number in the front followed by the noun, while in Thai a classifier is needed after the number (Tantulakorn 1997). For example, English says 'two birds'. Thai says *bird two tuu* (no English word is equivalent for the word *tuu* in this context). In addition, the classifier is never omitted while the noun can be ellipted if it is presupposed (Bandhumedha 1982).

Regarding verbs, Thai verb phrase usually consists of a verb as a nucleus, and a pre-verb, a post-verb or a verbal linker. There are about thirty patterns of verb phrase, according to Bandhumedha (1967). Her investigation of the Thai verb phrase structure in everyday life conversation of Bangkok people revealed that the pre-verbs usually occur before the verb while the post-verb may occur at the end of the sentence or between verbs. The verbal linkers always occur between verbs. She stated that no finite verbs can be omitted in Thai.

In contrast to Bandhmedha's (1967) study, Phukbhasuk (1980) found in her study on verb deletion in Bangkokian's spoken Thai language that nine types of verbs can be deleted; namely, conjunctive, contrastive, disjunctive, comparative, temporal, serial, reduplicative, responsive and interrogative.

Eg.	A:	(tur)	ja	kin	(rue)	mai	kin
	IG:	(you)	will	eat	(or)	not	cat?
	B:	Mai	(kin)				
	IG:	Not	(cat)				

Two words are ellipted in the sentence spoken by A, 'tur' (you) and 'rue' (or), and one word in B's response, 'kin' (cat). It is common for Bangkokian to use short form answers. In 'yes/no' question asking about doing something, if the answer is positive, the lexical verb cannot be omitted. In the above example, B has to answer 'kin' (cat) if he wants to answer 'yes.' But if he wants to respond negatively, he can retain the negation word 'mai,' and omit the lexical verb 'kin' as in the example sentence. Phukbhasuk (1980) stated that the deletion process of each type of verb phrases varies depending on the co-occurrence of the semantic elements.

Due to the difference of verbal ellipsis between the English and Thai languages, the deletion of the verb 'be' in the English passive voice causes a big problem to Thai people (Wimonchalo 1992, Tantulakom 1997). The normal English passive voice sentence is considered to be a serious problem for Thai students. But the passive voice with the deletion of the verb 'be' is even more critical. This is so because the active and passive voice structures in the Thai language are the same while those in English are different. In the Thai language, listeners and readers can intuitively figure out what the performer or the receiver of the action is. In cases where it is certain that the animate or non-animate subject of the sentence cannot perform a certain action but receive it only, the verbal group is neither added nor changed like that in English. For instance,

English: This cloth was bought in Banglumpoo.

Thai: p a- nee~ sue~ tee' banglumpoo

IG: cloth this buy at Banglumpoo

The listener can understand at once that the cloth was bought not that the cloth bought something. The same understanding applies to another example below:

English: This temple was built in Ratanakosin Age.

Thai: bot nee~ san g~ (nai) samai ratanakosin

IG: temple this build (in) age ratanakosin

If anyone or anything is a receiver of a bad action, an auxiliary 'tuk' is needed in front of the lexical verb. One may consider that the auxiliary 'tuk' is equivalent to the verb 'be' in English. It may be, but it never undergoes any changes like the auxiliary 'be' in English. Even the lexical verb itself is never affected by any changed either. For example,

English: The thief was caught yesterday.

Thai: kamoy tuk jab mue'wannee~

IG: thief tuk arrest yesterday

English: His house was confiscated.

Thai: Ban~ kaw tuk yued

IG: House (of) he tuk confiscate.

In English, the performer of the action is placed after the preposition in a passive voice sentence but in Thai, the performer is placed after the auxiliary 'tuk,'

English: He was abandoned by his parents.

Thai: kaw tuk poh'mae' ting~

IG: He tuk parents abandon. (No preposition is needed.)

It can be seen that the passive voice in both languages is quite different, resulting in Thai students' difficulty in learning this structure. When the verb 'be' in this kind of English structure is deleted, it is even harder for them to understand because they cannot figure out that the remaining part of the verbal group is derived from the passive voice, especially the one with the past participle verb with the -ed ending. The students could not differentiate the past participle form from the past simple as both are spelt the same. The passive voice with the omission of 'be' is often found in newspaper headlines, written materials, and textbooks in particular. It often causes confusion to Thai people. As mentioned earlier, Thai verbs do not undergo any change but the English do. This is a really serious problem when Thai students learn English, especially when they translate English into Thai or Thai into English.

As for pronouns, unlike English, each pronoun in Thai has only one form whether it functions as a subject or an object. For example, *chan*, which represents the speaker can be used as a subject or an object of a verb. In English, 'I' is used as a subject while 'me' is used as an object. However, in Thai there are a variety of pronouns for the speaker and the listener, depending on the interlocutors' relationship and the degree of politeness. Pronoun and noun subjects are often omitted in the Thai language (Wimonchalo 1992, Thep-akrapong 1997) if they are presupposed situationally or anaphorically; for example,

English: My house is an old house. It has four bedrooms.

Thai: ban~ chan pen ba kaw' mee hong~non see' hong~

IG: house I is house old has bedroom four room

The pronoun 'it' in the second sentence is ellipted in Thai, and the whole sentence can be placed after the first right away without any punctuation mark or space. Initially there was no punctuation mark in the Thai language (Chansing 1986). Some punctuation marks have been adopted from the English language but they are rarely used in typical Thai language. Instead a space is used to separate the words, ideas, and sentences. With the ellipsis of the subjects, it is, therefore, hard to recognise the

end or the beginning of the sentences. This also causes students to fall in to the error of writing run-on sentences in English as they do not know when to stop or start the sentence. The students have to learn how to chunk the sentences. Nevertheless, there are no specific rules of chunking the Thai sentences (Chansing 1986), resulting in difficulty when translating from Thai to English. Students/translators have to use their common sense and intuition to find where the sentence starts and ends, what and where the subject of the sentence is.

With regard to translation, Wimonchalao (1992) says the translators' inability to properly translate English into Thai is caused by:

1. Lack of understanding of vocabulary and idioms,
2. Lack of understanding of grammar and structure,
3. Lack of understanding the linkage between sentences, and
4. Lack of background knowledge.

She states that lack of knowledge of grammar and structure is the worst problem among Thai translators. She says that many of them do not realise that they are poor in this area. Instead, they think that their inability to translate is caused by not having enough command of vocabulary. In contrast to their belief, it is often found that even though they know the meaning of all difficult words, they cannot understand the given sentences.

In relation to the difference between Thai and English adjectives, in Thai an adjective is usually placed after the noun it modifies while in English it is placed in front. As per Thai possessive adjectives, they are formed by adding the word '*khong*' in front of the pronouns, e.g.

khong chan = of I (=my)

khong tar = of you (=your)

In the case where the noun is mentioned with the possessive adjective, the word '*khong*' can be omitted, leaving only the pronoun to modify the noun; for instance,

English:	my house
Thai:	ban~ chan
IG:	house (of) I

Apart from the arrangement of words, articles and conjunctions constitute another problem area for Thai students (Chamsing 1986, Wimonchalao 1992). Even though there are only 3 articles in English, Thai people always find them confusing as there are no specific rules for certain cases and there is no article in Thai. As for conjunctions, some of those in English can be used to introduce a greater number of kinds of clauses. For example, 'since' and 'as' can be used in cause or time clauses, etc. while, in Thai, conjunctions are not interchangeable.

It could be seen that the Thai and English languages are different from each other in many areas including ellipsis. This study will inclusively examine whether any aspects affect the students' ability or inability to handle ellipsis problems. Beside this, the present study is designed and expected to cover students' ability to interpret elliptical sentences, to recover, and to recognise ellipted elements in science and technology textbooks as no linguists have touched upon this matter before even though ellipsis has been studied by a number of them. It is hoped that the results of the study will be able to be used to help science and technology students to learn L2 more effectively.

4. Language Transfer

It is a commonly known and recognized fact that a learner's native language has some influence on their second or foreign language learning, though how much influence depends on varying factors. Such influence can be detected from many sources such as the systemic or non-systemic errors made in the L2, and usage of L2 structures similar to those of L1, etc. The influence or the so-called language transfer is considered to be a factor that can hinder or promote students' ability to learn L2. As previously mentioned, the Thai and the English languages are quite different from each other thus language transfer might have played a crucial role in Thai students

who are learning L2. In particular, it might affect the students' handling ellipsis problem. Language transfer will, then, be investigated inclusively in this study.

Chunjic and Fang (2000) say that L1 influence on L2 production, especially on L2 writing, has drawn considerable attention of generations of linguists. According to Tarone, Cohen, and Dumas (1983), it is possible that some learners apply native language rules and forms to the target language at the theoretical level and in transfer. This accords with Blum-Kulka and Levenston's (1983) claim which is that all learners begin their second language learning by assuming that for every word in L1 there is a single translation equivalent in L2. Therefore, they begin to communicate in second language by thinking in their mother tongue first and then use the word-for-word translation strategy to speak and write in L2. Such habit formation results in errors in the target language (Blum-Kulka and Levenston's 1983, Faerch and Kasper 1983, Chunjic and Fang 2000, Dechert 1983, Ellis 1997). It seems that this belief contradicts Gass and Selinker (1992), who have raised some interesting issues about the interference of L1 on L2 as follows:

- 1) Is L1 an inhibitive or a facilitative factor when people acquire or learn an L2?
- 2) Do people only fall back on their knowledge of the native language when the command of the second language is insufficient?
- 3) Which elements of the native language can be transferred and why?
- 4) Why do some elements of the native language persist in some L2 speakers?
- 5) How can transfer be studied?

(Gass and Selinker 1992, p. 20)

This matter is reflected by Pouw (1995) in his review of Corder's paper on "Strategies of Communication." According to Corder, the native language is just a basic, simple, possibly universal grammar that has little or no effect on the second language. Learners can either learn or probably create and remember the target language via their own linguistic development. Pouw comments that on the basis of a cognitive approach to second language acquisition, the knowledge of L1 is sometimes facilitative, sometimes inhibitive in L2 acquisition. "When L2 learners use the second language, they compensate their lack of command by using their

knowledge of the native language in order to express their intentions or interpret messages in the second language" (Pouw 1995, p. 25). This belief is backed up by Schwartz and Sprouse (1996) who claim that learners can develop their L2 syntax via extensive L1 influence at the initial stage.

On the contrary, Robinson (1978) claims that transfer is not accomplished easily except by the highly motivated or very gifted learner. A strategy or even a single skill taught in a given situation can be most successful if it can be applied in another situation almost identical to the one in which it is taught. If the strategy is used in a different environment and if there has not been a great deal of practice in positive reinforcement, it is unlikely to be successfully utilised in a new situation.

However, Chunji and Fang (2000) postulate that L1 serves as an intermediary language when learners apply meanings and reasons to process the target language. L1 influence on L2 production is hidden in the high-level cognitive operations in language production.

Iwata (1998, p. 2) confirms that language transfer is a major factor in L2 acquisition. It is governed by learners' perceptions about what is transferable and by their stage of development in L2 learning (McArthur 1988). Iwata adds that apart from the forms, L2 learners tend to transfer meanings and culture of the native language to the foreign language when they try to speak in the L2. Based on the behaviorist theory, Iwata (1998) assumes that a major cause of errors in L2 is caused by the difference between the two languages. If the structures of the two languages are obviously different, then a relatively high frequency of errors is possible to occur in L2, which indicates an interference of L1 on L2 (Dechert 1983, Ellis 1997). In addition, it can be predicted that learners would demonstrate difficulty in organizing L2 knowledge into appropriate coherent structures (Bhela 1999). Sometimes there are interferences and occasionally responses from one language are used in speech in the other language (Albert and Ober 1978 cited in Bhela 1999).

In contrast to those linguists' perspective, Fantini and Reagan (1992, p. 5) argue that L2 learners' errors do not only result from the difference between the two languages but also from another 3 types of strategies, namely, 1) transfer of rules from L1; 2) generalization and overgeneralization of L2 rules; and 3) redundancy reduction by omitting elements of the L2. In addition, learner errors may also result from faulty instructional materials, which do not adequately or appropriately explain the differences between the two forms, resulting in learner confusion.

Nevertheless, it is quite certain that difference between the two languages is one of the factors that causes learners' difficulty in learning L2. The number of errors caused by language differences varies from language to language depending on the nature or characteristics of the compared languages. For example, there are a lot of differences between the Thai language and the English language. Students have been observed to make a lot of mistakes when learning English. The present study may be able to list some of them.

To solve the problem of the transfer errors, Faerch and Kasper (1983) postulate that L2 learning will be most successful if the situations in which the two languages are learned are kept as distinct as possible. Like Faerch and Kasper (1983), Iwata (1998) adds that L2 learners need to learn those differences so they do not transfer their L1 forms, rules, meanings, or culture to L2 wrongly.

From the literature mentioned above, it can be said that language transfer plays a very important role in second language learning. This thesis will investigate whether L1 has any influence on the students' ability or inability to interpret, recover and recognise elliptical sentences.

5. Interlanguage

As this study is related to second language learning, it is also concerned with how and whether students operate within an interlanguage system to interpret, recover or recognise ellipted elements or not.

The term interlanguage was coined by Selinker (1972) to refer to the interim grammars which learners build on their way to full target language competence (Ellis 1996). In other words, an interlanguage incorporates the ways in which a given learner uses a transition system to guide them in understanding and using the target language. According to Selinker (1972), interlanguage results from a learner's attempt to produce the language that meets the target language norm. In doing so, learners use several processes including borrowing patterns from the mother tongue, expanding patterns from the target language, e.g. by analogy, and expressing meanings using the words and grammar which are already known (Richards, Platt, and Webber 1985). Using these processes, students produce their own provisional language that is different from both mother tongue and target language (Krashen 2002).

Ellis (1996, p. 30) claims that "interlanguage theory has identified a number of other, more specific processes such as overgeneralization, i.e. the extension of a L2 rule to a context in which it does not apply in the target language, and simplification, i.e. the reduction of the target language system to a simpler form." Cabrerias (2002) research on overgeneralisation of causatives in the interlanguage of native speakers of English learning Spanish confirmed that overgeneralisation of L2 was a process underlying interlanguage.

A number of linguists such as Corder (1981), Tarone, Cohen, and Dumas (1983) seem to agree that language transfer plays a significant role in learners' interlanguage while Corder (1981) claims that learners' interlanguage is systematic, regular, and consistent and it is based on L2 learners' personal grammar knowledge

or competence. Through this system, the learner is creating an account of structural entities of the target language, about its grammar, on the basis of his/her interaction with the information he/she is exposed to.

Nevertheless, Tarone, Cohen, and Dumas (1983) argue that it is still a controversial matter as to whether certain interlanguage forms should be considered a result of transfer from the native language or rather overgeneralisation of the target language. They also believe that teaching methods involving drills can lead to students' overgeneralisation of L2 rules as a factor in interlanguage formation.

In contrast to this idea, the investigation on Bulgarian learners' awareness of the functional morphology signalling present simple and progressive tense in English by Slabakova (2000) revealed that if L2 learners were properly trained, interlanguage was unlikely to develop, even though L1 and L2 rules or systems were totally different like the case of Bulgarian and the English tense systems. In Slabakova's study, the students were trained on the two tenses with a number of drills before being tested. It was found that 89% of the subjects were target-like in their use of -s and -ing endings, revealing that the difference of L1 and L2 did not affect the learners' ability in acquiring L2.

On the other hand, Plag's (2000) investigation on the irregular past tense formation in English interlanguage by German learners of English revealed that cross-linguistic influence might partially be responsible for the L2 patterns as he found that the German students created in their English some past tense ablaut forms that were close to the German vowels.

According to Selinker (1972), a learner's interlanguage system, or approximative system as designated by Richards, et al. (1985), can directly be overridden by many factors including language transfer, transfer of training, strategies of second language learning, strategies of second language communication, and overgeneralisation of target materials, language rules and semantic features. One learner's interlanguage pattern is, therefore, not necessarily the same as another's as it is generated individually.

With respect to development of interlanguage, Ellis (1996) claims that it develops through three concurrent phases which are innovation, elaboration, and revision. In the innovation phase, the learner acquires new forms. Next he/she elaborates them when he /she discovers the contextual uses of a form. Then at the last stage, revision, he/she adjusts the entire system.

Regarding the development of interlanguage, Tono (1999) conducted a corpus-based analysis to observe the interlanguage development of Japanese learners of English and found that at the initial stage of L2 learning, learners tended to frequently operate their L2 with interlanguage. Particularly when L2 learners found it difficult to put their ideas into English, they adopted Japanese words in English sentences. But when they moved to the next stage, the problem disappeared as a result of L2 practice. However, they still avoided using complex sentences. The study also revealed that the use of complex prepositional phrases was one of the most salient characteristics of fully developed interlanguage. Tono (1999) suggested that errors caused by students' interlanguage should not be treated as mistakes. It was recommended that teachers try to identify students' interlanguage rules and point out how they differ from the corresponding rules in the target language. This could be achieved by asking students to identify their errors and explain why they made them.

The controversy of how and why L2 learners operate interlanguage or which processes they base their interlanguage on might be resolved by using the learner as an informant in explaining the errors, assuming that he/she can provide reliable explanations so that students' errors caused by their interlanguage can be traced and corrected on the right track (Tarone, Cohen, and Dumas 1983, Tono 1999). Corder (1981) also postulates that corrections to this system can be made on an unconscious acquisition level or through deliberate self-correction.

The present study will, therefore, explore whether the way in which Thai students handle ellipsis problems may be affected by the fact that they are operating according to an interlanguage system. If this should be the case, the nature of the effect will be documented.

6. Reading Comprehension and Learner Strategies

Since this study is directly related to the readability, interpretability, and recoverability by students of ellipsis in textbooks, research on reading comprehension, interpretation as well as strategies for solving L2 problems are reviewed here.

It is certain that language learners at all levels use some strategies to understand what they are reading (Charnot & Kupper 1989 cited in Oxford 1989). Such strategies accumulate during their study of both L1 and L2 either consciously or unconsciously. Strategies are like a tool for linking new information with learners' existing schemata. Singhal (1998) believes that if L1 readers are frequently exposed to many examples, they may be able to generalize language patterns or guess the meaning of words, which may not have initially been in their linguistic schema, and the same procedure can be applied to the second language reading.

Regarding the similarity and difference of strategies used in L1 and L2, Barnett (1988) has found that learners use similar strategies to read both languages. He claims that the reader interacts with the text to create meaning. The level of readers' comprehension of the text depends on many variables, such as interest level in the text, purpose for reading the text, knowledge of the topic, foreign language abilities, awareness of reading process, and level of willingness to take risks in interacting with the text composition, which include text type, structure, syntax, and vocabulary ((Zintze 1974, Barnett 1988). Nonetheless, Singhal (1998) believes that there are a number of other factors, which contribute to the difference in L1 and L2 reading. Students' perceptions of their reading difficulties are similar in many ways across languages. Readers, especially L2 readers, can better understand some of similarities.

According to Oxford (1989), the most successful learners tend to use learning strategies that are appropriate to their reading situations including the material, the task, and their own goals, needs, and stage of learning. Learners with more proficiency have a tendency to employ more strategies in their reading situations

than do those with less proficiency (Barnett 1988, Oxford 1989). Nevertheless, not all learners are aware of the strategies they employ when they read.

In terms of reading process and strategies used in text reading, a good reader tends to overview the text first by looking at titles, subheadings, and diagrams (Singhal 1998). Then he/she would look for more important information and pay greater attention to it than other information. An attempt to relate one important point in the text to the other would also be made in order to understand the text as a whole. The reader's existing knowledge would be activated and used to interpret the text. Then they would reconsider and revise the meaning of the text based on its content. Within the process of reading, they would attempt to infer information from the text, determine the meaning of words that they could not understand or recognize by using context clues or neighbouring context, monitor text comprehension, identify or infer main ideas, use strategies to remember text such as paraphrasing, repeating, making notes, summarizing, self-questioning, etc. The good reader would try to understand relationships between parts of text and recognize text structure. If their comprehension fails to proceed smoothly, they would change their reading strategies to the ones more appropriate (Singhal 1998).

With respect to strategy of inference, Nash-Webber (1978) describes it as a factor in the derivation of non-explicit antecedents and referents for 3 types of discourse anaphora: definite pronouns, 'one'-anaphora, and verb phrase ellipsis. This derivation process is seen as being part of the normal process of text understanding. It is claimed that the use of non-explicit antecedents and referents for anaphora depends on a contract between writer and reader. This contract requires that if the writer uses an anaphoric expression whose antecedent or referent must be inferentially derived, he should be sure that the reader can infer accordingly.

Another interesting strategy is avoidance. Many learners tend to use avoidance strategy to get around target language rules or forms which are not yet an established part of the learner's competence (Tarone, Cohen, and Dumas 1983, Ellis 1995). Upon questioning, the learner may indicate an awareness of the target

language form or rule, but may prefer not to try to use it. According to Tarone, Cohen, and Dumas (1983), and Ellis (1995) there are 7 sub-strategies of avoidance, namely, topic avoidance, semantic avoidance, appeal to authority, paraphrase, circumlocution, message abandonment and language switch. All of these will be considered in this thesis. Below is a brief description of each strategy according to Tarone, Cohen, and Dumas (1983).

By topic avoidance, it refers to the learner's attempt to totally avoid communication about the topic which he/she does not know well about how to use the target language. He/she may avoid by either changing the topic or giving no verbal response at all.

In semantic avoidance, the learner tries to evade the content that he/she is unable to explain with the appropriate target language rules or forms. He/she may avoid by using related concepts, which may sustain the desired content

The appeal to authority sub-strategy occurs when the learner does not know how to say or cannot remember the words and, then asks someone else to supply a form or lexical item. He/she may ask if a form or item is correct, or he may look it up in a dictionary.

When using the paraphrase sub-strategy, the learner rewords the message in an alternative and acceptable target language construction in order to avoid a more difficult form or construction.

The circumlocution sub-strategy is a strategy in which the learner describes the desired lexical item or gives a definition of it in other words. For example, when one does not know the word for 'hammer,' he/she describes it as '*a thing you use to drive a nail.*'

In message abandonment, the learner cuts short the message on the initiated topic because he/she encounters difficulty with how to communicate in a target language

The last sub-strategy, language switch, is employed when the learner uses a native word or expression, untranslated, into the interlanguage utterance. According to Tarone, Cohen and Dumas (1983), the motivation for the language switch may be either an attempt to avoid a difficult target language form or one that has not yet been learned or a desire to fit in with one's peer.

It can be seen that there are many strategies that can be employed in reading. The present study will investigate students' strategies used in handling ellipsis problems to see how many of them are employed and whether they are successful or not.

7. Conclusion

According to the related literature mentioned above, it can be concluded that there are many kinds of ellipsis, some of which can cause ambiguity. There are also many factors that support and hinder the ability to interpret, recover and recognise English ellipsis; for example, background knowledge or world knowledge, similarity and difference between L1 and L2 sentence structures, presupposed information, distance of presupposed elements, types of ellipsis, number of constituents, L2 learning strategies, L1 interference. This may result in the long and tedious interpretation and even misinterpretation when students read English textbooks. Accordingly, this research will attempt, for the first time, to find out whether ellipsis and such factors affect her students who study in the field of science and technology and have to read textbooks in English. The issue will be addressed with the following research questions:

Research Questions

1. To what extent do students interpret elliptical sentences correctly?
2. Are students aware of ellipsis where it occurs?
3. Are students capable of recovering elided elements?
4. What factors are associated with students'
 - a) ability / inability to interpret ellipses correctly?
 - b) ability / inability to provide the elided elements?

As this study is attempting to investigate students' understanding and awareness of elliptical sentences by looking at their ability to interpret elliptical sentences and their ability to recover and recognise elided elements, the ellipsis category and principles of Quirk, et al. (1985) were chosen to base this study on because they are more related to these objectives. Quirk, et al. (1985) classify ellipsis types according to how each type is recovered. Using their categorisations would help to reveal the interpretability, recoverability and recognition of ellipses on the part of the students. Therefore, the following hypotheses are proposed:

Research Hypotheses

1. Students' difficulties in interpreting elliptical sentences and recovering elided elements can be related to (a) L1 transfer (b) L2 reading strategies.
2. Degree of difficulty in retrieval of ellipsis, based on Quirk, et al.'s (1985) principle, relates to degree of difficulty in interpretation.

Definition of Terms

The following terms are frequently mentioned in this study and need to be defined.

Ellipsis is, as described by Quirk, et al. (1985, pp. 883-884), the grammatical omission of one or more words that are obviously understood and grammatically or contextually recoverable.

Eg. "the man that he sees" maybe changed by 'ellipsis' to "the man he sees"

Elliptical Sentence refers to a sentence from which some elements are ellipted.

KMITNB refers to King Mongkut's Institute of Technology North Bangkok.

Subjects / Students / participants refers to KMITNB first year students who have completed two compulsory English courses and are selected to be the subjects of this study.

HSG refers to the high scoring group, the group of the subjects who scored their classroom English achievement test at the top 50.

LSG refers to the low scoring group, the group of the subjects who scored their Classroom English achievement test at the bottom 50.

L1 / Native Language refers to Thai language.

L2 refers to English language.

Native Speakers refers to speakers of English language as first language.

Deep Structure refers to a representation of the syntax of a sentence distinguished by varying criteria from its surface structure (Chomsky 1965, pp. 128-147).

Surface Structure refers to a representation of the syntax of a sentence seen as deriving, by one or more transformation, from an underlying deep structure (Chomsky 1965, pp. 128-147).

Ellipsis type 1 refers to strict ellipsis.

Ellipsis type 2 refers to standard ellipsis.

Ellipsis type 3 refers to structural ellipsis

Ellipsis type 4 structural ellipsis without precise recoverability.

Ellipsis type 5 refers to non-finite clause with ellipsis of the relative pronoun and the verb 'be.'

The following chapter will deal with thesis methodology. The overview of methodology on which this thesis is based will be presented. How the thesis instrument is constructed and administered will be explained. The chapter will also include the research design, the description of the subjects of the study and the selection process as well as the process of data collection and analysis.

Chapter 3

Methodology

1. Introduction

This chapter will present an overview of methodology employed for the research on which this thesis is based. It will provide reasons for the research methodology adopted and show how the test papers were prepared and how the subjects were selected. The research design, the testing and scoring process, and data analysis procedure will also be explained.

2. Overview of Methodology

As ellipsis is suspected to be a problem area students face when they need to comprehend their texts, this study focuses on investigating the students' performance in handling the kinds of ellipsis which occur in science and technology textbooks. In accordance with the assumption that perception might have some effects on performance, the students' perception of the difficulty of ellipsis was also one of the main areas of focus of this study. Therefore, students' ability to interpret elliptical sentences, to recover and to recognize the elipted elements as well as their perceptions on ellipsis were investigated in order to know to what extent the students understand the specific kinds of ellipsis frequently occurring in the chosen textbooks.

To serve the purpose mentioned above, three tests on ellipsis, namely, interpretation, recovery, and recognition tests, were designed. Perception rating scales and open ended questions related to strategies employed in answering the tests were also included to find out the students' opinions on and strategies to handle elliptical sentences, whether the students were aware of ellipsis, and whether their performance correlated with their perception. The elliptical sentences in English Science and technology textbooks were analysed and classified using Quirk, et al.'s

(1985) criteria (see Chapter 2, pp. 34-37, 41), and then some of them were extracted to develop the tests. Since Quirk, et al.'s (1985) principles are based on an analysis and classification of elliptical sentences in terms of recoverability using their set criteria systematically, it was most appropriate to base this study on them. It was also expected that they would be of help in analysing the students' ability to interpret elliptical sentences, to recover and recognise ellipted elements, thus resulting in the accomplishment of the objectives of this study. The three tests as mentioned above were constructed and administered with KMITNB first year students who had completed two English compulsory courses.

To ensure that the scoring was reliable, the tests were examined by the researcher and a second rater who was experienced in assessing English tests. The students' scores were analysed and used as an indicator of their ability to interpret elliptical sentences and to recover ellipted elements. Existing scores from students' English course profiles were also taken into account to see whether they correlated with the ellipsis scores obtained in this study, and whether they could be used to predict students' achievement in reading English texts. The test items, students' answers and verbal responses which have been transcribed will be analysed and discussed in detail in Chapter 6.

3. Subjects of the Study

Sixty first year students from the Faculties of Engineering, Applied Science and of Technical Education at King Mongkut's Institute of Technology North Bangkok (KMITNB), Bangkok Campus, Thailand made up the study group. The students sitting for the test comprised 18 from the Faculty of Engineering, 17 from Applied Science, and 14 from Technical Education. Another 11 students did not give the name of their faculty.

4. Selection of the Subjects

To select the subjects of the study, the researcher obtained the first year students' records of two English course scores kept in the Department of Languages and Social Science. The two courses were English for Science and Technology I and II; course codes: 2620111, and 260112. The number of students enrolled in both courses in the first year of their study in KMITNB in 2000 was 679. The students' scores on those two courses were added up. The range of the scores obtained was between 59–172 out of the total of 200. The selection of the subjects was based on the students' percentile rank of the total scores. A high scoring group (HSG) and a low scoring group (LSG) were formed for the study by taking the top 30 and the bottom 30 students regardless of their faculty. The scores of the top group ranged from 139 - 172 while those of the bottom were 66 – 100. Twenty additional students from the top and the bottom were obtained in case someone could not attend the test. The reasons for choosing the top and the bottom ranked students was to maximise any differences related to high or low English performance, to find out whether both groups had the same or different problems in handling ellipsis, and thereby to gain a better understanding of the relationship between overall proficiency in English as a foreign language and proficiency in dealing with ellipsis.

5. Research Design

The methodology for this research is an integration of qualitative and quantitative procedures. It attempts to investigate students' performance in interpreting elliptical sentences in English science and technology texts and in recovering ellipted elements in order to see whether ellipsis is a cause of misinterpretation or inability to interpret such sentences. Assuming that students have been exposed to enough foundation knowledge of the English language from their school years and from the two compulsory courses in their first year of studying in KMITNB, first year KMITNB students studying on the Bangkok campus were selected as the target group of the study.

The research also investigated the relationship between students' performance on the test, their own perception of the elliptical sentence tasks, and their achievement in the KMITNB English courses. Three tests of the same content and context, namely, interpretation, recovery, and recognition tests, were provided and administered. Each test initially consisted of 30 reading items but after the careful re-examination and re-classification in the light of the students' test performance, it was found that some items could have been ambiguous while others might not have included the best answer among the multiple choice options offered. Consequently, 10 items were left out of consideration in the analysis and only five ellipsis types were taken into account.

All items in the study were extracted from science and technology textbooks generally assigned for students to read. In each item of the first test (Appendix 1), an elliptical sentence, based on Quirk, et al.'s (1985, p. 889) categories, was included and underlined. This test was constructed to investigate whether the students were aware of ellipsis and to what extent they demonstrated their understanding of elliptical sentences. The subjects were asked to interpret the underlined part in Thai as they would be more comfortable to express their understanding.

As the students had to take three tests consecutively for the study and, according to the researcher's experience, the students always had difficulty with vocabulary, the researcher decided to give them a glossary of difficult words to lessen their anxiety and time spent looking up the words in the dictionary. An important additional reason for giving glossary was to gain their cooperation in doing the tests. Many dictionaries including those dealing with technical terms, and lecturers as well as experts in the subject area to be tested were consulted to obtain the correct meaning of the words for a glossary. In addition to the glossary, dictionaries were allowed for those who might want to look up more words.

As to time allowed, there was no limit imposed, but the subjects were encouraged to finish the task as soon as possible. After interpreting each item of the interpretation test (test 1, Appendix 1), the subjects had to answer in Thai why they interpreted the sentence that way and which strategies they used in their

interpretation. Their answers were either tape recorded or written down in the space provided on the paper. Beside each item, a 7-point rating scale was provided for the students to rate the level of difficulty of the item. The rating data were used to examine the students' perceptions on the test items and to check whether they accorded with their interpretation performance. For example, if a student rated the item as very easy, and could score on the item, it would indicate that the item was really easy, as he/she perceived it. The perception examination would help to find out how the students perceived elliptical sentences and whether their perception was related to their performance or not.

The recovery test (test 2, Appendix 2) contained the same items as test 1, but the subjects were asked to fill in the gaps provided in the place where the omitted elements were to be retrieved. This test was used to recheck whether or not they were aware of ellipsis and to examine whether or not the students understood English sentence structures before some elements were ellipted. The advantage of the gap filling test, according to Swinney and Osterhout (1991), is that "it is perceptual in the sense that immediate effects are driven by what is possible with the syntax". If any student could not find the word/s to fill in this test, they were allowed to leave blanks. However, they were encouraged to try. Again their reason for why they thought their word/s were the right choice for each item, and which strategy they employed in retrieving the ellipted elements, were tape-recorded or written down.

In the recognition test (test 3, Appendix 3), again the test items were the same as those in the first and second tests. The blanks were provided for the students to fill in the ellipted elements the same as in the recovery test but multiple-choice answers were provided. The students were to choose the best alternative. This test was designed to trace the students' problems in relation to English ellipsis. Again, students were tape-recorded when discussing why they thought that their choice was the correct one.

Invitation letters were sent to every selected subject to attend the test scheduled on May 31, 2000, which was in the institute summer vacation.

6. Test Paper Preparation

In order to ensure that the test items would be extracted from the textbooks commonly used by students of all science and technology disciplines and assigned by lecturers in the core course departments, the researcher directly asked the Registrar's Office what science and technology subjects all students had to study in the first year. It was found that physics, mathematics and computing were the common core courses students had to study. The lecturers of those three subjects gave the researcher the names of the books they had assigned their classes to read. They were:

1. *Physics for Scientists and Engineers* by Raymond A. Serway, Fourth Edition, 1996, 1442 pp.
2. *Calculus and Analytic Geometry* by George B. Thomas and Ross L. Finny, 1996, 1139 pp.
3. *Computer* by Larry Long and Nancy Long, Fifth edition, 1998, 522 pp.

The elliptical sentences found in the books were analysed and classified according to Quirk, et al's (1985) criteria. Some examples are shown on Table 2 below.

Table 2: Examples of the analysis of elliptical sentences appearing in 1st year students' science and technology textbooks.

Criteria*					
a	b	c	d	e	
+	+	+	+	+	As we will discuss later, these properties hold in three dimensions <u>as well as two</u> . (from math p. 960/ ellipsis type 1)
-	?	+	-	0	<u>The fundamental laws used in developing theories</u> are expressed in language of mathematics, the tools that provides a bridge between theory and experiment. (from physics p. 3/ type 8)
+	+	+	+	-	Is there a production level that will maximize American Gadget's profit? <u>If so</u> , what is it? (from math p. 360/ type2)
+	?	+	-	0	<u>Once on disk storage</u> , it can be loaded to a computer and manipulated as you would other graphic image. (from computer p. 139/ type 6)
-	+	+	+	-	<u>One of ten children and the son of the blacksmith</u> , Faraday received a minimal education and became apprenticed to a book-binder at age 14. (from physics p. 90/ type 5)
-	?	+	-	0	<u>The special theory of relativity developed by Einstein</u> successfully predicts the motion of objects at low speed and at speeds approaching the speed of light and hence is a more general theory of motion. (from physics p. 3/ ellipsis 8)

* Criteria of Quirk, et al (1985) (see Chapter 2 pp. 34-37, 41)

As each book contains many hundreds of pages and only 30 elliptical sentences were needed for the study, twenty percent of the pages were, therefore, selected to obtain elliptical sentences. The pages were sorted by a systematic sampling method. That is one page was taken from every 70 pages of the physics

text, from every 60 pages of the calculus text and from every 40 pages of the computer text. If no appropriate elliptical sentence was found on the selected pages, preceding or following pages were reviewed. Every incidence of ellipsis in the selected pages was analysed as shown above and was classified according to Quirk, et al.'s (1985) criteria and seven types of ellipsis. Ellipsis type 3, Quasi ellipsis, and ellipsis type 9, Semantic implication, were excluded from the study as they were not treated as ellipsis by Quirk, et al. (1985).

As the physics and calculus texts contained more pages, two elliptical sentences of each type were used as test items from them while only one was extracted from the computer text. The detailed investigation of ellipsis types in the selected pages was made to find the frequency of each type occurrence. The investigation, which also served the first purpose of the study stated in Chapter 1, revealed that the frequently used types of ellipsis, according to Quirk, et al. (1985), were:

1. Ellipsis type 8: Nonfinite clause with ellipsis of the relative pronoun and the verb 'be,' (32.62 %)
2. Ellipsis type 6: Structural ellipsis (21.22 %)
3. Ellipsis type 7: Structural ellipsis without precise recoverability (15 %)
4. Ellipsis type 5: Ellipsis short of criterion of unique recoverability (12.99%)
5. Ellipsis type 2: Standard ellipsis (12.46 %)
6. Ellipsis type 1: Strict ellipsis (5.57 %)
7. Ellipsis type 4: Situational ellipsis (None were found)

However, the frequency with which each ellipsis type occurred differed from book to book. In physics texts, nonfinite clause with ellipsis of relative pronoun and the verb 'be' was the most frequent (40 %) followed by standard ellipsis (14 %), structural ellipsis and structural ellipsis without precise recoverability (13.7 % each), ellipsis short of criterion of unique recoverability (12.97 %), and strict ellipsis (4.45 %). Structural ellipsis without precise recoverability was the most frequent type in the calculus and computer texts (35.7 % and 19 % respectively). Within those 6

types, strict ellipsis was the least frequent in physics and computer texts (4.45 % and 2.72 % respectively) while standard ellipsis is the least in calculus text (5.71 %).

Following data analyses, it was discovered that some items had been misclassified. After reclassification, there were only 2 items left for ellipsis short of criterion of unique recoverability (Quirk, et al.'s (1985) ellipsis type 5). Therefore, this ellipsis type was deleted from the final analysis and data for only five types were presented. These five types were renumbered accordingly: "

1. Strict ellipsis
2. Standard ellipsis
3. Structural ellipsis
4. Structural ellipsis without precise recoverability
5. Nonfinite clause with ellipsis of the relative pronoun and the verb 'be.'

As per the content of the test item, some sentences preceding and following the ellipted elements were included so that the students could see the context and get some ideas what the text was about. A glossary of difficult words was provided which contained definitions of technical terms given by lecturers and experts. The three tests were then composed (Appendices 1, 2, and 3). The items were initially arranged in the order of 6 ellipsis types mentioned above, 5 items for each type. But the reclassification affected ellipsis types, the item number of each type, as well as the item order. Ellipsis type 1 (Strict ellipsis) was made up of 6 items (items 1, 2, 4, 10, 18, 19). Ellipsis type 2 (Standard ellipsis) consisted of 4 items (items 6, 8, 9, 13). Ellipsis type 3 and 4 (Structural ellipsis and Structural ellipsis without precise recoverability) were composed of 3 items each (items 16, 17, 21 for type 3 and 22, 24, 25 for type 4), and ellipsis type 5 (Nonfinite clause with ellipsis of the relative pronoun and the verb 'be') included 4 items (items 26, 27, 29, and 30).

The first test required the students to interpret the underlined elliptical sentences in Thai, the second required them to retrieve the missing elements and in the third one, they had to choose the missing elements from a set of 4 multiple choice alternatives to fill in the blanks. Each test consisted of 30 items of exactly the same

sentences and glossary. However as mentioned above, only 20 items were used in final analysis. The first test also contained a 7-point rating scale placed beside each item, for the students to rate the perceived level of difficulty. The reason why three tests were required was to determine, in addition to the subjects' interpretation and perception of ellipsis, whether they could also recover and recognise ellipsis. The process of recalling what they had learned from their classes was captured with written comments and tape recordings.

7. Testing Procedure

The testing took place in the morning from 9.00 a.m. in the Institute's language laboratory which is equipped with tape recorders. Before starting the test, the researcher ensured that all students understood what they were required to do. The instructions were also given on the test papers. Any students not happy with being recorded were allowed to write down their answer in the blanks provided below each item. Most students preferred writing down their answers on the test paper reasoning that using a machine interfered with their concentration and was more time consuming. The students had to do the 3 tests respectively one after another.

8. Scoring Procedure

The students' answers were scored by the researcher and the second rater. For the interpretation and recovery tests (tests 1 and 2), two points were given for the exact answer, one if the answer was not exactly correct but conveyed students' understanding of the elliptical sentence, and zero for an incorrect answer. The scores of the inexact answers were added up to make the total for the purpose of the analysis. However, for the purpose of number of the correct answers, only exact answers were counted. Students' English grammatical errors when answering the tests were ignored. For the scoring of the third test (recognition test), two points were given to the correct answer, one point to the partially correct, and zero to the

incorrect one. The scores from the researcher and the second rater were added up and divided by 2.

9. Data Analysis

As already mentioned, subjects had to respond to three thirty-item tests: interpretation of elliptical elements in written Thai, supplying ellipted elements in written English, and recognising English ellipted elements in a multiple choice format. However, only twenty items were analysed due to the item re-examination and reclassification. Data analysis proceeded as follows.

The data were initially summarised to determine (a) the overall frequency of students who correctly answered each item and (b) the frequency of students from each group (HSG versus LSG) who correctly answered each item.

Next, data from each test were analysed at the test level, that is, test accuracy scores were correlated with English course scores, the latter being the scores that were used to divide students into high and low English performance groups (HSG and LSG). In this way the use of these groupings could be examined. The scores obtained from the three ellipsis tests were correlated with each other to see whether there was any relationship between them.

Next data from each test were analysed in terms of ellipsis types. As discussed the reclassification resulted in 20 items being assigned to five ellipsis types. Mean scores of each ellipsis type of the whole group of 60 students were calculated to compare the students' achievement in answering each ellipsis type. Mean scores were calculated and compared for the HSG and LSG groups for each ellipsis type as well.

Additional analyses were performed at the item level to examine the relationship between interpretation accuracy and rated item difficulty (Interpretation test only). The rating scores and the test scores were correlated to see whether the subjects' perceptions related to their performance.

Apart from the quantitative analysis, the data were also analysed qualitatively at the last stage. Each test item of the interpretation test was cited in this part followed by a Romanised Thai answer key, literal gloss, and literal translation. Then each item of the recovery and recognition tests was presented followed by their answer keys. A comparison between English and Thai sentences was made for each item. A basic content analysis was performed on the qualitative data which consisted of transcribed, tape-recorded comments and open-ended written comments. The results of this analysis, together with students' perceptions rating, were used to elucidate the reasons for their choices in the ellipsis tests. The results are presented item by item in Chapter 6.

The following chapter will be the presentation and an analysis of the students' performance and perceptions on the three tests. The mean scores and the ranges of the number of the correct items the students scored on each test as a whole group and separately by groups (HSG and LSG) will be displayed. The mean scores of each test will be calculated and presented as a whole group and separately by groups. These scores include those obtained from the correct and partially correct answers. The highest and the lowest scores of each test will also be summarised. Classroom English test and ellipsis tests will be correlated. In addition ellipsis tests will be correlated with each other. The number of scores each item gains will also be presented to differentiate the level of difficulties between the items. Perceptions on the interpretation test will be summarised and correlated with the performance scored. In the last part of the chapter, students' perceptions on the items will be presented and discussed in relation to their test performance individually, by groups, and test by test.

Chapter 4

Students' Performance and Perception on Ellipsis Tests

1. Introduction

This chapter is intended to present data showing students' performance on the tests at the item level, and to discuss the findings and what they show. The chapter is divided into 6 parts: 1) the introduction, 2) the students' performance on the three tests, namely, the interpretation, the recovery, and the recognition tests, 3) correlation between the classroom English test performance and the ellipsis test performance, 4) students' perception of the tests, and 5) conclusion respectively. The number of correct items for each test will be presented and discussed. The number of students getting each item correct by groups will be included (the interpretation test only). An analysis of the tests will be made in this part. Following this, correlation between the classroom English test performance and the ellipsis test performance will be made and described. Then the students' perception of each item of the interpretation test will be presented as a whole group (HSG and LSG combined) and as separate groups. And the last section will be the conclusion of the analysis at the item level. Three research questions: "1) Do students interpret elliptical sentences correctly?, 2) Are students aware of ellipses where they occur?", and "3) Are students capable of recovering ellipsed elements?" will be answered in this chapter.

2. Students' Performance on 3 Ellipsis Tests

In reference to Chapter 3, the subjects of the study were tested with three ellipsis papers. Initially there were 30 items of 6 ellipsis types in each paper. The re-examination and reclassification of the test items resulted in the deletion of 10 items and 1 ellipsis type. So the ellipsis types and items to be counted and analysed were as follows:

Type 1: Strict ellipsis consisted of items 1, 2, 4, 10, 18, 19.

Type 2: Standard ellipsis, items 6, 8, 9, 13

Type 3: Structural ellipsis, items 16, 17, 21

Type 4: Structural ellipsis without precise recoverability, items 22, 24, 25.

Type 5: Non-finite clause with ellipsis of the relative pronoun and the verb 'be,' items 26, 27, 29, and 30.

It could be seen that each type of ellipsis consisted of a different number of items, which might affect the quantitative findings to some extent. This problem was solved by transforming each group into the same base. In addition it was considered that the qualitative analysis, which will be presented in Chapter 6, would be of help to confirm the reliability.

As mentioned in Chapter 3, all three tests were based on the same examples of ellipsis which had been drawn from the students textbooks, but their appearances varied according to the tasks assigned for the students to do in each test (Appendices 1, 2, and 3). The first test (interpretation) examined the students' ability to interpret elliptical sentences. The students were asked to express their understanding of the underlined part of each ellipsis example in Thai. The second test (recovery) was designed to find the students' ability to recover the ellipted elements. The students were asked to fill in the omitted elements. So this test was of a cloze variety. The third test (recognition) was used to check the students' recognition of the ellipted word/s. So they were asked to choose the alternative that they thought best fitted the slot provided. Apart from those abilities, the students' perception of the relative difficulty of the test problems was sought and rated in the interpretation test.

Regarding the scoring process, the total points for each test were 40. Two points were allocated to the exact answer, one for the partially correct answer, and zero for the wrong one. Only the exact answers were counted as correct.

2.1 Number of Correct Items.

This section gives detail on how many correct items the students achieved for each test, first as a whole group and then separately by groups, the high scoring groups (HSG) and the low scoring groups (LSG). The data will be presented in terms of arithmetic mean. The maximum and minimum scores (range) for each test will also be included

Table 3: Number of correct items on 3 ellipsis tests for the whole group.

No. of Students	Test 1 (Interpretation)	Test 2 (Recovery)	Test 3 (Recognition)
60 \bar{x} (range)	7.9 (2-15)	3.88 (0-11)	7.45 (3-14)

As a whole and according to Table 3, out of 20 items the students could answer 8 items correctly on the average (mean = 7.91) for the interpretation test, 4 items for the recovery test (mean = 3.88), and 7 items for the recognition test (mean = 7.45). The interpretation test scores ranged from 2 to 15, while those of the recovery test were from 0-11, and those of the recognition test were 3-14. The students' achievement was below half the possible score on every test. This showed that ellipsis was difficult for them. According to the mean scores, it could be interpreted that the task the students found most difficult in answering the tests was to recover the elliptical elements, followed by the task of picking up the right choice to show their recognition of the omitted words, and finally the task of interpreting the elliptical sentences. When the scores were calculated separately by groups, it was found that the high scoring group performed much better than the low scoring group (Table 4).

Table 4: Number of correct items on 3 ellipsis tests for high and low scoring groups.

Students	Test 1 (Interpretation)	Test 2 (Recovery)	Test 3 (Recognition)
HSG \bar{x}	10.5	6.04	9.9
(range)	(5-15)	(1-11)	(5-14)
LSG \bar{x}	5.33	1.63	5.01
(range)	(2-10)	(0-5)	(3-10)

According to Table 4, on the average the HSG students could score on 11 items for the interpretation test (mean = 10.5) while the LSG could do 5 items only (mean = 5.33). The average number of correct items on the recovery test scored by the HSG was 6 (mean = 6.04) while that of the LSG was 2 (mean = 1.63). And the average number of correct items on the recognition test performed by the HSG was 10 (mean = 9.9) while that of the LSG was 5 (mean = 5.01). Out of the total of 20 items, the HSG could answer 11 items correctly in the first test and 10 items in the third test. This showed that their ability to interpret elliptical sentences was at the moderate level. But on the second test, the HSG could not perform this well. Their mean score was quite low, only 6.04. The HSG's scores ranged from 5 to 15 on the first test, 1-11 on the second, and 5-14 on the third. For the LSG, their performance on every test was very low. Their abilities to interpret and to recognize were almost the same whereas their ability at recovery was extremely poor. Their scores ranged from 2-10 in the interpretation test, 0-5, and 3-10 in the recovery and recognition tests respectively. In the detailed investigation, it was found that many members of the LSG could not score on the recovery test. From the obtained scores, it could be said that the HSG could handle ellipsis much better than the LSG but their ability was not high enough.

2.2 Number of Students Scoring Each Item of Interpretation Test

It is necessary to comment about the number of students who could correctly answer each item of the interpretation test so that it can be referred to when their perceptions of the items' level of difficulty are discussed later in this chapter and when each item is analysed in Chapter 6. Again only the exact answers were counted

as correct. The partial correct answers were not included. The number will be presented according to groups (HSG and LSG) in Table 5.

Table 5: Number of students scoring each item of interpretation test

Item No.	HSG (N=30)	LSG (N=30)	Total (N=60)
1	20	14	34
2	22	0	22
4	10	6	16
6	20	9	29
8	3	0	3
9	17	9	26
10	3	0	3
13	2	0	2
16	27	23	50
17	20	16	36
18	13	1	14
19	21	7	28
21	13	8	21
22	18	3	21
24	25	15	40
25	24	12	36
26	2	1	3
27	25	15	40
29	15	7	22
30	16	14	30

It can be seen from Table 5 that the students could answer items 16 the best, and items 24 and 27 the second best, i.e. 50 students could answer item 16 correctly, and 40 could score on items 24 and 27. On the contrary, few students could answer items 8, 10, 13, and 20. No one from the LSG could answer items 2, 8, 10, and 13. The frequency of only 6 items, items 1, 16, 17, 24, 25, 27, exceeded half of the number of the students taking the test, revealing that ellipsis interpretation was quite difficult for the students.

2.3 Students' Scores from Ellipsis Tests

This section presents the students' scores obtained from each test in terms of arithmetic mean. Partial answer scores will be included. As for scoring, an exact answer was allocated 2 points, and a partial answer one point. The total scores of the test were 40.

Table 6: Students' total score means of 3 ellipsis tests for the whole group.

No. of students	Test 1 (Interpretation)	Test 2 (Recovery)	Test 3 (Recognition)
60 \bar{x} (range)	16.93 (4-32)	8.96 (0-25)	16.95 (6-29)

The mean scores of test 1, 2, and 3 were 16.93, 8.96 and 16.95 respectively. It can be seen that, as a whole group, the students could answer the interpretation and the recognition tests correctly at almost the same level. The mean scores of both tests were close to each other. Nevertheless, the scores from the two tests were lower than half of the total, revealing that the students did not understand ellipsis much and could not recognize the ellipted elements. On the recovery test, the students performed very poorly. Their mean score was as low as 8.96. Even though the partial answers were also rewarded a point each, the students could not gain many additional points. Ellipsis must have been one of the students' problems in understanding English textbooks. In addition, they might not be aware of ellipsis when they come across it.

Table 7: Students' total score means of 3 ellipsis tests for high and low scoring groups.

Students	Test 1 (Interpretation)	Test 2 (Recovery)	Test 3 (Recognition)
HSG \bar{x} (range)	22.15 (10-32)	14.33 (2-25)	21.93 (13-29)
LSG \bar{x} (range)	11.7 (4-22)	3.58 (0-11)	11.97 (6-21)

When the separate groups were taken into consideration, it was found that the HSG could score on the interpretation test the best with the mean score of 22.15, followed by the recognition test with the mean score of 21.93, both of which exceeded the mid point of the total score. This showed that the HSG understood elliptical sentences moderately well and could recognize some ellipted words. However, their mean score on the recovery test was lower than half of the total (14.33), revealing that they were unable to recall many omitted words. Nonetheless, the range of each test scores of the HSG was very wide. The minimum scores of test

1, 2, and 3 were 10, 2, and 13 while the maximum were 32, 25, and 29 respectively. This showed that within the English high performance group, some students understood elliptical sentences well whereas the others were unable to handle ellipsis problems.

As per the low performance group, their mean score on every ellipsis test was very low, only one fourth of the total for test 1 and 3 (mean = 11.7 and 11.97). Their mean score on the recovery test was extremely low, 3.58 only. Looking at the range of each test, we could see that it was also very wide. The minimum score of test 1, 2 and 3 were 4, 0, and 6 while the maximum scores were 22, 11, and 21 respectively. Thus it could be assumed that most students in the LSG were very poor in ellipsis whereas a few of them were able to handle some elliptical sentences. According to the quantitative data, the LSG were considered poor in dealing with ellipsis.

3. Correlation between the Classroom English Test and the Ellipsis Test Performances.

The total of classroom English scores on each ellipsis test was plotted against the classroom English test scores in order to examine the relationship between prior English achievement and understanding of ellipsis (Figure 1). The HSG and the LSG are clearly described by two clusters confirming that the choice of the top and bottom 30 students did indeed result in differences in performance. With a few individual exceptions, the HSG performed better than the LSG on each ellipsis test. Pearson's Correlation Coefficients were correlated for each ellipsis test and significant positive relationships were found between each test and the classroom English scores (Figure 1). This means that if the students could answer any test, they could possibly answer the other tests too and vice versa.

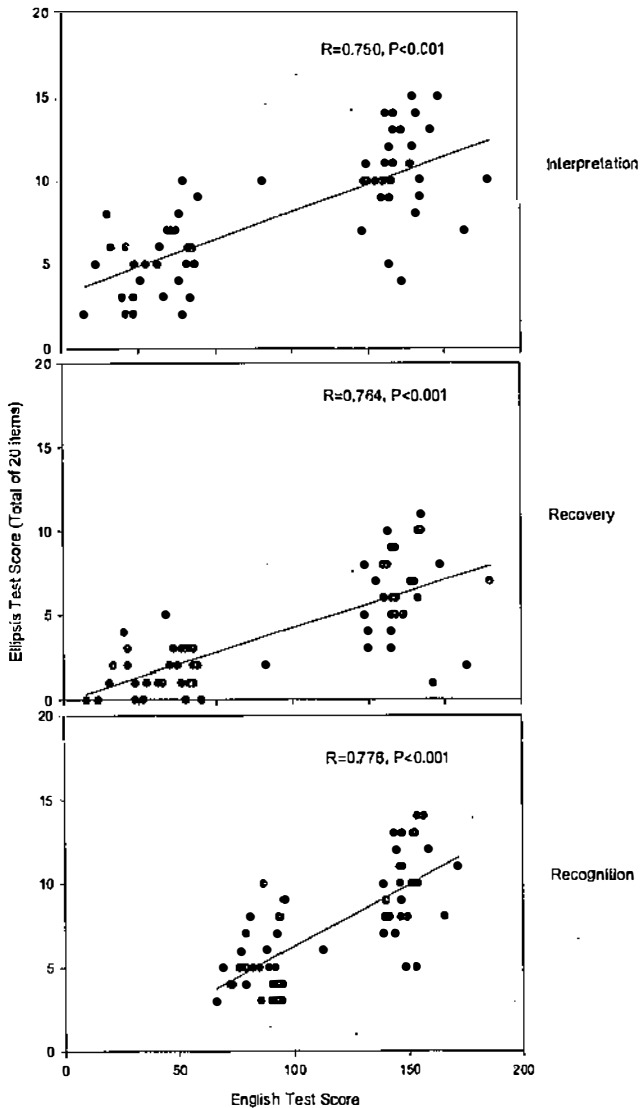


Figure 1: Classroom English scores by ellipsis test score totals

When the correlations of the separate groups were calculated, it was found that only one correlation was significant for each group. That is, the HSG's correlation between the recovery test and the recognition test was .406 ($p < 0.05$), and the LSG's correlation between the interpretation and the recovery tests was .380 ($p < 0.05$). This revealed that if the HSG could answer the recovery test, they could possibly answer the recognition test and vice versa. This is the same as the LSG's ability to do the interpretation and the recovery tests. As a matter of fact most students could answer the first test well, the second test poorly, and the third test almost as well as the first test.

4. Students' Perceptions Shown on the Interpretation Test

In the interpretation test, the students were asked to rate the level of difficulty on the 7 point rating scale provided alongside each test item. The perception was used to determine whether it correlated with the students' performance on the ellipsis test or not.

4.1 Students' Perceptions on Each Item.

The percentage of students rating each scale option was calculated to find out how each item was perceived. Points were allocated to each option in the scale as follows: 1 point for extremely difficult, 2 for very difficult, 3 for difficult, 4 for no comment, 5 for easy, 6 for very easy and 7 for extremely easy.

The data will be presented in 2 tables item by item. The first one highlights the whole group's perceptions and the second one gave light on those on separate groups (HSG and LSG).

As the percentage of the students' ratings for each item scattered across almost every option and on the average more than 30 percent of the students chose the no comment option, it was very hard to judge whether the students, as a whole, perceived the items as which specific category. Therefore categories 1 to 3

(extremely difficult, very difficult, and difficult) were collapsed to "difficult" and 5 to 7 (easy, very easy, and extremely easy) to "easy". The total percentage of each new category will then be compared. The students' perception on the difficulty of the item will be assumed by the category gaining higher percentage. The no comment option will not be counted as either easy or difficult.

Table 8: Percentage of students (whole group) rating the level of difficulty of each item in the interpretation test.

Item No.	Difficult %	No comment %	Easy %
1	38.3	50.0	31.7
2	43.3	38.3	18.3
4	36.7	36.7	26.7
6	8.3	36.7	55.0
8	56.7	33.3	10.0
9	23.3	30.0	46.7
10	38.3	41.7	20.0
13	46.7	40.0	13.3
16	28.3	28.3	43.3
17	35.0	26.7	38.3
18	23.3	25.0	51.7
19	15.0	20.0	65.0
21	26.7	31.7	41.7
22	31.7	33.3	35.0
24	18.3	31.7	50.0
25	33.3	40.0	26.7
26	38.3	25.0	36.7
27	41.7	25.0	33.3
29	35.0	35.0	30.0
30	30.0	26.7	43.3

As a whole (Table 8), the items that gained a higher percentage on the easy category were items 19, (65 %), 6 (55 %), 18 (51.7 %), 24 (50 %), 16 (43.3 %), 9 (46.7 %), 30 (43.3 %), 21 (41.7 %) while those gaining higher on the difficult category were items 8 (56.7 %), 13 (46.7 %), 2 (43.3 %), 27 (41.7 %), 1, 10, and 26 (38.3 % each). Items that gained approximately the same percentage on both categories were items 26 (38.3 % difficult, 36.7 easy), 22 (31.7 difficult, 35 easy), 17 (35 difficult, 38.3 easy). The percentage of the students rating the items as easy was apparently higher than that as difficult. It might be claimed that the students perceived the ellipsis test as rather easy.

4.2 Students' Perceptions of the Two Groups: HSG and LSG

In order to see how each group of the subjects perceived each ellipsis test item of the interpretation test, the percentage of each rating option was calculated and is presented in Table 9.

Table 9: Students' perception on each item in percentage by groups: HSG and LSG

Group	Item No.	Difficult %	No comment %	Easy %
High	1	26.7	23.3	50.0
	2	46.7	26.7	26.7
	4	26.7	30.0	43.3
	6	-	23.3	76.7
	8	66.7	23.3	10.0
	9	16.7	16.7	66.7
	10	36.7	46.7	16.7
	13	40.0	43.3	16.7
	16	13.3	36.7	50.0
	17	23.3	26.7	50.0
	18	6.7	20.0	73.3
	19	6.7	10.0	83.3
	21	10.0	33.3	56.7
	22	26.7	23.3	50.0
	24	3.3	20.0	76.7
	25	20.0	46.7	33.3
26	26.7	26.7	46.7	
27	30.0	23.3	46.7	
29	30.0	30.0	40.0	
30	20.0	13.3	66.7	
Low	1	50.0	36.7	13.3
	2	40.0	50.0	10.0
	4	46.7	43.3	1.0
	6	16.7	50.0	33.3
	8	46.7	43.3	10.0
	9	30.3	43.3	26.7
	10	40.0	36.7	23.3
	13	53.3	36.7	10.0
	16	43.3	20.0	36.7
	17	46.7	26.7	26.7
	18	40.0	30.0	30.0
	19	23.3	30.0	46.7
	21	43.3	30.0	26.7
	22	36.7	43.3	20.0
	24	33.3	43.3	23.3
	25	46.7	33.3	20.0
26	50.0	23.3	26.7	
27	53.3	26.7	20.0	
29	40.0	40.0	20.0	
30	40.0	40.0	20.0	

As a whole, the HSG rated most items as easy. A greater percentage were allocated to the easy category than to the difficult one (Table 9). Most HSG students (83.4 %) rated item 19 as easy. Within this percentage, 16.7 % claimed it was very easy, and 10 % viewed it as extremely easy. No one from the HSG rated item 6 as difficult. According to its percentage scattered on the easy categories (46.7 easy, 16.7 very easy, and 1.3 extremely easy), this item would have been claimed as very easy. Only 2 items, items 8 and 13 were viewed as difficult by the HSG.

Regarding the LSG, most items were rated on the difficult categories. Some students selected the extremely difficult option for most items. There were not many items that gained more percentage on the easy side. Items 6, and 19 gained 33.3 and 46.7 % respectively. Both groups of the subjects had similar perception on these 2 items. When their scores of these items were taken into consideration, it was found that they did not quite accord with their perception because only 20 HSG and 9 LSG students could answer item 6 correctly, and only 21 HSG and 7 LSG could score on item 9 (Table 5). The item that both groups could score on well was item 16, 27 HSG and 23 LSG, but both groups had different opinion on this item. The HSG thought the item was easy while more students in the LSG said it was difficult. This showed that the students' perception was not always in accordance with their performance.

5. Conclusion

The three research questions mentioned at the beginning of this chapter will be answered to conclude this chapter. According to the quantitative data, the students' ability to interpret the elliptical sentences was moderate. Not all of the HSG students could do better than those of the LSG. But as a whole the HSG students performed better in every test. Many students especially those from the LSG could not recover many items which suggests that some students were not aware of where ellipses occurred as they claimed that some sentences were complete in themselves. They could not fill in the gaps. However, some students were aware of ellipses where they occurred; otherwise they would not have been able to interpret them correctly or

incorrectly. This will be discussed in details in Chapter 7, where every item will be analysed indetails.

The next chapter will deal with students' performance and perceptions with respect to ellipsis types. Mean score, mean rank and median of each ellipsis type will be calculated. The comparison of the mean score of each ellipsis type between the HSG and the LSG, test by test will be presented. The order of difficulty obtained from students' performance and perceptions will be depicted and discussed. Students' strategies in handling the ellipsis test items will be included.

Chapter 5

Performance in Relation to Ellipsis Types

1. Introduction

This chapter will present the findings on the subjects' performance and perception according to the types of ellipsis. Mean scores from the items of each ellipsis type are presented for the HSG and LSG. The HSG and the LSG mean scores obtained from each ellipsis type will be compared to see the ellipsis type that can be successfully negotiated the most, to a lesser extent, and the least by each group of students and why. This chapter, then, comprises a discussion of 3 main comparisons of mean scores obtained from each test, and the students' strategies in answering the tests and a conclusion.

2. Mean Scores by Ellipsis Types

Mean scores of the three tests were calculated for each ellipsis type, firstly for the whole group, and secondly separately by HSG and LSG groups. The ellipsis types in the present study are based on the ellipsis categories of Quirk, et al. (1985) which are:

- 1) Strict ellipsis
- 2) Standard ellipsis
- 3) Structural ellipsis
- 4) Structural ellipsis without precise recoverability
- 5) Nonfinite clause with ellipsis of the relative pronoun and the verb 'be.'

Each category of ellipsis possesses different characteristics mentioned earlier in Chapter 2. Results from the three ellipsis tests were added together for each ellipsis type. As the reclassification resulted in a lower number of items for some ellipsis types, the data were converted to the same scale for comparison purposes.

Although the data for the composite scores were not all normally distributed, means were the most convenient measure of central tendency to examine differences between ellipsis types (Figure 2).

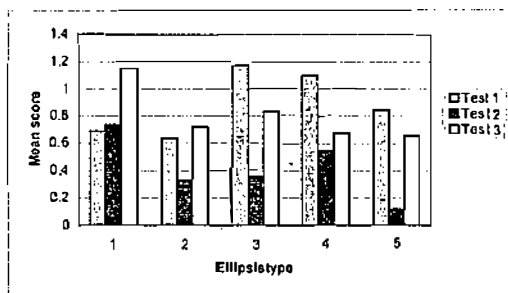


Figure 2. Mean scores of 5 ellipsis types of the 3 tests

In the interpretation test (test 1), the mean scores revealed that the most difficult type of ellipsis was type 2 followed by types 1, 5, 4, and 3 respectively (means = .64, .69, .85, 1.10, and 1.18). In the recovery test (test 2), the order of difficulty was types 5, 2, 3, 4, and 1 (means = .12, .33, .36, .55, and .74) while that in the recognition test (test 3) was types 5, 4, 2, 3, and 1 (means = .66, .68, .72, .84, and 1.15). This showed that each type of ellipsis had different degrees of difficulty with respect to interpreting, recovering and recognising. One kind of ellipsis could be easy for one task but difficult for another.

With respect to the mean scores in total of the 3 tests, students scored lowest on ellipsis type 5, followed by types 2, 4, 3 and 1. All mean scores were less than half of the total (.54, .56, .77, .79, and .86 respectively). This implies that students were not good at ellipsis.

3. Comparison of Mean Scores between HSG and LSG: Interpretation Test

This section compares the students' ability to interpret 5 ellipsis types based on Quirk, et al.'s (1985) categories. Mean scores for each ellipsis type in the interpretation test differed between the HSG and the LSG (Figure 3).

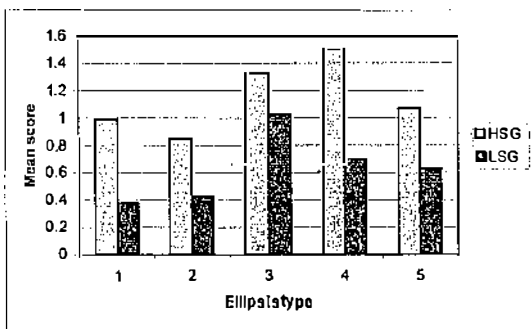


Figure 3: Comparison between mean scores of the HSG and the LSG: interpretation test

According to Figure 3, it can be seen that the HSG could interpret ellipsis type 4 the best followed by types 3, 5, 1 and 2 (means = 1.50, 1.33, 1.07, .99, and .85) while the LSG interpreted type 3 best followed by 4, 5, 2 and 1 (means = 1.03, .70, .63, .43, and .38). The HSG's mean scores on all types of ellipsis were higher than those of the LSG. Due to the non-normality of some of the composite data for ellipsis types, a Mann-Whitney U test was used to determine whether there were significant differences between the HSG and the LSG for the different ellipsis types. It was found that the two groups were significantly different for ellipsis types 1, 2, 4 and 5. It is apparent that the LSG ability was almost less than half of that of the HSG. This difference was significant for each ellipsis type according to the Mann-Whitney U test ($P = 0.056$ for type 3 and $P < 0.01$ for the remaining types).

These findings lead us to the questions why the students are not capable of interpreting the elliptical sentences extracted from their own textbooks, what factors are causing difficulty in doing this, whether they are aware of ellipsis, and whether the students' L1 hinders their L2 learning. As will be seen in Chapter 6, one obvious factor is that the structure of the Thai sentences (L1) is apparently different from that of English (L2). Therefore, the students might have had difficulty acquiring a structural rule in L2 when that rule is different in L1.

For ellipsis type 1, strict ellipsis, even though an exact copy of the antecedent was available for the students to refer to, they could not interpret the sentence in Thai because the counted noun in the last part of the sentence in Thai cannot be totally ellipted. Whenever a counted noun in the later utterance is presupposed, it must be substituted by a classifier rather than omitted (see detailed analysis of item 1 in Chapter 6). As a whole, the Thai language does not have ellipsis type 1 as the English does. Word substitution is applied in the translation or interpretation of English ellipsis type 1.

Ellipsis type 2, standard ellipsis, has been proved to be the most difficult type for KMITNB students in this study. Of all items in this type (items 6, 8, 9, and 13), item 6 seems to be only one item whose structure is the same as that in Thai. An object after the instructional verb can be omitted both in English and Thai. However, in Thai, a specific word, "*chong*", is needed to precede instructional verbs. This caused the students to fail to interpret the sentence correctly. Most students did not put "*chang*" in front of the instructional verbs in ellipsis type 2. Nevertheless, the students' answers were still counted as a "partially correct" although the word "*chong*" was missing. For the other 3 items in this type, their structures vary item by item and all are not the same as those of Thai. The presupposed words are not the exact copy of the ellipted elements. As explained by Quirk, et al. (1985), this ellipsis type can be used where criterion (c), that the ellipted word(s) be an exact copy of the antecedent, is not applied. Many students, according to their responses to the tape recorder, were apparently aware that something was missing because they felt that the sentences were strange, especially item 8 (see more details in Chapter 6). But they did not know what was ellipted. The students were not familiar with this kind of

sentence. In Thai, neither omission of a finite verb between the auxiliary verb and an object nor omission of a relative pronoun is possible. So they could not interpret the item correctly. For item 13, both the structural complexity of the presupposed clause and the ellipted part themselves augmented the students' confusion.

For ellipsis type 3, structural ellipsis, (items 16, 17, and 21), both groups of the students could interpret it fairly well because such ellipted elements as in English sentences of items 16 and 17 are automatically attached to the finite verbs when translated into Thai.

Regarding ellipsis type 4, structural ellipsis without precise recoverability, (items 22, 24, and 25), the HSG students could interpret it the best while the LSG could do it the second best. They could interpret items 24 and 25 well since in the Thai language, the word 'tee' which is equivalent to the English 'that' is needed and seems to be automatically attached to the preceding noun it modifies as one word.

With respect to ellipsis type 5, nonfinite clause with ellipsis of the relative pronoun and the verb 'be,' (items 26, 27, 29, and 30), the students interpreted the meaning quite successfully because the use of passive voice is very rare in Thai. (Bandhumedha 1982, Phukbhasuk 1980). The same structure is used in both active and passive voices in most cases. Listeners or readers of Thai can automatically differentiate who or what the doer or the receiver of the action is. For example, Thai people say, "*The house is building*" instead of "*the house is being built.*" So in the interpretation test, the students' answers were counted as correct even though they did not use passive voice in their answers because the sentences were communicable in the Thai language. But this Thai structure could be expected to cause a problem in the students' recoverability of English ellipsis in test 2. The active voice pattern of English ellipted elements will be supplied because the students directly translate from their Thai sentences.

Considered as a whole, the results of the students' interpretation are not impressive because most mean scores are below average (50%). If this was not because of the different structures between L1 and L2, it could have been because of

the lexicon. However, since the students were provided with a glossary, they should not have had any difficulty with the lexicon while they were doing the tests. Moreover, a dictionary was allowed if they needed more explanation. Many students responded to the tape recorder that the test was very difficult. Even though they knew all the word meanings, they could not put the words together to make sense in Thai. Ellipsis, therefore, can be seen as a particular problem for Thai students in understanding English.

4. Comparison of Mean Scores between HSG and LSG: Recovery Test

A comparison of mean scores between the HSG and the LSG was made for the recovery test which required the students to supply the ellipted elements to the test items (Figure 4). This test was designed to test the students' ability to recover the ellipted elements in the sentences that they had seen before in test 1 (interpretation test). The students had to write down the recovered words in the blank provided in each item.

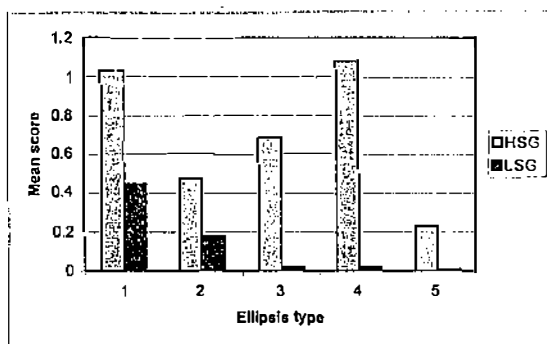


Figure 4: Comparison between mean scores of the HSG and the LSG: recovery test

The LSG's mean scores were extremely low in every ellipsis type, especially in types 3, 4, and 5 (Figure 4). The lowest mean scores of both groups were on the same ellipsis type, type 5, nonfinite clause with ellipsis of the relative pronoun and the verb 'be,' (the HSG's mean score = .23, and the LSG's = .01). This is true to the prediction mentioned earlier in the analysis of the interpretation test above. The students could interpret ellipsis type 5 correctly because, unlike in English, the active and passive voice structures in the Thai language are the same. The listeners or readers can distinguish who performs or receives the action mentioned in the sentence. But when the students had to express a passive voice sentence in English, they could not do so because the structure of the Thai passive voice differs from that of English. Both groups of students recovered this type of ellipsis very poorly.

With regard to the order of difficulty, both groups' mean scores varied from type to type. It can be seen from figure 4 that ellipsis type 4, structural ellipsis without precise recoverability, was well recovered by the HSG, followed by types 1, 3, 2, and 5. The LSG recovered type 5 with the least success and type 1 showed the best recovery followed by types 2, and 3. The LSG recovered ellipsis type 1 the best while the HSG ranked this type second. Even though the score on type 1 is the best for the LSG, it does not reach half of that of the HSG. The difference between the HSG and LSG was significant for each ellipsis type according to the Mann-Whitney *U* test ($P < 0.01$).

In ellipsis type 5, few students in the LSG supplied the words in the problem sentences. Those who did not complete the sentences claimed that the items were too difficult. So most students in the LSG got zero for most items.

According to the raw scores, no student could achieve half of the total scores of this test. This may have been because of the nature of the test itself. Cloze-tests are deemed very difficult. Students are frequently frustrated with this kind of test (Weir 1990, pp. 46 - 47). In the ellipsis recoverability test, the students might not have understood why they had to fill in the blanks since they had seen the items in the first test that seemed to be the complete ones.

Another reason may be that the presupposed elements of most types of ellipsis were not the exact words for the students to retrieve. For the LSG, who could not retrieve type 4 ellipsis, it might be because they could not see any presupposed words. The word 'to retrieve' was not present in the context of the test item. For type 5, neither group could recover the ellipted element. This may be related to the difference between L1 and L2, that is, the passive voice is rarely used in the normal written or spoken Thai language. Even though the students had practised both full and short forms of relative clauses, they could not recall these structures when they had to use them outside class. This is a problem that needs solving. It seems that either the students cannot apply the knowledge gained from the classroom to the new setting or the teachers cannot teach them to do so.

Another problem may be that the English of textbooks is rather complicated. The writers may not have targeted a non-native speaker audience. They may not realise that non-native speakers in many countries still have to rely on their textbooks to keep pace with the global academic advancement. So in addition to the students' unawareness of ellipsis, their inability to understand the sentences in their English textbooks has also been revealed.

5. Comparison of Mean Scores between HSG and LSG: Recognition Test

Mean scores of the HSG and those of the LSG were compared for the recognition test (Figure 5). This test aimed to measure the students' ability to recognise the ellipted elements which were provided as one choice among the other three. The test items were still the same as those in the interpretation and the recovery tests.

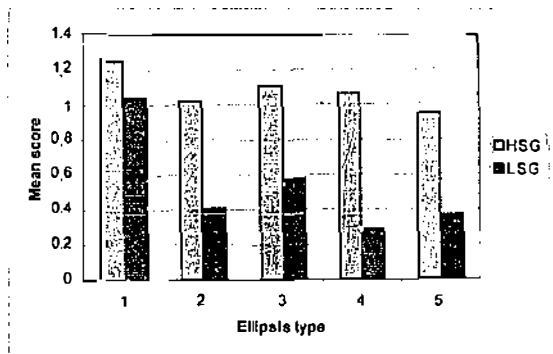


Figure 5: Comparison between mean scores of the HSG and the LSG: recognition test

Compared with the recovery test, the ability gap between the two groups is much narrower for the recognition test (Figure 5). Both groups of students were able to do this test better than the second one. The LSG did this test much better than they did the second one. It may be said that the LSG are better at recognising elliptical elements in test 3 than at recovering them in test 2.

In considering the order of difficulty of all ellipsis types in the recognition test, both scored on ellipsis type 1 the best, followed by type 3. The HSG scored on ellipsis type 5 poorly while the LSG ranked it the second poorest. The difference between the HSG and LSG was significant for each ellipsis type according to the Mann-Whitney U test ($P = 0.022$ for type 1 and $P < 0.01$ for the remaining types).

Ellipsis type 5 still poses a serious problem in the recognition test since these ellipses were recovered less readily than other types of ellipsis. The students could not recognise the ellipted elements of this type, which were a relative pronoun plus a form of the verb 'be'. It was found that the students' choice of each item varied. Some chose only the relative pronoun. Others chose the relative pronoun plus a subject and a verb 'be'. This again reflected a lack of grammatical knowledge as well

as the interference of LI. In Thai, a pronoun subject is inserted after the relative pronoun. For example, in Thai, item 27 can be:

"The second half of the proof, that Eqs. (3) imply that F is conservative, is a consequence of Stokes' theorem which/that it was taken up in Section 14.7."

In type 3, item 21, most students thought that the embedded clause was a time clause. They chose 'when' instead of 'that' to fill in the blank of this item which read:

"Careful study shows that, as the temperature of an object increases, the thermal radiation when it emits consists of a continuous distribution of wavelengths from the infrared, invisible, and ultraviolet portions of spectrum"

This indicates that the students did not see the relationship between the head noun and its modifying clause. They paid more attention to the modifying clause and thought that it was an adverb clause. On further analysis of both the LI utterances and some students' responses to the tape recorder, it was found that an equivalent relative pronoun in Thai is "wela" which might have been equated to "when". "Wela" can be used to introduce either a time clause or a relative clause. However the latter case is rarely found.

For items 22 and 25, the problems read:

*"How many derivatives do the functions you know have?" and
"However, if you see something on TV you like, you can probably obtain the rights to use it (usually for free)."*

Most students picked up 'if' instead of 'that' as their choice to fill in the gaps. This is so because they were more familiar with conditional clauses of 'if you know' and 'if you like' in Thai. While in item 24, a number of students selected 'where' being certain that it was a relative pronoun representing place to put in the problem sentence.

"A joystick is a vertical stick that moves the graphic cursors in the direction _____ the stick is pushed"

They did not understand the application of the relative pronoun 'where' in the relative clause, that is, it represents a place preceded by a preposition. This may be due to lack of practice with the grammatical feature or the students' carelessness.

The overall mean scores of the 3 tests reveal a difference in ability between the HSG and the LSG. The HSG could answer every test better than the LSG. It can be inferred that the students' achievement scores obtained from the classroom test could distinguish the good from the poor and could also distinguish their ability to deal with ellipsis tests. The HSG scored on all ellipsis tests better than the LSG did.

6. Students' Reading Strategies

In the investigation of the strategies employed in finding the answers to the test items, most students said they primarily used the grammatical knowledge obtained from their English classes, and the contextual clues to help them solve the elliptical problems. They also specified the clues they made use of, e.g. the word 'significant figure s' in item 1, etc. Most of the clues that the students identified were correct. Apart from context clues, they also looked at the structure of the presupposed statement. So, three strategies, namely, grammatical, contextual and structural were frequently employed. If those 3 strategies did not work, their last option was to guess.

7. Conclusion

The quantitative findings in relation to ellipsis types revealed that the students' ability to interpret, recover and recognise each ellipsis type varied mostly depending on the similarity or difference between the students' native language and the target language. Most types of ellipsis in English are different from those of Thai. The students, therefore, encountered difficulty in interpreting, recovering and

recognising the ellipted elements. The students used various strategies developed in their English classes to help in answering the test items. Most students overestimated their understanding of English (Chapter4).

The next chapter will deal with qualitative analysis. All items of each test will be analysed taking into account the statistical data obtained from the previous and the present chapters. The students' performance and perceptions will be discussed in more detail. The chapter will fully discuss the students' problems in handling ellipsis. The thesis objectives, questions and hypotheses will be revisited in relation to the findings.

Chapter 6

Item Analysis

1. Introduction

This chapter will discuss the tests, item by item to see in detail the students' performance, perceptions, and reasons for their answers, the structure of each test item, and any impediment or support for L2 from L1. The students' tape-recorded responses will be referred to in this chapter. As one of the purposes of constructing 3 tests for this study was so that the researcher could trace the students' understanding of ellipsis, items of the same number in each test will be analysed together. Each group of ellipsis items will form a part of this chapter. The quantitative information will be integrated with the analysis in each case. So this chapter will be divided into 9 parts including the introduction, the presentation of the analysis, discussion of the findings and the conclusion.

2. Presentation of Item Analysis

As five types of ellipsis based on the categories of Quirk, et al (1985) were investigated in this study, the test items were arranged from types 1 to 5. The first six items, which included items 1, 2, 4, 10, 18, 19, were of type 1 referred to as strict ellipsis while the second four, items 6, 8, 9, 13, were of type 2, standard ellipsis. Items 16, 17, and 21 constituted type 3, referred in this study as structural ellipsis. Items 22, 24, and 25 made up type 4, structural ellipsis without precise recoverability. Ellipsis type 5, called non-finite clause with ellipsis of the relative pronoun and the verb 'be', consisted of item 26, 27, 29 and 30.

In analysing each item, it is necessary first to refer to L1 structure and usage. Since there were few scholars investigating Thai ellipsis, the researcher based her analysis on her knowledge of the Thai language as a native speaker who was

required to study her own language at school and college. Bandhumcdha's (1967, 1982), Phukbhasuk's (1980), Chansing's (1986), Wimonchalao's (1992), Tantulakom's (1997), and Thep-akrapong's (1997) findings and works will be referred to inclusively in this chapter.

The structure of the analysis of each test item is composed of:

1. the test item or problem statement (PSI) of the interpretation test (test 1);
2. the answer key (AKI) for the elipted part in Thai pronunciation using Romanised words;
3. the interlinear gloss (IG);
4. a literal translation (LT) with elipted portions bracketed where necessary;
5. the problem statement of the recovery test and the recognition test (tests 2&3, abbreviated as PS 2&3) and the answer keys (AK 2&3);
6. explanation of relevant features of the Thai language;
7. the students' performance and strategies during the tests;
8. the reasons for the students' answers, and
9. the researcher's overall interpretation.

The students were asked which strategy they used to answer each test item and they were also asked to give reasons why they answered the items as such. The students' strategies and reasons were recorded on tape cassettes or written on their test paper. All of this information is used in the analysis.

As mentioned earlier in Chapter 2 Thai is a tonal language and tone markers are applied nonnally above the initial or the second consonant (if clustered) of a word. There are 4 tone markers called MAI~ EK for falling tone, MAI~ TO for rising-falling, MAI~ TREE for rising, and MAI~ JATAWA for falling-rising tone. Due to the constraints of the keyboard, in this thesis the 4 tone markers are represented by ', ~, *, and + respectively each of which will be placed at the end of the syllable or word of such tone in the answer key of the interpretation test.

In addition, items that share commoa characteristics of the Thai language will be explained together.

3. Ellipsis Type 1: Strict Ellipsis (items 1, 2, 4, 10, 18, and 19)

According to Quirk, et al (1985), strict ellipsis meets 5 criteria:

1. The ellipted words are precisely recoverable.
2. The elliptical construction is grammatically 'defective.'
3. The insertion of the missing words results in a grammatical sentence (with the same meaning as the original sentence).
4. The missing words are textually recoverable.
5. The missing words are present in the text in exactly the same form.

The problem sentences of items 1, 2, 4, 10, 18, and 19 met all criteria mentioned above. Therefore, they were categorized as strict ellipsis. The data obtained from the tests of those items were analysed as follows:

Item 1

PS1: In this case we would express the mass as 1.5×10^3 g. if there are three significant figures, and $1,500 \times 10^3$ g. if there are four.

AK1: ta~ mec sec' tua

IG: if { there are } 4 (classifier of bird)
 { have }

PS2&3: if there are three significant figures, and $1,500 \times 10^3$ g. if there are four _____.

AK2&3: significant figures

As said in Chapter 2, in counting anything in the Thai language, a classifier must be put after the number and it cannot be omitted except in some short conversations (Bandhamedha 1982, Tanlulakom 1997). Different nouns have different classifiers.

c.g. 4 pens = pakka sec' dam-

Gloss: pen 4 (classifier)

5 tables = toh* ha~ tua

Gloss: table 5 (classifier)

So in this case, the students had to apply a classifier for the word '*significant figures*' which is '*tua*' in the Thai language. The Thai word for '*significant figures*' could also be ellipted but it would be clearer if the students put it in their interpretation.

In regard to the research question number one stated in Chapter 2, which reads 'To what extent do students interpret elliptical sentences correctly?' thirty-four students (56.6%) answered this item correctly. Most of those who could not score on the item did not put the classifier in, while the rest misinterpreted the sentence. As for the strategies employed in answering this item, most students said that they looked for the contextual clues and looked at the structure of the sentence to help them interpret it. Even though many students said that they were familiar with this type of sentence, as they had seen such sentences in the textbooks before, more than 40 % could not interpret this sentence. It is possible that the students translated the sentence word by word using the glossary and stopped suddenly at the word '*four*', not realising that such an expression is not used in Thai, or they might have been afraid that if they added more Thai words than the words given in English, they might not be correct. The students did not dare to take the risk of answering in more words. Some of the students may not have known what was ellipted either. So they did not put the classifier in after the word '*four*.' And it is probable that some did not understand the whole sentence and, therefore, misinterpreted the whole thing. This accords with Bamelt's (1988) claim, which is that the level of willingness to take risk in interacting with the text and foreign language ability are one of the variables that can determine the level of reader comprehension. Taking Bamett's (1988) view into account, it may be said that the students who did not dare to take the risk of adding more words in their answer did not comprehend the sentence and the context to some extent. However, the major problem arising from this item might have been mainly related to the difference between Thai and English sentence structure.

In the recovery test, this item was correctly answered by 44 students (83.3 %), 25 from the high score group (HSG) and 18 from the low score group (LSG). It obtained the highest score frequency of all in this test. Those who did not score on the item filled in the following words, *significant*, *what will?*, *mass*, $1,500 \times 10^3$.

Those who did not answer the item just said that they could not answer. Most of them were from the LSG. One of them said that the sentence was complete in itself so he did not know how to find the word to fill in. This showed that he was not aware of the ellipsis. But those who could score on the item claimed that they used the previous clause as a clue to help find the words to fill in the sentence. They stated that the presupposed clause, 'if there are three significant figures,' was the clue. And they also viewed this item as an easy one. This confirmed the views of Oxford (1989) and Chamot & Kupper (1989 cited in Oxford 1989, p. 2) that students at all levels use strategies for reading but some or most learners are not aware of the strategies they use.

In the recognition test, this item received the highest score frequency from both groups: 29 from the HSG and 23 from the LSG. It can be presumed that the presupposition is quite clear. The students could make the right choice, saying that they looked at the neighbouring context to get the words. This was quite in accordance with Momouchi's (1986) claim which is that contextual information from previous frames can help restoring elliptical elements. For those who could not answer the item correctly, it might have been that they could not figure out the meaning of the whole sentence and did not realise the presupposed part of the sentence due to their poor English ability, i.e. the students had an inability to recover meanings from the co-text because of lack of English vocabulary. (Akman 1997, p.1). This group of students could be claimed not to have been aware of the ellipsis in this problem sentence.

Item 2

PS1: You should suspect that the law of gravity does not have the inverse square dependence that it should.

AK1: seung' man kuanja mee

IG: that it should have

PS2&3: You should suspect that the law of gravity does not have the inverse square dependence that it should _____.

AK2&3: do/have

Verbal ellipsis in Thai is different from that in English and occurs less frequently (Bandhmedha 1967, 1982). The finite verb cannot be omitted after an auxiliary. But in some cases a finite 'be' can be left out especially when it is preceded by an auxiliary 'should' and followed by an adjective.

Eg. <He is not as good as he should be good >
<He is not as good as he should ^.>

And in most cases, the subject of the second clause can be ellipted if it is the same person as that of the first clause (Thep-akrapong 1997). So the above sentence can be spoken or written as:

Eg. <He is not as good as ^ should ^.>

As per this test item, the main verb cannot be left out after the auxiliary 'should' in Thai. Only the object which is already presupposed can be omitted. (Bandhmedha 1982, Phukbhasuk 1980). Only twenty-two students from the HSG (36.67% of the whole subjects) could interpret the sentence correctly. No one from the LSG could score on this item. As for the strategy, some students claimed that the context, grammar knowledge and the glossary were of help while others said that they guessed the answer. Some students translated the sentence word by word and stopped their translation immediately after the word 'should' for fear that it might be wrong if they put more words than were in the problem statement. So their answer did not make sense in the Thai language. Guessing answers and not taking risks to answer were referred to by Ellis (1996), Tyrone, Cohen, and Dumas (1983) as an avoidance strategy. The students answered this item the same way as they did in item 1. The others may have exploited their background knowledge of physics and articulated the theory that they knew rather than sticking to the problem sentence. Alternatively the students might not have understood the sentence. They may not have understood what they were being asked to do. So they tried their best to explain the concept lying beyond the problem statement. This might be counted as an avoidance strategy too (Tarone, Cohen, and Dumas 1983). The students employed it when they did not know the target language well. In the test, neither an explanation in relation to ellipsis nor an example of how to answer the test item was provided since this study was intended to find out whether or not the students were aware of

ellipsis when it occurred. The students' inability to interpret partially proved that some students were not aware of ellipsis.

It is very interesting that, in the recovery test, some students supplied the word '*suspect*' in the blank without considering the sentence thoroughly. They just compared the structure of first part and the last part of the sentence they were working with. The first part of the sentence reads '*you should suspect....*' And the last part also contained the word '*should*' just as in the first. So they put the word '*suspect*' in. This revealed that they certainly did not know the meaning of the sentence.

A number of students completed the sentence with the verb '*be*.' This can be traced back to their past English classes. According to the researcher's experience, the students had often practised most of the sentences with the pronoun '*I*,' and the verb '*be*' in the present simple or infinitive form in their English class. They as well as a lot of Thai people, consequently, overgeneralised the L2 rule (Selinker 1972, Corder 1981) and said or wrote '*I'm*' or '*I am*' whenever they wanted to start their sentence with '*I*.' Moreover, they were also accustomed to the word '*be*' which is used after some modals such as *will*, *would*, *can*, *could* and *should*. So in this study the phenomenon, that the students put the word '*be*' in, was just a habitual action of too much practice of the modals followed by '*be*' during their English language study. This is called '*the prefabricated pattern*', a subcategory of overgeneralization, which was defined by Hakuta (1976) quoted by Tarone, Cohen, and Dumas (1983, p. 8) as a regular patterned segment of speech employed without knowledge of its underlying structure, but with the knowledge as to which particular situations call for what patterns.

However, some students put the verb '*have*' in their answer. This could be analysed in two ways. Firstly, this phenomenon is related to the matter of language transfer or the interlanguage where the students compared the problem sentence with that in their native language and then interpreted or retrieved the word(s) having the same meaning as that in their native language (Tarone, Cohen, and Dumas 1983, Iwata 1998, Chunjic and Fang 2000., Ellis 1997, Alben and Olber 1978 (cited in

Bhela 1999), Blum-Kulka and Levenston 1983). Practically in the Thai language, the finite verb could not be omitted or substituted (Bandhumedha 1967, Thep-akrapong 1997, Phukbhasuk 1980). The students, therefore, put 'have' in their answer. Secondly, this phenomenon may have been related to students' familiarity with the British English way of using the word 'have' as a finite verb without any auxiliary in the interrogative, negative, and declarative sentences as well as in a short answer.

eg. Have you any money?

Yes, I have.

No, I have not.

The students might have thought of such sentences they had learnt in school, and consequently, answered 'have' for this item. The matter of interlanguage and overgeneralisation of target language, as Selinker (1972) and Corder (1981) postulated, could possibly account for this answer

Apart from this, some students put *have the square dependence* in because they retrieved the exact presupposed elements which include the object of the verb 'have' due to their lack of understanding of grammar and structure of L2 (Wimonchalo 1992). This, following Chomsky (1965, pp. 128-147), may be considered as the deep structure of the sentence before it was shortened to 'have' or derived to 'do' in American English in the surface structure of normal conversation or writing. Traced back to its origin, this sentence consists of 3 sentences which read:

1. You should suspect something.
2. The law of gravity does not have the inverse square dependence.
3. The law of gravity should have the inverse square dependence.

Sentence 3 was derived to be an embedded clause of sentence 2. The derivation process should look like this. 'The law of gravity' in sentence 3 was changed to a pronoun 'it' to represent the same words in sentence 2. Then the word group of 'have the inverse square dependence' was omitted as it was also a repetition of that in sentence 2. The word 'that' was inserted in the front as a conjunction. So sentence 3 became 'that it should' Then the whole derived part was placed after the words 'the inverse square dependence' in sentence 2, resulting in the sentence which reads 'The law of gravity does not have the inverse square dependence that it

should.' Then the conjunction *'that'* was inserted in the front of sentence 2, which was later replaced the word *'something'* in sentence 1. So at the surface level, the sentence reads:

'You should suspect that the law of gravity does not have the inverse square dependence that it should.'

Having realized such a possibility, the researcher gave one point to the students who retrieved *'have an inverse square dependence'* as this answer, according to the researcher, was also correct to some extent. Their answer showed that they understood the essence of the sentence correctly in spite of the omission of some words (Hardison 1992). In this study, the researcher did not limit herself to looking at the surface structure of the sentence only because it was not possible to predict what kind of structure the students would retrieve. So any kind of answer whether invoking deep or surface structure, and whether short or long was acceptable as long as it conveyed the students' correct understanding. But the deep or long structure retrieval was counted as the partially correct. Only *'do'* or *'have'* was counted as a correct item.

Most students in giving the reason for their choice of words said that they took the context of the whole sentence and its structure into consideration. This implies that the teaching of context clues and grammar was helpful to the students. The students had been taught how to combine sentences. The deletion of the repeated word(s) was included in the teaching. So in this case, those who could retrieve the exact copy of the presupposed elements might have maintained what they had learned in class in their conscious or subconscious mind and applied it in this test. However, only 12 students (20 %) recovered the ellipted element correctly; 11 from the HSG and 1 from the LSG.

For the recognition test, fifteen students (25%) could score on this item: 11 from the HSG and 4 from the LSG. A number of students claimed that they looked at the neighbouring context before choosing the words. This was the strategy employed by most test takers (Hardison 1992, Allen 1995, Placencia 1995). However, for this item the students looked at the wrong part of the sentence. They just compared the

part: that looked similar and decided to choose 'suspect' without considering the meaning and the rest of the sentence.

Item 4

PS1: If the formula holds for $n = k$, does it also hold for $n = k+1$? The answer is yes, and here's why.

AK1: 1. lach nee' kue hetpon wah' tammai jueng pen chen'nan~

IG: and here is reason why is so

AK1: 2. lach nee' kue hetpon wah' tammai jueng chai'

IG: and here is reason why yes

PS2&3: If the formula holds for $n = k$, does it also hold for $n = k+1$? The answer is yes, and here's why _____.

AK2&3: the answer is yes

Ellipsis like that in the above problem sentence is not possible in Thai. It needs a substitution for 'the answer is yes' to complete the sentence. We cannot say 'here's why' as in English. 'hetpon wah' (the reason wah) must be inserted between the verb 'be' and the question word 'why' and 'jueng pen chen' nan~' must be placed after 'why' to make sense. If the sentence had been 'and here is the reason why it is so,' the students might have been able to answer the item because they used the word to word translation strategy. Literally, the elliptical sentence means 'lach nee' kue tammai' in Thai which is not standard. Most of the students, therefore, interpreted it wrongly. Only 16 students (26.6 %) could answer correctly. Those who answered the item incorrectly literally translated the English sentence word by word and stopped their translation at the word 'why'. They thought that this sentence was very easy since there was no difficult vocabulary. They did not realise that some words were elliptical in English but could not be in Thai. So their answer was not correct. Their perception of the sentence was wrong.

However, it is possible that the students understood this sentence well but some of them could not express the meaning appropriately in Thai since they were from science and vocational streams. Their Thai and their English skills tended to be

poor. Nonetheless, some students really did not know that there was an ellipsed element after 'why'. Therefore, they failed to reconstruct the ellipsis.

In the recovery test, there are many varieties of the wrong answers: *it does, does it hold for $n=k+1$, $n=k+1$, the formula holds, it is true, it real, it is, not true it false, it yes, do you think?* For the first 4 answers, the students tied themselves up with the question 'why' and they were quite certain that 'the why question' was derived from 'why does it also hold for $n=k+1$ ' as the answer to the question was 'yes'. Actually this answer is grammatically wrong too. The word 'does' cannot be used and 'hold' should be 'holds' with 's' ending because this is supposed to be a part of an affirmative sentence. The students did not realise this matter.

For the answers, *it does, it is true, it real, it is, it yes*, they were literally close and it could be assumed that the students did not know how to express themselves in appropriate English and could not recall the exact word to retrieve. These answers apparently showed that the students used analogy with English words, not realizing that a particular word had to be used in a particular context; as for example, in the case of the words 'true' and 'real.' The meaning of both words is the same in some cases in Thai, especially in mathematics. So they may have thought that both meant the same in this context too.

As per the answer 'do you think?' it might arise from the question 'why do you think so' which was, actually, incorrect. Nevertheless, it reveals that that student tended to understand the context of the sentence. As said in the analysis of this item in test 1, Thai people tend to retrieve 'tamnai jueng pen chen' num~' which is equivalent to 'why it is so' instead of 'tamnai kamtoeb kue chui' (why the answer is yes). 'why it is so' is the surface structure (Chomsky 1965) of the Thai language that came to some of the students' minds unconsciously. Only 5 students from HSG scored on this item in the recovery test.

In the recognition test, this item scored 21; 13 from the HSG and 8 from the LSG. Most students allowed the subject knowledge to override linguistic cues; i.e. they related their answer to the preceding mathematical problem more than to the

language. So they chose 'it also holds for $n=k+1$ ' or 'does it also hold for $n=k+1$ ' as their choice. Those who made the former choice were accurate with respect to the sentence structure while those who chose the latter may have been careless or may not have known the structure of the indirect speech well enough. This may be said to be a matter of inattention. This item received 21 scores: 13 from the HSG and 8 from the LSG.

Item 10

PSI: Which deluxe single hospital rooms, if any, will be vacated by the end of the day?

AK1: 1. mee hong~ piset diw' mni? ta~ mee hong~ nai

IG: {there is } room deluxe single ? If {there is. } room which
 {have } {have }

AK1: Ja yai~ ok bang- yen nec~?

IG: will move out evening this?

LT: Is there (any) deluxe single room? If there is (one), which room will (its patient be) move(d) out this evening?

AK1: 2. ja mee hong~ piset diw' hong~ nai wang'

IG: will {have } room deluxe single room which empty
 {there be } is evacuated

AK1: bang~ yen nec~

IG: any evening this?

LT: Will there be (any) empty deluxe single room this evening?

PS2&3: Which deluxe single hospital rooms, if _____ any _____ will be vacated by the end of the day?

AK2&3: if there is/are any deluxe single hospital room(s)

The Thai sentence for this item is totally different from the English. It cannot be translated word by word. Many changes must be made to make a proper Thai sentence (See the gloss given). To interpret or translate this sentence into Thai as in the first answer, the words 'there is ... deluxe single rooms' can be ellipted as in English, but the ellipted element must be presupposed. In the second case, 'if any' is

ellipted in Thai and the word 'there is' is moved to the front and changed into 'will have'

Only three students from the HSG could answer this item correctly in the interpretation test. Lexically and structurally, this sentence is too difficult for the students to interpret. There is no Thai equivalence for this sentence. The students said that even though the glossary was provided, they did not know how to make sense of those words. This type of elliptical sentence is too complicated for them. Almost none of the students could interpret this item. This contradicted Uljin and Strother's (1990) finding which is that the complexity of the syntax does not affect the reading comprehension of native and non-native English speakers when reading technical English. In this study, it did affect their reading comprehension significantly.

In the recovery test, this item received 18 scores; 14 from the HSG and 4 from the LSG. The answer 'which one' supplied after the word 'any' reveals that the students partially understood the context of the sentence but could not retrieve the words. Some students put 'of it' after 'any' because they knew that the word following 'any' must be the presupposed noun in the front part of the sentence but they failed to notice that the presupposed noun was plural. So they replaced it with a singular noun. Although their answers were not correct, they revealed a part of the students' English knowledge gained from their EFL classes. Most students did not supply the ellipted words saying that it was too difficult and they did not know the answer

In the recognition test, fewer students could answer this item because of the complicated order of the sentence. Nine students from the HSG and seven from the LSG could gain the point. Most of them said they chose the answer by guessing. So it cannot be said that they knew what was ellipted.

Item 18

PS: What does it mean for a function to be differentiable on an open interval?
On a closed interval?

AK1: lach tua tee' (sueg')ha anupandai- bon chuang'

IG: And (classifier of function) that differentiable on interval

AK1/2: pid maikwamwa' yang'rai

IG: closed mean what (or how)

LT: And (what about the) one (that is) differentiable on (a) closed interval,
(what/how does it) mean?

PS2&3: What does it mean for a function to be differentiable on an open interval?
_____ on a closed interval?

AK2&3: What does it mean for a function to be differentiable on a closed interval?

The ellipted elements in this sentence cannot be omitted in the Thai language but some words, especially a noun, can be substituted. The phrase 'for a function' is substituted with 'tua tee' which is similar in meaning to 'the one that' while the question is substituted with and expanded into 'lach maikwamwa' yang'rai, (And what about, means what?'. The relative pronoun 'tee' (that) and the verbal group 'ha anupan dai-' (literally means 'can calculate/can find value for its derivative' in Thai but here it can mean '(be) differentiable') are also needed to modify the classifier in the Thai sentence in this case. Actually the word 'differentiable' means 'tee' or 'sueg' ha anupan dai-'. When 'tee' or 'sueg' ha anupan dai-' is placed after the word 'tua tee', the word 'tee' or 'sueg' in front of the word 'ha anupan dai-' is deleted because both 'tee' and 'sueg' function similarly as a conjunction joining a noun/pronoun and its modifier together. However, it is common for some Thai people to say or write 'tua tee sueg' but not 'tua tee tee'.

In the interpretation test (test 1), thirteen students from the HSG and only one from the LSG could score on this item. In the recovery test (test 2), eleven HSG students and three LSG could recover the ellipted element correctly while in the recognition test (test 3), fifteen HSG and thirteen LSG students recognised the ellipted elements provided in the multiple choices.

The problem with this item was caused by the difference between the students' target and first languages. The presupposed sentence structure in the target language was totally different from that in Thai. In Thai, this sentence is not spoken or written as long as it is in the English language. It is read:

Thai: Function tee' (or sueng') ha anupan dai~ bon chuang' perd

IG: Function differentiable on interval open

Thai/2: Maikwamwa' yang'rai

IG: Mean what (or how)

LT: What (does the) function (to be) differentiable on an open interval mean?

Thus the students were unable to understand the English sentence (Chansing 1986). And as a result they could not interpret the second sentence either. The Thai language used for translating or interpreting the problem sentence was also very complicated in itself because it needed a substitution and expansion. But for the recovery test, the students applied their skill at using context clues to help retrieve the ellipted elements without knowing what the sentence meant (Allen 1995). They just compared the sentences and realised the similarity, and finally supplied the sentence as presupposed. This was the same for the recognition test.

Item 9

PS: What is a second derivative? A third derivative?

AK1: Laeh tu tee'sam kue arai

IG: And (classifier of a derivative) third is what

LT: And what about (a) third derivative, what is it?

PS2&3: What is a second derivative? _____ a third derivative?

AK2&3: What is a third derivative?

This item is similar to the previous item in that the presupposed element cannot be ellipted in the Thai language but it can be substituted. The noun 'derivative' is replaced by the classifier 'tan'. And the question part is expanded into 'laeh ... kue arai (and what about..... is what?)' The word 'third' means 'tee sam' in Thai.

In the interpretation test, twenty-one HSG and seven LSG students could interpret the sentence correctly while in the recovery test, fewer students from the HSG could score on the item; only nineteen of them. But more LSG students, thirteen students, could recover the ellipted elements correctly. In the recognition test, fewer HSG students could recognise the omitted elements provided while many more LSG students, nineteen, were able to pick up the ellipted elements correctly.

The students reasoned that they did not understand the presupposed sentence. They tried to translate word by word and could not get the right meaning. In the recovery test, many students supplied the word 'And' as a conjunction only. Furthermore, most students in the HSG put 'What about' or 'How about' in, and they also chose these two answers in the recognition test, reasoning that they were familiar with this type of questions. In addition, they were close to the Thai language when being translated. The students did not get any points for those two answers because they were not the exact one and according to Huddleston and Pullum (2002), 'What about' and 'How about' are not appropriate in formal language such as that found in written textbooks. Those who could score on the items said that they just copied the presupposed sentence because they looked at the neighbouring context and believed that what they found there was of the same pattern. In the recognition test, many HSG students chose either 'And what about' or 'And how about' which was just partially correct. So they did not score much on this item.

With respect to the difficulty of this type of ellipsis, the quantitative analysis in Chapter 5 revealed that its mean scores of the correct items in the interpretation, recovery, and recognition tests were .69, .74, and 1.15, making the average score of the 3 tests of .86, the highest score of all types. However, it is below the mid point. As for the students' perception on this type, most students viewed four items as difficult. Only items 18, and 19 were rated as easy. From this it could be claimed that this ellipsis type was rather difficult. Both groups' perceptions accorded relatively well with their performance.

The investigation of the students' performance by groups and by tests shown in Tables 3, 4, and 5, Chapter 5 revealed that the HSG was much better than the LSG

in answering the interpretation and recovery tests. For the recognition test, both groups could perform almost similarly. The mean scores by tests of the HSG were .99, 1.03, and 1.25, while those of the LSG were .38, .45, and 1.04 respectively. The finding accorded with the ability of each group. As for the perception, the HSG rated most items as easy while the LSG did the opposite. The LSG's perception was true while that of the HSG was somewhat less so.

4. Ellipsis Type 2: Standard Ellipsis (items 6, 8, 9, 13)

Four criteria are applied for this type of ellipsis, according to Quirk, et al (1985). Criterion (c), the exact copy criterion, need not apply.

Item 6

PS1: If the velocity of a particle is non-zero, can its acceleration ever be zero?

Explain.

AK1: jong atibai

IG: explain

PS2&3: If the velocity of a particle is non-zero, can its acceleration ever be zero?

Explain _____.

AK2&3: Explain why or why not it is so.

In the Thai language, the elements after 'explain' can be ellipted as in English. But the word 'jong' must be added in the front of 'atibai' (explain) because it is a pre-verb for ordering someone to do something (Bandhmedha 1967). It is not a part of the word 'explain'. However, the word 'jong' may be omitted if the sentence is not ellipted. That is, 'jong' may not be needed when we say '*Explain whether the particle's acceleration can ever be zero if its velocity is non-zero.*'

This item was interpreted correctly by 29 students (48.33 %). Most students viewed it as an easy item. The ones who got it wrong did so because they did not put the word 'jong' in the front.

Some students gave only the meaning of the word as in the glossary, not being aware of ellipsis both in English and Thai.

In the recovery test, only three students from the HSG and one from the LSG scored on this item. A number of students said there was no need to fill in the blanks because the sentence was complete in itself, implying that they were not aware of the ellipsis. Those who completed the sentence with the wrong answers put in the following; *how, how could they do that, please, why does it happen, the reason why its acceleration ever be zero, why it can be zero, your thinking, why it can or can't, its acceleration may be zero, why do you think like that, your answer, that, relate between velocity and acceleration.* The students' answers reveal that many of them knew well what was requested by way of explanation but they did not know how to express it in English. Their answers, 'why it can or why it can't,' can best illustrate their ability to retrieve the elements. The answer "please" reveals that the students might have thought in terms of politeness in spoken language.

In the recognition test, twenty-two students (15 from the HSG, 7 from the LSG) answered 'why or why not its acceleration can ever be zero.' This phenomenon is the same as what they did in item 2, which is related to the matter of surface and deep structure. The students might have unconsciously applied the grammar rules for sentence combining and word deletion which they had overgeneralised (Selinker 1972) to their retrieval of their answers. They, consequently, retrieved almost the exact copy of the presupposed elements, not realizing another layer of derivation.

In addition, there were some students who chose 'about the velocity and the acceleration of a particle'. This answer can be said to be associated with the Thai language. Thai teachers usually ask students, in the Thai language, to explain 'about something' not 'explain something.' So the word 'explain about' remained in their mind as an interlanguage phrase, causing the retrieval of such words in the given situation (Cabrera 2002., Luth 2002, Krashen 2002, Zingale 2002, Tono 1999). This is why only 7 HSG students could score on this item.

Item 8

PS1: Video are produced as you would any video products (set, actor, and so on), then digitized for storage on CD-ROM.

AK1: There are 2 possible answers:

1. video tuk palit yang' tee' kao palit kan tua'tua' pae

IG: video produced as they produce in general

2. video tuk palit yang' tee' kon palit video tua' tua' pai

IG: video produced as you produce video in general

PS2&3: Videos are produced as you would _____ any video product,

AK2&3: produce/ do to

In Thai, the first alternative from the answer key is preferable if the word 'you' is changed to 'they' because it is understood that most readers could not produce a video. Rather someone else could. The word 'kan' is a post-verb meaning 'with each other,' or 'together' when many people do something together or something similar. In the first alternative interpretation, the auxiliary 'would' and 'video products' can be left out. For the second, the word 'you' is still present, the word 'would' is dropped out, 'produce' is retained, and 'products' is ellipted.

Not being professional translators, all students answered with the second choice. Only three students (8.33 %) from the HSG could answer this item correctly. Almost all students viewed this item as hard. This may be because such sentences are very rare in textbooks used in English classes. The researcher is quite certain that English teachers rarely teach this kind of sentence. If they happen to come across it, they may just translate it for the students, not emphasising what is ellipted or explaining why the sentence is formed as such. It is possible that the students did not understand why the auxiliary is followed by the object instead of the finite verb. If they had realised this, they should have known that the finite verb is ellipted. But if they had never been taught ellipsis of this kind, this would have been beyond their ability. This type of sentences needs to be taught.

Only 6 students could answer this item correctly in test 2; 3 from each group. The incorrect answers are: *as, produce by, assemble, be, have, use, like, produced,*

hightech, video digitized, to, digitized, be produced, storage and so on. Among these, *assemble* is the closest to the context but the word is not presupposed. However, this reveals that the students' thinking process is based on their native language. And as they were students in the field of science and technology, they picked up the technical term to complete the sentence. The answers, *hightech, video digitized, and digitised*, also revealed the students' background knowledge in technology. The answers, 'be' and 'like' illustrate the students' acquaintance with the two words employed after the auxiliary 'would' caused by frequently heard English expressions in and outside the classroom. The phrases '*produce by, produced, and be produced*' show that the students knew the presupposition but were not able to recover the correct word. This resulted from their lack of grammar knowledge. The answer 'storage' is very clear evidence that the students tried to find the word by equating the English with the Thai and they did not know that 'storage' is a noun. This reveals that some students' grammar awareness was very poor.

In test 3, this is also a matter of code-mixing of L2 and L1 (Zingale 2002). The students took the presupposed elements and their first language rule into account. What was presupposed was '*produced*' and the Thai grammar rule prohibited the omission of the finite verb. Therefore, many students answered '*produced*,' the exact copy of the presupposed element, not realizing that the ellipted verb was placed after the auxiliary 'would,' and the right word must be '*produce*,' an infinitive verb. Fourteen students from the HSG and six from the LSG scored on this item. This reveals that if the ellipted words are not the exact copy of the presupposed one, it is almost impossible for Thai students to recover or recognize them.

Item9

PS1: In 1981, IBM tossed its hat into the personal computer ring with its announcement of the IBM Personal Computer, or IBM PC. By the end of 1982, 835,000 had been sold.

AK1: There are 2 possible answers for this item:

1. kai computer IBM PC dai~ / (orpai) 835,000 kneng'

IG: sell computer IBM PC 835,000

2. computer IBM PC tuk kai pai 835,000 kneng'

IG: computer IBM PC was sold 835,000

PS2&3: By the end of 1982, 835,000 _____ had been sold.

AK2&3: IBM Personal Computers / IBM PCs

Unlike in the English language, the sentence structure of the active and the passive voice in the Thai language is the same. The Thai readers or the listeners can automatically realise or distinguish who the performer or the receiver of the action is. (Wimonchalo 1992, Tantulakom 1997).

Eg. Thai: sapan kamlangkoh'sang~

IG: bridge is building

LT: (The) bridge is (being) built.

Most of the time, only action that causes negative results is written or spoken in the passive structure as in English (Tantulakom 1997). In Thai, the word 'tuk' (which is not a form of the verb 'be,' but can be considered equivalent to the function of the verb 'be' in English passive voice) is inserted in front of the main verb to show that the subject of the sentence is the receiver of the action.

Eg. Thai: pu~chai koiueng' tuk ka'

IG: man a was killed

LT: A man was killed.

In item 9, the problem statement is in the passive voice. The students may not have realized or remembered the passive voice structure of the English sentence. So some of them could not interpret this sentence. Twenty-six students (43.3 %) could

interpret correctly and they chose to interpret as in the second alternative in the answer key

Of those who did not answer, some thought that 835,000 was the amount of money the company had got as they did not recognise the passive verb that followed but thought of the money earned in relation to the word 'sold'. Unlike English verbs, verbs in the Thai language never undergo any change no matter what time the events occur or what the subject is, singular or plural. 'Sell' or 'sold' means the same in Thai. When one 'kai' (sell, sells, sold) something, he gets the money. So they put the word 'dollar' or 'baht' (Thai currency) in.

On the contrary, some students did not put any word after the number in their interpretation. They just wrote:

Thai: kai dai~ 835,000 as their answer.

IG: sell 835,000

leaving ambiguity as to what the number refers to. This, according to the researcher, was cheating. The students did not know exactly what the number referred to. They chose not to supply any word after the number to be safe from penalty despite not allowing the omission of a classifier in the Thai language. They used an avoidance strategy to answer this problem. (Tarone, Cohen, and Dumas 1983).

With respect to the word 'dai~,' it is a post-verb meaning that one has done something and gained whatever and 'pai' in the second answer key is also a post-verb used to indicate that something was taken away. (Bundhamedha 1982, Phukbhasuk 1980).

Regarding the number '835,000,' as there was no noun after it, it was ambiguous to the students especially when they did not recognise the passive voice sentence. To them, it might have referred to what was sold or to the amount of money received. It may be said that in this item, the students knew that something was ellipted but they did not know what, so they did not put any word in. Some students might have been afraid that it would be wrong to put more words in as it would be different from the original sentence. Therefore, the causes of the mistakes

here were related to their low English proficiency and the interference of the mother tongue.

Twenty-three students recovered the clipped elements correctly in test 2; 19 from the HSC and 4 from the LSG. The interesting wrong answers are *computers, units, products, piece*. These particular answers show that the students had tried to find the word with the same meaning as a classifier for (a) computer(s) in the Thai language to fill in, but they could not recall the exact word. The other answers were *costed, \$, profit bath* (Thai currency). They show that the students did not understand the sentence. Seeing the big number, they related it to the word 'sold' and filled the blank with such words. Another interesting answer is *bf it* which implies that the students knew what 835,000 referred to but could not use the proper English word to answer

In test 3, the researcher intended to have choice (c) as the correct answer for this item, she offered 2 alternatives within this choice; IBM personal computers or IBM PCs. Her intention was that either IBM personal computers or IBM PCs was correct. She did not mean that the students had to fill all the words of this choice in the sentence slot. In Thailand, it is common to have 2 alternatives in one answer choice as the one in (c), if both are correct, or if one alternative is the abbreviation or another name of the other one. It is certain that students know and are familiar with this kind of option. Since students are thus likely to interpret the two elements in © as alternatives rather than constituting the whole answer, either element ('IBM personal computers' or 'IBM PCs' could also be counted as correct. So in choice (c), if the students understand the presupposed and the elliptical sentences, it will not be any problem to them. However, within this choice the researcher unintentionally typed the word 'the' in front of the words *IBM personal computers* or *IBM PCs,*' which made the choice grammatically wrong. Nevertheless, twenty-seven students chose choice (c) as their answer, saying that they looked at the presupposed sentence in finding the answer for this item and knew that *IBM personal computers* or *IBM PCs were sold.* According to the analysis of this item in the interpretation and the recovery tests, the students' mistake was caused by other factors rather than the article 'the.' A number of students could not score on this item in the recognition test

mostly because of other kinds of grammar mistake. For example, they did not recall that the ellipted words needed an 's' ending as it is a plural noun. Unlike in English, no additional element is needed at the end of a noun to mark its plurality in Thai. In this item, the ellipted word was different from the presupposed noun. It needs an 's' ending because it is a plural noun. Consequently, some students failed to recognise this point. Some students answered 'IBMs' because 'IBM' to their knowledge in common speech refers to (any brands or kinds of) computers rather than to the company itself. IBM was the first brand of computer machines that came into use in Thailand. So 'IBM' is often used in reference to any brands of computers just as with many other types of merchandise. For example, instead of using the term detergent, they say 'Fab,' the first popular brand of detergent in Thailand, to refer to any brands of detergent. It could be inferred that this was a problem of conceptual influence across cultures. However, it cannot be that choice of the answer (a) 'IBMs' revealed the students' recognition of the plurality of the recovered element because in choice (c) the answer was in the plural too. Even though choice (c) contains an article 'the' in the overall response or in the first alternative within response (c) (the IBM personal computers), the second alternative (IBM PCs) could be argued to be correct for those who interpret option (c) as providing two alternatives. The students who chose to answer 'IBMs' did not realise that this response-though pragmatically appropriate in common speech-is itself elliptical. Moreover, the word 'IBM' in the presupposed sentence refers to the company producing IBM computers but is used as a 'classifier' (in Halliday's terms) in the phrase 'IBM personal computers.' The researcher would rather claim that the students did not know that the words 'personal computers' or 'PCs' had to come after the word 'IBM'.

Item 13

PS: How is a function's differentiability at a point related to continuity there, if at all?

AKI: ta~pue' man bangeam _____ sampan kan

IG: if it coincidentally relate with each other

LT: if it is coincidentally related (with each other at all)

PS2&3: How is the function's differentiability at a point related to continuity there, if _____ at all?

AK2&3: if it is at all/ if it is related to continuity at all?

This sentence is considered a standard ellipsis sentence because the recovered element is not exactly the same copy as that of the presupposed sentence. The presupposed '*a function's differentiability at a point*' is replaced by the pronoun '*it*.' In the Thai language, this sentence was spoken or written differently. It reads:

t a-pue' man bangearn sampan kan

which literally means '*if it is coincidentally related with each other*' The word '*pue*,' or '*hak*' is a part of the word '*if*.' '*ta~pue*,' '*ta~hak*,' or '*ta~*' can be said to mean '*if*.' In this case, it is necessary to say '*ta~pue*,' or '*ta~hak*,' and '*bangearn*,' because the combination of these three words included the meaning of the word '*at all*' The word '*sampan*' is usually followed by either the word '*kan*' if two things are related to/with each other or by '*kan kab*' if one thing is related to/ with another. The word '*kan*' is a post-verb which means '*with each other*' or '*together*.' (see item 8)

Only two students from the HSG could interpret this item accurately. This item is considered the hardest one. One reason behind this is that the elliptical sentence of this kind does not occur in Thai. We have to say it in full as in the answer key to the interpretation test (AK1). Another reason is that the students are more familiar with '*at all*' in another sense as in '*I don't like this at all*,' rather than this type of sentence. '*at all*' in '*I don't like this at all*,' means '*laey*,' which is a word for expressing emphasis. So when the students combined the words '*if*' and '*at all*' in this sense, they could not arrive at any sensible meaning.

Apart from this, the lexicon and the structure of the presupposed sentence are also factors that obstruct the students' ability to interpret. The subject of the problem sentence is modified with too many words both in the front and at the back. Some students thought that '*related tothere*' was a participial phrase modifying the word '*a point*'. They felt confused. However, some students considered that this item was easy because only a short phrase was required for the interpretation and they were sure to score on this item. But they were wrong.

In test 2, only one student from HSG could score on this item. Thirty-five subjects did not supply any word saying that they did not know and could not find any word for the slot. The words the students had filled in were: *one, that, includes any case, a function's differentiability, continuity, the points are*, all of which were relevant to neither English nor Thai. It might be said that the students knew neither the structure nor the ellipsis of this kind of sentences.

In test 3, not many students could score on this item either. This was so primarily because the structures of the L1 and L2 sentences were vastly different, i.e. the omitted part was totally different from that of the Thai language, and secondly because the modification of the noun subject was so complicated. In addition, the auxiliary and the finite verbs were placed very far from each other causing students' confusion. However, there were some students who made the choice containing 'there is' which indicates that they used the neighbouring context to help to retrieve the missing elements. Unfortunately, they were not correct. Only 18 students could recognise the ellipted element in this item: 12 from the HSG and 6 from the LSG.

In regard to the quantitative analysis in Chapter 5, standard ellipsis of the interpretation test was ranked the lowest with the mean score of .64. This ellipsis type's mean scores of tests 2 and 3 were .33 and .72. By groups, the mean score of the HSG was twice as high as that of LSG (.85 and .43). For the perception on this type of ellipsis, the students viewed two items as difficult (items 8 and 13), and another two (items 6 and 9), as easy but they scored on the items very poorly. According to the quantitative and qualitative analysis, it might be inferred that students' problems of incomplete grammatical knowledge, overgeneralisation, interlanguage, and sentence ambiguity as well as complexity found in the analysis of this type significantly caused the students' difficulty.

5. Ellipsis Type 3: Structural Ellipsis (items 16, 17, 21)

Ellipsis of this type can be recovered structurally, i.e. the ellipted element can be retrieved with the help of the structure of the sentence. Two problem items in this type are similar in that the word 'that' following the verb and preceding a clause was

ellipted. But in Thai, the word 'wa' which is equivalent to the English word 'that' in this context cannot be omitted. It is automatically attached to the verbs related to thought and speaking such as *think believe, assume, conclude, say, wonder, know*, etc., when they are followed by a clause. The other item is also structurally recoverable. The relative pronoun 'that' representing things is omitted. It means 'tee' or 'sueng' in Thai and it cannot be ellipted. However, the students were more familiar with the word 'that' as a demonstrative adjective meaning 'nan~' in Thai.

Item 16

PS1: Repeat this process until you are convinced you have found the shortest path.

AK1: jonkratung' kun nae'jai wa' kun dai~ pop

IG: unti you are convinced that you have found

AK1/2: tang tee'san~ tee' sud laew~

IG: path shortest

PS2&3: Repeat this process until you are convinced _____ you have found the shortest path.

AK2&3: that

This must have been the easiest item for the students. It received the highest score frequency of all in the interpretation test; 27 from the HSG and 22 from the LSG, making a total of 49 points or 81.66 %. The students could interpret this item well because the word 'wa' comes automatically after the word 'convinced' in Thai. For those who could not score on this item, it was because they did not understand the meaning of the whole sentence. They just used their imagination and answered something different.

In the recovery test, no one from the LSG could retrieve the ellipted element. Only 16 students from the HSG could answer this item correctly. The reason why most students could not recover the word after 'convinced' is that there is no equivalent English word for 'wa' in Thai. So most of them said they did not know. Some of them said the sentence was complete in itself and there was no need to find the word to complete the sentence. However, some students tried to find the English

word that they thought was closest in meaning. For example, some of them put in the word 'which' because they got confused by the relative pronoun 'which' and 'that' both of which can be used to represent a non-human noun. They thought that 'which' means the same as 'that' not realizing that the 'that' in this test item conveys a different meaning. Some students completed the sentence with *it process*, and *solution*. This might be because they thought that 'convinced' was a transitive verb. So they supplied an object. For the answer 'with process', it is certain that the students translated from the Thai language. Thai people say *nie' jai kab something'* meaning 'convinced with something'. 'kab' means 'with'. So instead of saying 'convinced of something', they say 'convinced with something'. This shows that the students did not understand that 'convinced that' must be followed by a clause and 'convinced with' must be followed by a noun. Apart from those answers, there are some interesting ones like 'or until, and, until', in which it may be presumed that the students supplied the connector to combine the two clauses together.

Some students did not choose the word 'that' in the recovery test, maybe because they forgot that it can be used as a connector meaning 'wa' in Thai, not only as a demonstrative adjective. So they tried the other choices. However, 37 students; 26 from the HSG and 11 from the LSG, could answer this item correctly.

Item 17

PS1: A billionaire offers to give you \$ 1 billion if you can count it out using only one-dollar bills. Will you accept her offer? Assume you can count one bill every second, and be sure to allow for the fact that you need eight hours a day for sleeping and eating.

AK1: sommut wa' kun samart nab dni~ nueng' bai' toh' winatec.

IG: assume that you can count one note per second

LT: assume (that) you can count one bill every second

PS2&3: Assume _____ you can count one bill every second,

AK2&3: that

Thirty-six students could interpret this item correctly. Many students who could not said they did not know. They wrote something like 'they are counting bank

notes,' etc., for their answer. In this test, the researcher did not provide the meaning of the word 'assume' for the students because if it had been told, they would have known at once that 'wa' was omitted. The students would have already known this word. If not, they were allowed to consult the dictionary or ask the researcher or the proctors. So the problem here was that they neither looked it up nor listened when their peers asked the researcher and the proctors. Another problem is with the word 'every'. If it had been changed to the word 'per', more students might have got the correct answer. The students were more familiar with the word 'per' than 'every' in the sense of ratio. So they could not interpret the item as they should.

For the recovery test, the students could not recover the omitted word 'that' because they could not find an English word equivalent to the Thai word 'wa'. This is the same problem as that in the previous item. They were more familiar with the word 'that' in the form of a demonstrative adjective modifying a noun placed far away as mentioned earlier.

It was obvious that the number of HSG students being able to answer this item correctly was dramatically fewer than those who could successfully complete the interpretation test and the previous item. Only 7 of them and 1 from the LSG could recover the right word. Many students did not give any answer. Some answered 'if' because they were accustomed to saying 'somnoi wa' ta~' which means 'assume that if'. Many Thai people say so even though it is not grammatical in Thai. 'if' is the repetition of the conditional word.

More than half of the students picked 'if' as their choice in the recognition test. This is so because, as said above, Thai people can say 'assume that if'. The students did not know that this is not possible in English. So only 16 students; 13 from the HSG and 3 from the LSG, could answer the item correctly.

Item 21

PSI: Careful study shows that, as the temperature of an object increases, the thermal radiation it emits consists of a continuous distribution of wavelengths from the infrared, visible, and ultraviolet portions of

spectrum.

AK1: rangsae kwamron~ lee man pac' okma

IG: radiation thennal that it emit

LT: (The) thennal radiation (that) it emits

PS2&3: Careful study shows that, as the temperature of an object increases, the thennal radiation _____ it emits consists of a continuous distribution of wavelengths from the infrared, visible and ultraviolet portions of spectrum.

AK2&3: that

Twenty-one students (35 %) could interpret this item correctly. Most students who could not score on this item probably were not aware that 'it emits' is a relative clause modifying 'thermal radiation' and they did not know how to break the sentence into chunks so that it was easier to interpret (Chansing 1986). It is very common in Thai that when we talk about something, we say the noun subject first followed by its pronoun then a verb and the rest of the sentence, for example, 'the teacher he doesn't come today'. This characteristic of the Thai language was referred to as 'Topic-comment' by Thep-akarapong (1997, p. 293) as 'left-dislocation' by Grohmann (2000). So in this item, the students maintained the word order of the mother tongue (Zingale 2002) by applying their first language to L2 interpretation based on their familiarity. So most of them say "radiation thermal it will emit wave thermal continuously," not being aware of the omitted word 'that.'

Only 8 students from the HSG could recover this item in the recovery test. Most students did not put any word in, saying that they did not know what was missing. As noted above, the students did not know how to split the sentence into chunks to make it clearer for their interpretation. The wrong answers that can be used to trace the students' idea are *object, of, of an object, make*. The students put the word 'object' in as a noun modified by the thermal radiation. Those who completed the sentence with 'of' and 'of an object' might have thought of the relationship between 'the thermal radiation' and 'it' or 'an object,' while those who chose the word 'make' might have thought of finding a verb for the subject, 'the thermal radiation'. The students did not realise that 'it emits' was a relative clause modifying

'*the thermal radiation.*' They had based themselves on the Thai language most of the time when they were studying English.

As some students did not realise that a relative clause was embedded due to the length and the complexity of the sentence, they chose either the word 'when' or 'of' to fill in the blank in the recognition test. Twenty-three students, 11 from the HSG and 12 from the LSG, scored on this item.

According to the quantitative data in Chapter 5, the mean scores of ellipsis type 3 (structural ellipsis) of the whole group (HSG and LSG combined) were 1.18 for the interpretation test, .36 and .84 for the recovery and the recognition tests respectively

By groups, the HSG performed much better than the LSG did. The mean scores of the HSG were 1.33, .69, 1.11 and those of the LSG were 1.03, .02, and .58. Both groups' mean scores of the interpretation test surpassed the mid point. As said above that the ellipted word is automatically attached to the Thai verbs that mean 'convince' and 'assume.' So the students could interpret them correctly. But their attempts to recover the words in test 2 could prove that they were not aware of ellipsis of this type.

As per the students' perception on this type of ellipsis, both groups viewed all items as easy. Nevertheless, they were not awarded many points. Their performance and their perception did not accord with each other.

6. Ellipsis Type 4: Structural Ellipsis without Precise

Recoverability (items 22, 24, 25)

According to Quirk, et al. (1985), this type of ellipsis can be recovered structurally but the ellipted element can be one of the two or three different words, for example, the relative pronouns 'who,' 'whom,' and 'that' all of which can be used to represent a human noun. The following items of this study contain this type

of ellipsis. The ellipsed elements are a form of relative pronouns. They are either 'which' or 'that' which means 'tee' or 'sueng' in Thai. The difference between the English and Thai languages in relation to relative clauses is that the relative pronouns can be omitted in some cases in English but they cannot be omitted in Thai. These two Thai relative pronouns must be put immediately after the noun they modify.

Item 22

PS1: How many derivatives does the function you know have?

AK1: function tee kun wajak mee anupan kee' tua?

IG: function that you know have derivative how many?

LT: How many derivatives (does) (the) function (that) you know have?

PS2&3: How many derivatives does the function _____ you know have?

AK2&3: which / that

Most students failed to mention the clause 'do you know' in their interpretation of this item. Many of them said 'How many derivatives does this function have?' or 'How many functions does the derivative have?' Twenty-one students (35 %) could interpret this sentence correctly, 18 from the HSG and 3 from the LSG. Normally, the structure of the English question is complicated to Thai students since many differences occur (Chansing 1986); the arrangement of word order, the placement of the question word, the movement of the subject, and the addition of an auxiliary verb, all of which result in Thai students' confusion. When the noun subject is modified by a relative clause whose relative pronoun is omitted, it is even more confusing. If the relative pronoun were not deleted, the students might be able to interpret the given question.

In the recovery test, most students did not answer this item. Only 13 students from the HSG could recover the ellipsed element correctly. The wrong responses were *order, do, can, are, if, of*. The answers that can be traced back are 'do' and 'if'. The students filled the blank with these two words because they were familiar with the question 'Do you know...?' And the clause 'if you know...'. In the recognition test, they also picked up these words as their choice. This confirmed the researcher's

speculation. Thirty-five students could score on this item, 20 from the HSG and 15 from the LSG.

Item 24

PS1: A joystick is a vertical stick that moves the graphic cursors in the direction the stick is pushed.

AK1: nai tittang tee' joystick tuk pluk pai

IG: In direction that joystick is pushed

LT: in (the) direction that (the) joystick is pushed

PS2&3: A joystick is a vertical stick that moves the graphic cursors in the direction _____ the stick is pushed.

AK2&3: that/which

Forty-one students (68.3 %), 25 from the HSG and 16 from the LSG could interpret this item correctly. As the relative pronoun in Thai cannot be left out, the students put the word 'tee' in its place automatically. Some of those who answered wrongly said, 'this sentence talks about a device.' They did not realise what they were asked to do. Some just spoke about something else like 'To use the device, the device is pushed,' or 'move the cursor by pushing the stick.' This reveals that the students were not aware of what they were asked to do and what the sentence meant. In the recovery test, only one student from the LSG and 17 from the HSG could recover this item. And only 14 students could recognize the ellipted element in this item in the recognition test, 9 from the HSG and 5 from the LSG.

Item 25

PS1: However, if you see something on TV you like, you can probably obtain the rights to use it (usually for fee).

AK1: tn~ kun hen kong tee' kun chob nai TV

IG: if you see thing that you like in TV

LT: if you see (something) that you like in TV

PS2&3: However, if you see something on TV _____ you like,

AK2&3: which/ that

Some students appeared to translate this sentence word by word, causing an ambiguity on what 'you like' (the 'TV' or 'something'). Thirty-six students (60%) could score on this item in the interpretation test. This English sentence is ambiguous to Thai students. They are not sure about 'what you like', 'something' or 'TV' because in Thai, the relative clause 'you like' is normally placed after the noun it modifies. Eighteen students from the HSG could recover this item in test 2 (the recovery test). Those who could not, possibly, did not remember or understand what they had studied in their English classes in relation to the relative clause. In test 3 (recognition test), the same number of students as that in test 2 could recognize the omitted word, 15 from the HSG and 3 from the LSG.

Owing to the findings above, it may be concluded that ellipsis type 4, structural ellipsis without precise recoverability, was one of the difficult types. Its mean scores for each test were 1.10, .55, and .68, which were less than half in the recovery and the recognition tests. However, by groups, the mean scores of the HSG were 1.50, 1.08, and 1.06 and those of the LSG were .70, .02, and .29 respectively. The HSG's performance on this type of ellipsis is much better than that of the LSG.

With respect to the students' perception on this ellipsis type, they viewed the first 2 items as easy (items 22 and 24), and the last item (item 25) as difficult. Their scores did not accord with their perception. It may be claimed that their perception was deceptive.

7. Ellipsis Type 5: Nonfinite Clause with Ellipsis of the Relative Pronoun and the Verb 'Be' (items 26, 27, 29, 30)

Ellipsis of this type is related to the omission of the relative pronoun and the verb 'be' in the passive voice relative clause in English. The passive voice relative clause in Thai can be shortened by deleting the auxiliary 'be' when it is certain that the object of a verb in the relative clause is not the performer of the action (Bandhmedha 1967, 1982, Tantulakom 1997). The relative pronoun and the other parts must be retained.

Item 26

PS1: The first part of this textbook deals with mechanics sometimes referred to as either classical mechanics or Newtonian mechanics.

AK1: kolosat sueŋ' bangkrang' ajja maitueng kolosat classic ruc

IG: mechanics which sometimes may refer to mechanics classical or

AK1/2: kolosat Newtonian

IG: mechanics Newtonian

LT: mechanics which sometimes (was) referred to (as either) classical mechanics or Newtonian mechanics

PS2&3: The first part of this textbook deals with mechanics, _____ sometimes referred to as either classical mechanics or Newtonian mechanics.

AK2&3: which is / that is

Only three students, two from the HSG and one from the LSG could interpret this item. Most students said, '*sometimes classical mechanics or Newtonian mechanics is referred to in mechanics.*' In this sentence, the word '*referred*' is the past participle used to modify the word '*mechanics.*' As the past simple and past participle forms of the verb "*refer*" are the same, that is '*referred,*' Thai students can hardly distinguish the difference between the two. So the students might have thought that '*referred*' was another main verb of the sentence as in Thai, the participle verb modifying the noun object is often thought or used as a main verb of that noun object.

Eg. Thai: chanhen kau dem yoo tee' sayam square

IG: I see him walk at Siam Square

LT: I saw him walk(ing) in Siam Square

The word '*dem*' or '*walk(ing)*' is often thought as a finite verb of the word '*kau*' or '*him.*' This is the cause why Thai people frequently speak or write run-on sentences in English.

Moreover, in Thai, passive voice is translated the same as active voice (Tantulakom 1997, Wimonchalao 1992, Thep-akrapong 1997). So in this item, the students tended to think that '*sometimes mechanics means or talks about classical mechanics and sometimes means Newtonian mechanics.*' Three students, two from

the HSG and one from the LSG could interpret this sentence correctly, and only one student from the HSG could recover the ellipted element in test 2 while the rest of the students were likely not to be aware of ellipsis in this sentence. In the recognition test, 18 students could recognize the answer to this item, 13 from the HSG and 5 from the LSG.

Item 27

PS1: The Faraday constant is the quantity of electricity required to deliver a standard amount of in electrolysis, and the SI unit of capacitance is the Farad.

AK1: pariman faifa~ jamnuan nung' tee' tong~ song' kaw

IG: quantity electricity amount a that must deliver in

AK1/2: electrolysis

IG: electrolysis

LT: (the) quantity (of) electricity (that) was required to deliver a (standard) amount (of) in electrolysis.

PS2&3: The Faraday constant is the quantity of electricity _____ required to deliver a standard amount of in electrolysis,

AK2&3: which is/ that is

Most students could supply the Thai relative pronoun in this item in the interpretation test. Those who could not explained the different matter of Faraday constant which they had learned from their physics class instead. However, this item is quite hard for some students to interpret because of the lexicon and the structure of the whole sentence. The words '*quantity*' and '*amount*' occur in close proximity to one another. To the students, their meanings are the same. So they could not express their meaning in Thai. Moreover, the prepositions '*of*' and '*in*' are also placed next to each other. This increases the load of interpretation. In the recovery test, only one student from the HSG could retrieve the ellipted elements while in the recognition test, 19 students could recognize the omitted word, 10 from the HSG and 9 from the LSG.

Item 29

PS1: The second half of the proof, that Eqs. (3) imply that F is conservative, is a consequence of Stokes' theorem, taken up in Section 14.7.

AK1: pen pon kong tritsadee Stokes tee' yoo' nai tontee' 14.7

IG: is consequence of theorem Stokes that is in section 14.7

PS2&3: The second half of the proof, that Eqs. (3) imply that F is a conservative, is a consequence of Stokes' theorem, _____ taken up in Section 14.7.

AK2&3: which was / that was

Twenty-two students (36.66%) could interpret this item. Some students thought that Stokes' theorem caused the writing of section 14.7. The others said, '*the consequence of Stokes' theorem is applied in Section 14.7.*' As Thai does not use passive voice sentences frequently, the students did not realise that this was a deleted form of a passive voice clause. No one scored on this item in the recovery test. Twenty-two students could recognize the ellipted elements in this sentence, 19 from the HSG and 3 from the LSG.

Item 30

PS1: A special glove fitted with sensors covers her right hand and allows her to manipulate objects during the design process.

AK1: tungmue piset tee' tidtung~ tua sensor wai~ suamyoo'

IG: glove special that fit/install sensor wear/cover

AK1/2: tee' mue kwa kongkau

IG: at hand right her

LT: (A) special glove (that was) fitted (with) sensors covers her right hand

PS2&3: A special glove _____ fitted with sensors covers her right hand.....

AK2&3: which is/ that is

The students were confused with this item since there are 3 nouns in the problem statement; the glove, the sensors and the hand. Their answers show that they did not think that the sensor was fitted on the glove but on the hand. Some answered '*the sensors cover her hand*' Thirty students (50%), 16 from the HSG and 14 from the LSG, interpreted this item accurately in the interpretation test. It may be said that

this sentence is quite ambiguous to the students as they did not know where the sensors were fitted. If they had been aware of ellipsis and passive voice, they should have been able to score on this item. No one could retrieve the ellipted elements of this item in the recovery test. Only 20 students could pick up the right choice for this item in the recognition test, 15 from the HSG and 5 from the LSG.

As a whole, items 26 - 27 received the lowest score frequency of all in the recovery test. The students could not retrieve the omitted elements. They said the items were very difficult. They did not understand the sentence structure and did not know how to make sense of the glossary given. The quantitative data obtained from the tests also supported the impression that this type of ellipsis was a critical problem. The mean scores of the 3 tests were .85, .12, and .66. The students could retrieve this type of ellipsis in tests 2 and 3 the worst. Nevertheless, they interpreted this type a little bit better than they did ellipsis types 1 and 2 (strict and standard ellipses). This was so mainly because of the difference between the Thai and the English languages especially in the area of passive voice. Tests 2 and 3 (recovery and recognition tests) could trace that the students did not understand English passive voice well and could not recognise it either.

Regarding the students' perception, item 26 was weighed almost the same on both difficult and easy sides. Items 27 and 29 were viewed as difficult while item 30 was expressed as easy. Their performance and their perception were not quite in accordance with each other

8. Discussion of the Findings

The item analysis of the study revealed that the students used several strategies to handle ellipsis in the tests. At least 11 strategies were quite obvious. This finding accorded with Charvát and Kupper (1989 cited by Oxford 1989, p.3), who confirmed that language learners at all levels use strategies for reading either consciously or unconsciously. But it contradicted Oxford's (1989) claim, which was that the most successful learners tend to use learning strategies that are appropriate to the material, to the task, and to their own goals, needs, and stage of learning (see

Chapter 2). It was found in this research that even though the students adopted many appropriate strategies such as using contextual or structural cues to answer the ellipsis problems and even though half of the subjects had high potential in classroom English, they were not so successful in solving the ellipsis problem. The quantitative part of this study especially in Chapter 4 could best prove that both groups of the subjects were not good at ellipsis. They scored on a small number of ellipsis test items (see the students' test results in Tables 3 - 7, Chapter 4). The whole group's correct item mean scores on the 3 tests were very low; only 7.9 items out of 20 for the interpretation test, just 3.88 for the recoverability and 7.45 for the recognition test. When considering the high and low scoring groups separately, it can be seen that the high scoring group's mean scores for tests 1, 2 and 3 were 10.5, 6.04 and 9.9. They gained only half of the total in test 1 and 3 and did very poorly in test 2. For the low scoring group, their mean scores of the 3 tests were 5.33, 1.63 and 5.01, which was very low. This led to the question whether both strategies, using contextual or structural cues to answer the ellipsis problems, employed by the students were appropriate to the material, to the task, and to their own goals, needs, and stage of learning or not. According to the researcher, they were very appropriate because the test items were from their own textbooks and most elliptical elements were presupposed. It was necessary for readers to examine context clues or structure of the sentence when handling ellipsis (Allen 1995, Momouchi 1986, Shapiro and Hestvik 1995). The presupposed elements were certainly the best clues. Nevertheless, these strategies were not very helpful in enabling them to interpret elliptical sentences. It was possible that, according to Barnett (1988), the students' foreign language ability was not high enough to comprehend the unique characteristics of English sentence structure.

Apart from using contextual and sentence structural cues as two major strategies to handle most elliptical sentences, the analysis also revealed that the students employed some other strategies to do the tests. These were word-for-word translation into L1 with the help of the glossary found in items 1, 4, 6, 9, and 16 of the interpretation test, looking at co-text for a parallel structure, in items 1, 2, 13, 18, 19, guessing in most items, using subject matter knowledge to work out the meaning, in items 2, 9, 25, 26, 27, applying classroom knowledge or generalization, in items 2,

6, and 10, operating with analogy with L1, in items 2, 6, 8, 19, and 22, projecting back to supposed deep structure, in items 2, avoidance, in items 13, 17, 18, and 19, and operating by analogy within L2, in item 16.

Actually the word-for-word translation strategy was applied to many items in the interpretation test but it was very apparent in the items mentioned above and those who used this strategy were not awarded a point because they stopped translating where the sentence ended for fear that it would not be correct if they put more words in. They were not confident enough to take a risk to answer the test. This, as mentioned earlier, accorded with Barnett's (1988) claim which is that readers' level of willingness to take risk in interacting with the text and their foreign language ability are variables that can determine the level of reader comprehension. The more willingness and the better ability they have, the more risks they tend to take. With regard to the subjects of this study, it might be said that level of their comprehension might have been low. If not, they would have taken more risks to answer the items in more words.

Another strategy frequently employed was guessing. Several students said that they guessed in answering most items when they did not really know the answer. And they used this strategy as the last choice. Guessing answers and not taking risks in answering were referred to by Ellis (1996), Corder (1983), Tyrone, Cohen, and Dumas (1983), as two of the avoidance sub-strategies.

Using subject matter knowledge to work out the meaning was another strategy found in this study. The student might try to answer the test items but not be able to translate them literally. However, they knew the subject matter of those items. They, therefore, used their background knowledge of the subject matter to explain in their own words instead of interpreting the part they were required to do (see analysis of items 26 and 27). This accorded with the finding of Kato (1986) and Grant-Davie (1995) which is that background knowledge of the subject matter is essential for the interpretation of elliptical sentences. Guessing answers, not taking risks to answer, and using subject matter knowledge to work out the meaning were referred to by

Ellis (1996), Corder (1983), Tyrone, Cohen and Dumas (1983) as avoidance sub-strategies.

In regard to analogy, the recoverability test revealed that one of the strategies frequently used was operating by analogy with L1. The students supplied the English words translated from their first language. But the words they used were not correct in the particular context of English. For example, in item 6 of the recovery test, some students filled the blank with '*how could they do that,*' '*why does it happens*' to mean '*how such phenomenon occurs*' because they tried to use the English sentence translated from the Thai language, believing that both were equivalent and should be correct. This finding contradicted Robinson's (1978) claim, which was that a strategy in a given situation has the best chance of successful application if it is used in another situation identical to the one in which it is taught. In the classroom setting, the students were often familiar with the translation method of teaching. They applied it in doing the test, not realizing the lack of correspondence of the words and eventually were not successful.

In addition to L1 analogy, some students chose to perform their task by L2 analogy (see analysis of items 4, 6, and 9). Those who used this strategy might not have realized the limitation of the possibilities of analogy of L2 words. A particular word can be used in the particular context; for example, 'do the job,' not 'make the job' and 'make the bed' not 'do the bed.' However, some students did not recall this matter because in this case, 'do' and 'make' mean the same in Thai. Thus, they used the word that they were more familiar with or they could think of first. (see the analysis of item 4, 6, and 9).

Projecting back to the supposed deep structure was also found in the study as one of the strategies the students used to retrieve the omitted elements. Blum-Kulka and Levenston (1983) say that normally the students do accumulate knowledge of L2 structures but find it difficult to organise and present them appropriately and coherently. In this study, some students did not know the meaning of the sentence. They just compared the preceding part with the part they were supposed to do and copied the words from the similar part to retrieve for the elipted elements. (This is

referred to by Hardison (1992) as 'the copying process.'). Consequently, they got the wrong answer (see the analysis of item 2). Nonetheless, other students did not compare the structures of the presupposed and the elliptical sentences. They knew the meaning of the sentence and so copied the presupposed words, which actually belonged to the deep structure of the sentence, not realising that the presupposed elements were derived before they were omitted (see analysis of items 2 and 8).

Of all strategies, avoidance was most frequently employed. The students who did not answer the test always said that they did not know the answer, to avoid thinking of some other reasons.

Apart from students' strategies, the item analysis also revealed a number of students' problems obstructing their ability to handle ellipsis such as differences between L1 and L2, English ability, teaching of English, etc. all of which might be worth mentioning in this thesis.

One unavoidable grass root problem was the difference between English and Thai language structures. Chansing (1986), Wimochalao (1992), Tantulakom (1997), and Norris (2000) agree that structural differences between the two languages cause difficulty in translation. The present study apparently supported what they said as most students could not do the interpretation test (test 1). The HSG's and LSG's mean scores were 10.5 and 5.33 out of the total of 20 (see Table 4, Chapter 4). In reference to students' performance of test 1 in Table 5, Chapter 4, it could be seen that there are a lot of items on which students' scores were very low such as items 8, 10, 13, and 26. Only 3 out of 60 students could score on item 8, 10 and 26, and only 2 students could score on item 13. When the structures of the problem statements were investigated and compared with those of the Thai language, it was found that they were totally different. And so this was the cause of errors (Decher, 1983, Ellis 1997, Iwata 1998, Nonis 2000).

Students' low English proficiency was another major problem that caused difficulty not only in the ellipsis tests but also in dealing with English as a whole. The cause of this problem could have been many; e.g. the students' ability, the

students' experience in past English classes including EST classes, English class materials, teachers, and learning environment.

The other two relevant problems found in this study were students' incomplete knowledge of second language grammar and incomplete recall of second language instruction, both of which were related to each other. The analysis especially of tests 2 and 3 revealed that most students did not have proper grammatical knowledge. They depended too much on understanding of sentence parts rather than the sentence structure as a whole, which, as Hoey (1991) claims, can result in inability to see the semantic interrelationship of each part of the long sentence (see analysis of item 21 as an example). The students could neither recall nor recognize the ellipted elements well enough. For example, they inserted a past participle verb '*produced*' instead of an infinitive verb '*produce*' after the modal '*would*' in item 8 in spite of having been taught in class that a modal had to be followed by an infinitive verb. They did not recall the instruction on how reported speech questions are arranged. Consequently, they could not fill in the ellipted reported speech after the clause '*and here's why*' in item 4. A number of students could not retrieve or recognise the conjunction '*that*' in ellipsis type 3, structural ellipsis. Many of them said that the sentences were complete. This also showed that they were not aware of ellipsis.

Students' insufficient second language vocabulary was one of the major problems resulting in inability to gain clues from co-text. In the recovery test, in which the ellipted elements had to be supplied, very few students could do so. Most of them reasoned that they neither had much English vocabulary nor understood the sentences even though a glossary was given. Moreover they did not know that the preceding sentences usually presupposed the ellipted elements.

Another problem found was students' incomplete background knowledge, which could be an obstacle for their understanding of English. In the analysis of items 26, 27 and 29, some students used their background knowledge to answer the problems rather than using their English language knowledge. As such background knowledge was incomplete, they could not answer the test items correctly.

Lack of attention to structural detail could be seen when the students answered item 4. They were not careful enough to examine what was exactly elipted in the English sentence. They just jumped to their conclusion and answered 'why it also holds for $n=k+1$ ' instead of 'why the answer is yes' in item 4. Item 17 could also confirm that the students were careless. They did not pick up cues from the test setting which could have helped them. They did not register when the proctor gave the meaning of the word 'assume' to their peer. If they had done so, they could have got the correct answer at least for test 1, the interpretation test. The investigation also showed that many students did not pay much attention to answering the whole tests especially tests 1 and 2. A number of test items were left blank. They reasoned that they had no aptitude in language study and so were poor in English. For test 3, every student did choose the answer provided for all items but not many could answer the items correctly.

Transfer of training and overgeneralisation were found intermingling and obstructing students' ability to retrieve the omitted word correctly. This study confirmed that if students were often exposed to any words or sentence patterns too often, such words or patterns would stick firmly in their mind resulting in habit formation and overgeneralisation (Tarone, Cohen, and Dumas 1983, p. 8). Thai students had been given too much concentrated practice with specific words like 'I am' or 'I'm' as it was easier to start practising with something in relation to oneself; 'I am a boy, I am a girl, I am hungry....' They, therefore, used 'I am' every time they started the sentence with 'I' no matter what tenses were employed. The finding in this thesis revealed that the subjects used to frequently practise English sentences with the verb 'be' preceded by modals such as *can, could, will, would*. They sometimes put the word 'like' to follow the word 'would' as they are accustomed to the expression 'I would like to'. Moreover, too much practice of specific words like 'I am' or 'I'm,' 'like,' and 'be,' many of them filled in 'be' instead of 'have' to answer test item no. 4, which reads, 'You should suspect that the law of gravity does not have the inverse square dependence that it should ____.' This was so because the students could not differentiate between sentences (Ronon 2002, p. 2). "They thought about new experiences in terms of old experiences." (Tagg 1996, p. 31)

Another problem causing students' difficulty was the first language transfer. This is a significant problem causing students' inability to master their second language learning. Many ellipses in the Thai language are different from those in English. Students were not familiar with the English ellipsis, so they transferred their Thai concept into their interpretation and retrieval of ellipted elements in English. Test item no. 17 could best illustrate this claim. As the problem statement is '*Assume you can count one bill every second.*' the students interpreted as '*Assume if you can count one bill every second*' because it is very common in Thai to employ the word *fa~ (if)* after the word '*sommut wa*' (*assume that*). The students therefore transferred their Thai to English interpretation and retrieval of ellipsis. This finding supported what had been claimed before by Gass and Selinker (1992), Pouw (1995), Schwartz and Sprouse (1996), Chunji and Fang (2000), Iwata (1998), Bhela (1999), Ellis (1997), Albert and Olber (1978 cited in Bhela 1999), Blum-Kulka and Levenston (1983) and Fantini and Reagan (1992) that language transfer plays a role in influencing the students' L2 study.

As a result of language transfer, some interlanguage forms were used by the students in this study. This could obviously be seen in items 16 and 17. The students mixed the native language lexicon with that of the target language. They said '*convincet with*' instead of '*convined that*', and '*assume if*' instead of '*assume that*' because they could use those expressions in their native language (Tarone, Cohen, and Dumas 1983, p. 8).

Verbal substitution was found to be as another problem the students were unable to handle. In many cases, before a part of the sentence is ellipted, it undergoes some changes or derivations. Substitution is one of the phenomena. In elliptical sentences, it was hard for the students to see that the ellipted elements had already been derived to the surface form (Monson 1982). They just looked at the presupposed part and copied it (Hardison 1992) for the answer (see the analysis of item 2). Item 2 illustrated the contradiction between Quirk, et al.'s (1985) and Halliday and Hasan's (1976) theory of ellipsis. The former seems in favour of retrieving the exact copy of the presupposed elements while the latter prefer the verbal substitution or the surface form. With respect to this study, both were

acceptable because it at least showed that the students understood the sentence. Unfortunately, not many of them could answer this item correctly.

Misreading of anaphora, pragmatic misreading, and conceptual influence across cultures were also problems hindering students' ability to interpret, recover and recognize elliptical elements (McArthur 1988, Fazilatfar 1999, Nash-Webber 1978). In item 4, the students could not figure out what should be an anaphor of the ellipsed part. They let their Thai concept overrule their L2 linguistic cues, picking up the wrong anaphor to answer the test (see analysis of item 4). This phenomenon also occurred in item 6 where the students misread the problem statements and, therefore, answered in terms of politeness by filling the word 'please' after the instructional verb 'Explain' instead of putting 'why or why not it is so?' in.

Some students made mistakes because of their carelessness. In item 4 of test 3 (recovery test), they chose 'does it hold for $n = k+1$ ' to complete the sentence 'The answer is yes, and here is why _____.' They did not notice that this sentence was not interrogative. When they saw the word why, they just thought that it was. They, consequently, chose the choice that was in the form of an interrogative sentence. Item 17 could also illustrate the students' carelessness. The students neither paid attention to the proctor's explanation of the meaning of the word 'assume' nor consulted a dictionary. So they did not score on this item.

The analysis of item 6 revealed that the conceptual difference across sub-cultures could be a problem for students, as they could use a variety of words in one situation in Thai but not in English.

Another problem causing students' difficulty was the ambiguity of some structural cues such as the past simple and the past participle forms of regular verbs in English ending with 'ed'. The students could not differentiate them. This was the case for item 26.

English homonyms in L2 were another source of the students' difficulty. The students were unable to pick up the right English word for the specific context. In

item 4, the students did not know which English word to use to express the meaning of 'tuk,' or 'jing' in Thai. They used the word 'read' in a wrong context.

Inability to access deep structure seemed to be one of the problems in handling ellipsis too. The analysis of items 19 and 24 showed that the students did not know the structure of a complex sentence containing a relative clause and participial phrase, so they could not interpret, recover, or recognise what was ellipted in such sentences.

Of all problems found in this study, lack of instruction in ellipsis could account for all mistakes the students had made. Most students admitted that they neither knew the meaning nor understood the problem sentences they were required to interpret, recover and recognise.

9. Conclusion

The item analysis revealed that students faced difficulty in solving ellipsis problems. They tried their best to do the job using several strategies gained from their past experience and English classrooms to handle ellipsis. Context and structural clues were generally employed in most items. If these two strategies failed to overcome the difficulty, they resorted to other strategies such as word-for-word translation, operating with analogy of L1 and so on. Yet most students guessed doing the best when they could not solve the problems and some used an avoidance strategy by just saying they did not know how to answer the tests. No matter how hard they tried, they were not very successful. Several problems were found to be the sources of difficulty interfering with students' ability to handle ellipsis problems. The most apparent factor was that they had not been taught this topic in class before. But if they incidentally had, the teaching was just indirect. So it could be concluded that most students were not aware of ellipsis and could not score well on the tests. Some major problems responsible for students' failure found in this study were insufficient grammatical and structural knowledge, inadequate command of vocabulary, inefficient reading skill, language transfer and transfer of training.

With respect to the perceptions on the test items (Tables 8 and 9, Chapter 4), most students viewed more items as easy while their performance scores were not as relatively high. It may be claimed that their perceptions were not in accordance with their overall performance on 3 clipsis tests, which was very low.

In the next chapter, the overall study including the quantitative and qualitative data and findings will be reviewed in the light of the research questions and hypotheses. Implications and suggestions for further study will be included.

Chapter 7

Conclusion, Implications and Suggestions

1. Introduction

This study has investigated students' ability to interpret elliptical sentences and to recover and recognise ellipsed elements occurring in science and technology textbooks. It has also examined the factors supporting and hindering the students' ability to solve problems with respect to ellipsis. Quantitative and qualitative analysis has been carried out and presented in the previous chapters. In this final chapter, the whole study including the findings will be summarised. Implications will be discussed and a number of suggestions for further study will be made.

2. Summary of the Study

Teaching and learning English in Thailand has not been as successful as might be desired. There seem to be many problems. English ellipsis was suspected to be an obstacle hindering students' ability to learn English. The present study was, therefore, conducted to find out whether it was true or not and to serve the following purposes:

1. to survey what types of elliptical sentences frequently occur in the scientific and technical textbooks read by students at KMITNB,
2. to investigate students' performance in interpreting elliptical sentences,
3. to check students' understanding of elliptical sentences,
4. to find out whether students can recover the ellipsed elements,
5. to investigate what promotes or obstructs students' ability to interpret and recover ellipsis in sentences,
6. to find out which particular types of elliptical sentences are more difficult for Thai students.

The study purposes led to the following questions:

1. To what extent do students interpret elliptical sentences correctly?
2. Are students aware of ellipsis where it occurs?
3. Are students capable of recovering elipted elements?
4. What factors are associated with students'
 - a) ability/ inability to interpret ellipses correctly?
 - b) ability/ inability to provide the elipted elements?

Then the following hypotheses were proposed:

1. Students' difficulties in interpreting elliptical sentences and recovering elipted elements can be related to (a) L1 transfer (b) L2 reading strategies.
2. Degree of difficulty in retrieval of ellipsis, based on Quirk, et al.'s (1985) principles, relates to degree of difficulty in interpretation.

To serve the study purposes, to answer the questions and to test the hypotheses, literature related to ellipsis was reviewed. It was found that Halliday and Hasan (1976), and Quirk, et al. (1985) have described ellipsis elaborately. Halliday and Hasan (1976) classify ellipsis into 3 main types. And within one type, there are some more subtypes, which they linguistically touch upon in detailing every possibility (see Chapter 2). But Quirk, et al. (1985) classify ellipsis into 9 main types, basing on the recoverability principles. Each of their ellipsis types represents a group of sentences as a whole. Therefore, the ellipsis category of Quirk, et al. (1985) was employed in this study because one of its main purposes was to investigate the students' ability to recover elliptical elements. Elliptical sentences were surveyed in students' three core course English textbooks in science and technology, physics, mathematics, and computer. Six ellipsis types, namely, strict ellipsis, standard ellipsis, ellipsis short of criterion of unique recoverability, structural ellipsis, structural ellipsis without precise recoverability, and nonfinite clause with ellipsis of the relative pronoun and the verb 'be', were found frequently to occur. Three ellipsis tests were, then, provided, using the elliptical sentences extracted from the three surveyed textbooks. All tests contained the same ellipsis examples but required the subjects to do different tasks. The first one was for interpreting elliptical sentences (Appendix 1). The second and the third were for recovering and recognising elipted

elements (Appendices 2 and 3). The first test was supposed to check students' understanding and awareness of elliptical sentences while the second and the third were intended to examine their knowledge of English as well as what promoted or obstructed the teaching and learning process.

As for the size of the tests, there were 30 ellipsis problem statements in each test. Pre or post sentences were also given as clues. Five items formed one ellipsis type. However, it was found later that 8 ellipsis test items were defective, so they were discarded. The deletion affected the item number of ellipsis short of criterion of unique recoverability. There were only 2 items left in the type. So this ellipsis was also deleted.

To lessen students' frustration at vocabulary difficulty, a glossary was given in the tests and dictionaries were allowed. Apart from interpreting, retrieving, and recognising, the subjects were also required to rate the difficulty of items in the interpretation test (test 1) as well as to explain how they answered the test items. The information obtained was used to trace students' strategies, difficulty, and perceptions of the tests. All tests were administered successively on the same day, on May 23, 2000. Time allowed for students to finish the tests was not limited but all students could finish the tests within 3 hours.

In regard to the subjects of the study, they were sixty students who had enrolled in two compulsory English courses in the academic year 1999, the first year of their study in KMITNB. To select the subjects, students' scores obtained from the two classroom English courses were added up. The top 30 students formed a group called the high scoring group (HSG) and the bottom 30 formed another group called the low scoring group (LSG).

The tests were marked by the researcher and a second rater. Two points were given to the exact answer, one to the partially correct answer, and zero for a wrong answer. The total scores of each test were 40. However, only exact answers were counted as correct for the purpose of counting the correct answer. The total number of items was 20. The obtained data were analysed using SPSS for Windows software.

3. Summary of the Findings

The findings will be summarised in regard to three different levels of investigation: tests, ellipsis types, and items. For each level, phenomena in relation to students' responses to the ellipsis tests will be included.

3.1 Findings in Relation to the Ellipsis Tests

It was found that, as a whole, the students could do the interpretation test best, followed by the recognition and recovery tests respectively. The average scores on the interpretation test (test 1) and the recognition test (test 3) were slightly different, 16.93 for test 1 and 16.95 for test 3, out of the total of 40. The recognition mean score was the lowest, 8.96. (Table 6, Chapter 4). No tests' mean scores reached half of the total, implying that the students were poor in ellipsis. The analysis of the tests revealed that students could score more on the recognition test because there were multiple-choice answers for them to choose. Some could recognise the correct answers while some got the correct answer by guessing. As for the interpretation test, a variety of answers were wholly or partially acceptable in Thai. So the students were awarded points for such answers.

In contrast to the interpretation and the recognition tests, the recoverability test was scored very poorly. Students could not score well since most of them used the direct translation method. The third test, the recognition test, which was designed to trace the students' thought, confirmed that the students thought of the answers in the Thai language first and then translated them into English before putting them in the blanks provided in test 2 or choosing the answer choice in test 3. Most answers did not make sense in English due to the difference in structures and vocabulary between L1 and L2. The performance of some students on some items in the recognition test could also confirm that there was, to some extent, an interference of the students' mother tongue. Insufficiency of grammatical knowledge was assumed to partially cause students' inability to recover and recognise the ellipted elements.

With respect to the number of the correct items in which only the exact answers were counted, students' test 1 evidenced more exact answers than tests 2 and 3. The mean scores of the correct answers were 7.9, 3.88, and 7.45 respectively out of the total of 20 items (Table 3, Chapter 4), implying that students were very weak in ellipsis

In terms of correlation among the tests which included the 3 ellipsis tests and the prior classroom English tests, it was found that all correlated with each other significantly ($P < 0.001$). Most students could score more on the first and the third tests but less on the second correlatively. The HSG could do every test better than the LSG.

In addition to the performance test, the students' perception of interpretation test was examined. It was found, as a whole, that the students viewed more items as easy (Tables 8, and 9, Chapter 4). However, their scores did not accord with their perceptions, i.e. one might have expected that they might have said that the tests were very or extremely difficult since their scores were very low.

3.2 Findings in Relation to Ellipsis Types

It was found, as a whole, that the students could score on ellipsis type 1, strict ellipsis, the best (with the mean score of .86) since the ellipted elements could be retrieved from the exact copy of the presupposed clause. Ellipsis type 5, nonfinite clause with ellipsis of the relative pronoun and the verb 'be,' was scored the lowest. Its mean score was only .54 out of the total of 2 points. This was mainly due to the structural difference between L1 and L2 especially in the area of relative clauses and passive voice (see item analysis in Chapter 6). The sentence structures of both active and passive voice are the same in most cases in the Thai language. Readers or listeners intuitively know who is the performer or receiver of the action. Relative pronouns cannot be ellipted in Thai. Therefore, ellipsis type 5 could be neither recovered nor recognised due to the influence of the students' mother tongue and the complexity of the English sentences in the test.

Another three ellipsis types were not scored well either. Their mean scores in the order of difficulty were .56, .77, and .79 for types 2, 4 and 3 respectively.

In the interpretation test, students could do ellipsis type 3 best with the mean score of 1.18 followed by types 4, 5, 1, and 2. In the recovery test, they scored on ellipsis type 5 the worst. Its mean score was only .12. Students did not score ellipsis type 5 well in the recognition test either. Its mean score was .66 only (Figure 2, Chapter 5). This is because the answers in the Thai language in test 1 are acceptable, but the answers in tests 2 and 3 revealed that the students neither understood the problem statements nor had enough background knowledge of English sentence structures. Furthermore, a number of students were not aware of ellipsis for they said that the sentences were complete in themselves and that there was no need to put any words in the recovery test.

When taking the groups into account, the quantitative data showed that the HSG performed much better than the LSG in every ellipsis type and test. The HSG scored best on the recognition test, followed by the interpretation and recovery tests. Its mean scores on most ellipsis types of the former surpassed half of the total. The LSG interpreted ellipsis type 3 and recognised ellipsis type 1 the best with mean scores of 1.03 and 1.04. Both groups scored poorly on the recovery test (Figures 3, 4, and 5, Chapter 5).

3.3 Findings in Relation to Ellipsis Test Items

The calculation of correlations between test items revealed that most items in one test correlated significantly with those in the other tests, indicating that the students could score on the specific item in one test and that in the correlated test or vice versa.

The item analysis in Chapter 6 revealed that the students used many strategies in handling ellipsis problems either consciously or unconsciously (see also students' transcripts in Appendix 4). At least 9 strategies were found. The strategies most

consciously and frequently used were looking at structural and contextual cues, and word-for-word translation. Another 4 strategies were: using subject matter knowledge to work out the meaning, operating by analogy with L1, overgeneralisation of L2 structure, and projecting back to the supposed deep structure. When those strategies were not effective, students tended to guess or avoid answering, saying that they did not know or understand the sentences. The students tried their best to succeed in the tests using various strategies learnt from their classrooms; nonetheless, they were not so successful as they should have been.

Several problems were found hindering students' ability in handling ellipsis. The most important problem was the difference between L1 and L2. Most ellipses in English were found not possible in the Thai language, causing students' inability to interpret elliptical sentences, recovering or recognising ellipsed elements. Students' low English proficiency, incomplete knowledge of second language grammar, incomplete recall of second language instruction, insufficient second language vocabulary, incomplete background knowledge of subject matter, lack of attention, carelessness, misreading of anaphora, pragmatic misreading, inability to access deep structure were all found to be obstacles that derived from the students themselves (Chapter 6).

As for the problems caused by external factors, the careful investigation indicates that transfer of training could lead to students' overgeneralisation, and, together with language transfer, could lead to interlanguage features which contrasted with target language features. Conceptual influence across cultures, conceptual difference across sub-cultures, ambiguity of some structural cues, and English homonyms were found to be apparent factors that obstructed students' English ability. And another factor, which is lack of intensive instruction on ellipsis, could be held responsible for most of the problems (Chapter 6).

Apart from the problems, some factors were found to support students' ability in handling ellipsis especially in the interpretation part. They were similarity of L1 and L2, some Thai unellipsisible words equivalent to the English ellipsed elements

such as the word 'with' which is equivalent to the conjunction 'that', and the presupposed elements.

From the study, it could not be concluded that L1 is always an obstacle to L2 ellipsis interpretation as there were some points that also supported the students' ability to interpret elliptical sentence. But it could be said that L1 plays an important role in governing the students' transferring of language.

With respect to reading strategies, it could be concluded that using structural and contextual cues, and a grammar translation method are strategies that most affect the students' ability in interpreting elliptical sentences and recovering the ellipted elements.

In relation to the degree of recoverability, it cannot be claimed that this depends on the degree of difficulty in interpreting. But the study has shown that the students could interpret twice as much as they could recover. It is possible that when the students interpret in Thai, what they say is acceptable but for the recoverability, they just use the grammar translation method resulting in the wrong words for the English context most of the time. The different structure and vocabulary or homonyms of the two languages may partially hinder students' ability to recover.

In conclusion, the first hypothesis, which is that the students' difficulties in interpreting elliptical sentences and recovering ellipted elements can be related to (a) L1 transfer (b) L2 reading strategies, was statistically and analytically supported by the findings of this study, while the second, which is that degree of difficulty in retrieval of ellipsis, based on Quirk, et al.'s (1985) principles, relates to degree of difficulty in interpretation, was not.

However, the results of the study need to be interpreted with caution as some constraints arose during the test administration such as students' fatigue and boredom for they had to sit for a long tedious test with three papers consecutively. The students might not have worked effectively in the second and the third tests. Moreover, the examination was scheduled after a long break from students' English

study and during their vacation. They might have forgotten some lessons they had learned and might not have been in a mood conducive to being tested.

4. Implications and Suggestions

The findings of the present study revealed that students in the field of science and technology were still rather poor in the English of their field. Although, to some extent, they knew the subject matter, it did not help them much in reading English textbooks in the same areas. According to Grant-Davie (1995), ellipsis allows efficient reading if the reader has enough background knowledge to allow ready inference of what has been omitted and by requiring readers to make inferences, it makes the writing more engaging, more intellectually or aesthetically stimulating. Grant-Davie's (1995) belief could not be applied to everyone especially the non-native speakers. It might partially be possible that the students had not enough background knowledge of both subject matter and the English language.

Actually the subjects of this study had been studying English for science and technology for two consecutive semesters. They did not perform as well as they should have done. It is possible that there may be something wrong either with the students themselves or with the English instructions. As said in the first chapter, students in the vocational stream are generally poor in English. This could be confirmed by the present study.

With respect to the teaching of English, it was assumed in the previous chapter that the past repetitive training on some words or sentence patterns could affect students' learning process. They tended to transfer the repetitive words/patterns in most cases where such words occurred. For example, they would say '*I am*' or '*I'm*' whenever the word '*I*' was mentioned. A variety of forms / words / patterns are suggested for practice to overcome the problem of students' overgeneralisation.

In regard to the interlanguage, it may be assumed from this study that one of the causes of its retention was insufficient instructions. It is the teachers' job to

explain in more detail or to give various usages of a word so that students do not apply the wrong L1 word they think equivalent to that in the English language. To do this, or to speculate which words should be explained in more detail, may sound very hard for teachers to do. But if they can first try with words commonly used, guide the students as to how to choose the right word for the specific context, as well as teach them Thai and English homonyms, it will be most beneficial to the learners.

The present study also reveals that the students recalled incomplete grammatical instruction. All students had certainly been taught how to combine sentences using relative pronouns. The deletion of the pronouns and the verb 'be' in both active and passive voices had also been taught. But the students could not recall what they had studied in class and could neither interpret the elliptical sentences nor recover or recognise the ellipted relative pronouns and the verb 'be.' It is possible that during the class, the students might not have understood the lesson or been attentive enough, or that the teachers neither emphasised the importance and the frequent occurrence of this kind of ellipsis nor related what they taught to the reading the students would encounter in the future. Relating ellipsis to the relevant reading and listening discourse is, thus, strongly recommended.

In reality ellipsis is always employed in both spoken and written language. Teaching ellipsis as a separate topic is highly recommended to make students more aware of this kind of discourse as the present study most quantitatively and qualitatively confirms that students seemed to be unaware of it.

With respect to the textbook according to Grant-Davie (1995, p. 6), "the elliptical text is exclusive in the sense that it is not designed for all readers, just for those who can supply missing information or missing warrants or assumptions that support an argument." It is suggested to textbook authors that the number of ellipses be reduced and the occurrences be not too close or frequent. Even Halliday and Hasan (cited in Placencia 1995, p.131) proposed two reduction principles which are: "Do not reduce where reduction leads to unclarity. Otherwise, reduce as much as possible." Mayer (1985) also recommended that science textbooks should be improved. As far as globalisation is concerned, students in most parts of the world

can access textbooks more easily. It will be beneficial to them if they can read good textbooks more easily even though they are non-native speakers.

The findings of the ellipsis study unveil a number of problems in relation to ellipsis in scientific and technological textbooks as well as teaching and learning English in Thailand especially in the area of science and technology where most students are poor at English while the need for science and technology transfer through English medium is apparent. Many problems arose from the students themselves as mentioned earlier, yet many more were from learning and teaching processes. Education planners, educators, administrators and teachers need to help to solve such problems. It is necessary for English instructors to help to find out the problems and to work out for solutions so that the students in this field can improve their English for their own benefit.

5. Suggestions for Further Study

The present study throws much light on students' difficulties in learning both general English and English for specific purposes. There are many interesting topics that need to be deeply investigated. Below are some suggestions that may be useful to perspective researchers.

As the study reveals that most students were not aware of ellipsis and leads to the above suggestion that ellipsis should be taught intensively as another topic, an ellipsis teaching experiment should be conducted to find out whether students' ability in handling ellipsis is improved or not and to find out what supports and hinders their ability.

This study did not investigate four types of ellipsis classified by Quirk, et al. (1985) because they are rarely found in science and technology textbooks. They are quasi-ellipsis, ellipsis short of the criterion of unique recoverability, situational ellipsis, and semantic implication. It is recommended that ellipsis of such types should be studied in other forms of discourse to find out how frequently they occur, to what extent students can handle them, and whether they cause students problems

in learning English or not. The findings may help English educators, and teachers to decide whether to put ellipsis in the teaching of English intensively. Moreover, textbooks of different fields such as humanities, social study, politics, law, communication should be studied to find out which types of ellipsis frequently occur and whether students can interpret, recover or recognise them or not. The language of those fields is very important and necessary for communication and living. Misinterpretation may lead to personal or global misunderstanding, and conflicts. The further study may reveal many more things that will help improve global English education. In addition, it may help to prove whether what Hutchinson and Waters (1987) had found, which is that there are few semantic differences between scientific and general English texts, is true or not.

Specific ellipsis types and subtypes of Halliday and Hasan (1976) could be studied in the way in which this thesis has studied the types isolated by Quirk, et al. (1985), specifically, verbal ellipsis in relation to finiteness and modality, tense and voice that could not be included or deeply investigated in this study. Unlike English verbs, Thai verbs neither undergo change, nor have a variety of forms. In the present study, the students got confused by past simple and past participle forms of regular verbs which look alike. They could not distinguish one from another. Furthermore, they retrieved the words '*produced*' and '*be produced*' after the presupposed elements '*Video are produced as you would ...*' in item 8, showing that they did not understand modality and voice much. It would be interesting and challenging to investigate how students retrieve ellipsis of finite verbs. The outcome of the study might help the teachers of English realise how necessary it is to handle ellipsis with care in their teaching.

The current study also reveals that Thai students overgeneralised some English words and expressions due to the transfer of repetitive training. Follow-up studies could be made into the factors associated with this kind of transfer of training and the ways in which student overgeneralisations on the basis of such learning can be minimised.

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Appendices

Test 1

Student's Code _____

Instructions

1. Read the following passages carefully. Interpret the underlined part and write down your interpretation in the Thai language according to your understanding.
2. After interpreting each item, please answer the following questions either by tape-recording or writing your answers on the blanks provided. Put a cross (X) in the box on the right to express the level of difficulty according to your opinion.
3. Feel free to answer the questions. In case you do not know how to answer, some guidelines are provided but you can give more answers according to your opinion.

Question 1: Why did you interpret as such?

(Below are guidelines for the answers. You can choose more than one or add some of your own.)

- a. I'm familiar with this kind of sentences. I always see them in my textbooks.
- b. I know the subject matter because I used to study it before.
- c. I used to study and see this kind of English sentences before.
- d. I guessed answering.
- e. Others, please specify.

Question 2: What help you to interpret as such?

(Below are guidelines for your answer. You can choose more than one or add some of your own.)

- a. I used the knowledge of grammar and structure obtained from English classes.
- b. I looked at the neighboring context. Please specify which part/s or word/s.
- c. Others, please specify.

Test 1

Student's Code _____

คำแนะนำ

1. จงอ่านข้อความแต่ละข้อให้ถี่ถ้วนแล้วตีความข้อความที่ขีดเส้นใต้ ตามความเข้าใจของนักศึกษา
เขียนคำตอบลงในช่องว่างที่กำหนดให้
2. หลังเขียนคำตอบแต่ละข้อแล้วจงตอบคำถาม 2 ข้อต่อไปนี้ โดยขีดเสียงลงในเทพหรือเขียนคำ
ตอบลงในที่ว่างท้ายข้อ และจงกาเครื่องหมาย X ในช่องขวามือให้ตรงความรู้ที่กล่าวข้อสอบมี
ความยากง่ายเพียงใด
3. ขอให้แสดงความคิดเห็นตามความเป็นจริง ถ้าไม่ทราบจะตอบอย่างไร จะเลือกแนวทางการ
ตอบที่ให้ไว้ หรือจะตอบเพิ่มเติมอีกก็ได้

คำถาม 1 ทำไมจึงตีความเช่นนั้น?

(เลือกตอบได้มากกว่า ๑ ข้อ)

- ก. คู่กันเคยกับข้อความชนิดนี้เพราะเคยอ่านพบในท้าววาม่อย
- ข. เคยเขียนวิชานี้มาจึงรู้เนื้อหาวิชา
- ค. เคยเรียนและเคยเห็นประโยคภาษาอังกฤษแบบเดียวกันนี้มาก่อน
- ง. เดา
- จ. อื่น ๆ โปรดระบุ _____

คำถาม 2 มีอะไรช่วยให้นักศึกษาคิดและตีความเช่นนั้น?

(เลือกตอบได้มากกว่า ๑ ข้อ)

- ก. ใช้ความรู้เกี่ยวกับโครงสร้างของประโยค และไวยากรณ์
ที่เคยเรียนมา
- ข. อาศัยข้อความใกล้เคียง โปรดระบุที่ใช้คำหรือข้อความใด

- ค. อื่น ๆ โปรดระบุ _____

1. In this case we would express the mass as 1.5×10^3 g
 if there are three significant figures, and 1.500×10^3 g
 if there are four.

.....

case = กรณี express = แสดง mass = มวล significant = สำคัญ
 figures = ตัวเลข

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

2. You should suspect that the law of gravity does not
 have the inverse square dependence that it should.

.....

suspect = สงสัย law = กฎ gravity = แรงโน้มถ่วง inverse square
 dependence = การแปรผกผันยกกำลังสอง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

3. Plot points representing the profit as a function of
 year, and join them by as smooth a curve as you can.

.....

plot points = จุดต่างๆ representing = แสดง profit = กำไร function
 = ฟังก์ชัน join = เชื่อมโยง smooth = เรียบ curve = ส่วนโค้ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

คำถาม 2. ก. ข. ค. _____

4. If the formula holds for $n = k$, does it also hold for

$n = k + 1$? The answer is yes and here's why.

.....
.....

formula = สูตร holds for = กำหนดว่า...เป็นจริง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

.....

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

5. If you wish, you can instruct the agent to purchase and deliver a present to Ryan (a one-time goal)

.....
.....

wish = ต้องการ instruct = แนะนำ agent = ตัวแทน purchase = ซื้อ
deliver = ส่ง present = ของขวัญ Ryan = (ชื่อคน) ไรอัน goal = เป้าหมาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

.....

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

6. If the velocity of a particle is nonzero, can its acceleration ever be zero? Explain.

.....
.....

velocity = ความเร็ว particle = อนุภาค nonzero = ไม่เป็นศูนย์
acceleration = ความเร่ง zero = ศูนย์ Explain = อธิบาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

คำถาม 2. ก. ข. ค. _____

7. How do we know for sure what the graph looks like between the point we plot? The answer lies in calculus, as we will see in Chapter 3. There we will use a marvelous mathematical tool called derivative to find out a curve's shape between plotted points. Meanwhile we have to settle for plotting points and connecting them as best we can.

.....
.....

point = จุด plot, plotted, plotting = กำหนดจุดลงในกราฟ loc to = อยู่ใน
marvelous mathematical tool = เครื่องมือทางคณิตศาสตร์ที่ล้ำค่า
derivative = อนุพันธ์ find out = หา curve = ส่วนโค้ง shape = รูปร่าง
connecting = เชื่อมต่อ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

8. Video are produced as you would any video product (set, actor, and so on), then digitized for storage on CD-ROM.

.....
.....

produced = ผลิต product = ผลิตภัณฑ์ digitized = แปลงสู่รูปแบบเป็น
ระบบดิจิทัล storage = เก็บ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

<input type="checkbox"/>	ง่ายมาก ๆ
<input type="checkbox"/>	ง่ายมาก
<input type="checkbox"/>	ง่าย
<input type="checkbox"/>	ไม่มีความเห็น
<input type="checkbox"/>	ยาก
<input type="checkbox"/>	ยากมาก
<input type="checkbox"/>	ยากมาก ๆ

9. In 1981, IBM tossed its hat into the personal computer ring with its announcement of the IBM Personal Computer, or IBM PC. By the end of 1982, 835,000 had been sold.

.....

tossed its hat into = (ตำนาน) โยนเข้า
 personal computer ring =
 สิ่งเวียนตามความคิดของคน sold = ขาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไร้มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

10. Which deluxe single hospital rooms, if any, will be vacated by the end of the day?

.....

deluxe = พิเศษ นุหษา single = เดี่ยว hospital = โรงพยาบาล vacated =
 ทำให้ว่าง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไร้มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

11. No, no, stupid! ... the other end (cartoon about orbital motion)



stupid = โง่ the other end = ปลายอีกข้างหนึ่ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีคำตอบเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

12. If the piece is cut in half, the two resulting pieces still retain their chemical identity. But what if the pieces are cut again and again, indefinitely?

cut in half = ตัดครึ่ง resulting pieces = ชิ้นส่วนที่ถูกตัด retain = มีคงรักษา

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีคำตอบเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

chemical identity = คุณสมบัติทางเคมี indefinitely = อย่างไม่มีที่สิ้นสุด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

13. How is a function's differentiability at a point related to continuity there, if at all?

.....

.....

function's differentiability = อนุพันธ์ของฟังก์ชัน point = จุด

related to = สัมพันธ์กับ/เกี่ยวข้องกับ continuity = ความต่อเนื่อง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

14.



Digital camera : Look, _____ No film.

.....

.....

Digital camera = กล้องดิจิทัล

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

15. Vision Input offers great promise for the future. Can you imagine travelling by car from your home town to Charleston, South Carolina, without the burden of actually driving? Sound far-fetched? Not really?

.....

Vision input offers a great promise for the future. = การมีวิสัยทัศน์อันส่งผลให้
 มีอนาคตสดใส imagine = คิดถึงหรือจินตนาการ traveling = การเดินทาง without = ปราศจาก
 burden = ภาระ actually = จริง ๆ sound = ฟังดู fetched = ใกล้เคียงความจริง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

16. Repeat this process until you are convinced you have found the shortest path

.....

repeat = ทำซ้ำ process = กระบวนการ until = จนกระทั่ง convinced = แน่ใจ
 found = พบ shortest = สั้นที่สุด path = ทาง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

17. A billionaire offers to give you \$1 billion if you can count it out using only one-dollar bills. Will you accept her offer? Assume you can count one bill every second, and be sure to allow for the fact that you needs eight hours a day for sleeping and eating.

.....

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

.....

 billionaire = เศรษฐีพันล้าน offer = เสนอ billion = พันล้าน count = นับ
 one dollar bills = ธนบัตรใบละ 1 ดอลลาร์ second = วินาที be sure to allow for the fact that = ต้องแน่ใจว่าเรื่องมีเวลาไว้ด้วย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

18. What does it mean for a function to be differentiable on an open interval? or a closed interval?

.....

.....

mean = หมายความว่า function = ฟังก์ชัน differentiable = ซึ่งหาอนุพันธ์ได้

open interval = ช่วงเปิด closed interval = ช่วงปิด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ใจไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

19. What is a second derivative? a third derivative?

.....

.....

second = ที่สอง derivative = อนุพันธ์ third = ที่สาม

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ใจไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

20. Smart computer shoppers usually get what they need,

not what they think they need, And they can save a lot of money.

.....

Smart computer shoppers = มีเครื่องคอมพิวเตอร์ที่สิ่ง need = ต้องการ
 save = ประหยัด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

21. Careful study shows that, as the temperature of an

object increases, the thermal radiation it emits
consists of a continuous distribution of wavelengths
 from the infrared, visible, and ultraviolet portions of
 spectrum.

.....

careful = ระมัดระวัง temperature = อุณหภูมิ object = วัตถุ increases = เพิ่มขึ้น
 thermal radiation = การแผ่รังสีความร้อน emits = ปล่อยออกมา consists of =
 ประกอบด้วย continuous distribution = การกระจายออกมาอย่างต่อเนื่อง
 wavelengths = ความยาวคลื่น infrared = อินฟราเรด visible = ซึ่งมองเห็นได้
 ultraviolet = อุลตราไวโอเล็ต portions = ช่วง spectrum = สเปกตรัม

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

22. How many derivatives do the functions you know have?

.....

derivatives = อนุพันธ์ functions = ฟังก์ชัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. ง. _____

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

23. No matter how far out in the sequence of odd-numbered terms we begin, we can always add enough positive terms to get an arbitrarily large sum.

.....

.....

no matter how far out = ไม่ว่าจะยาวเท่าใดก็ตาม sequence = ลำดับ

odd-numbered terms = เลขคี่ enough = เพียงพอ positive terms

:: เลขบวก arbitrarily large sum = ผลรวมใหญ่

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. ง. _____

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

24. A joystick is a vertical stick that moves the graphic cursors in the direction the stick is pushed.

.....

.....

joystick = อยุคstick vertical = แนวตั้ง stick = قضبان graphic

cursors = เคา์ursor/ ตัวชี้ที่เนือ้รูปภาพ direction = ทิศทาง pushed =

ผลักดันไป

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

ง่ายมาก ๆ
ง่ายมาก
ง่าย
ไม่มีความเห็น
ยาก
ยากมาก
ยากมาก ๆ

คำถาม 2. ก. ข. ค. _____

25. However, if you see something on TV you like you can probably obtain the rights to use it (usually for fee).

.....
.....
probably = อาจจะ obtain = ได้ rights = สิทธิ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- จำนวน ๗
- จำนวน
- จำนวน
- ไม่มีความเห็น
- มาก
- มากมาก
- มากมากๆ

26. The first part of this textbook deals with mechanics, sometimes referred to as either classical mechanics or Newtonian mechanics.

.....
.....
part = ส่วน textbook = ตำรา equal หมายถึง = เท่ากัน โทนี่ mechanics = กลศาสตร์ referred to = อ้างถึง as = จำนวน other classical mechanics or Newtonian mechanics = กลศาสตร์คลาสสิก หรือ กลศาสตร์นิวตัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- จำนวน ๗
- จำนวน
- จำนวน
- ไม่มีความเห็น
- มาก
- มากมาก
- มากมากๆ

27. The Faraday constant is the quantity of electricity
required to deliver a standard amount of in electrolysis
 and the SI unit of capacitance is the Farad.

Faraday constant = ค่าคงที่ซึ่งหมายถึง quantity = ปริมาณ electricity = โวลท์
 required = ต้องการ deliver = ส่งให้ standard amount of electrolysis =
 ปริมาณมาตรฐานของสารละลาย
 Farad = หน่วยความจุ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- | | |
|--------------------------|---------------|
| <input type="checkbox"/> | ง่ายมาก ๆ |
| <input type="checkbox"/> | ง่ายมาก |
| <input type="checkbox"/> | ง่าย |
| <input type="checkbox"/> | ไม่มีความเห็น |
| <input type="checkbox"/> | ยาก |
| <input type="checkbox"/> | ยากมาก |
| <input type="checkbox"/> | ยากมาก ๆ |

28. A chemical in a liquid solution (or dispersed in a gas)
 runs into a container holding the liquid (or the gas) with,
 possibly, a specified amount of the chemical dissolved
 as well.

chemical = สารเคมี liquid solution = สารละลายที่เป็นของเหลว dispersed
 = ฟู่งกระจาย container = ภาชนะ holding = ใส possibly = เป็นไปได้
 specified amount = ปริมาณที่กำหนด dissolved = ละลาย as well = เช่นกัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- | | |
|--------------------------|---------------|
| <input type="checkbox"/> | ง่ายมาก ๆ |
| <input type="checkbox"/> | ง่ายมาก |
| <input type="checkbox"/> | ง่าย |
| <input type="checkbox"/> | ไม่มีความเห็น |
| <input type="checkbox"/> | ยาก |
| <input type="checkbox"/> | ยากมาก |
| <input type="checkbox"/> | ยากมาก ๆ |

29. The second half of the proof, that Eqs. (3) imply that F is conservative, is a consequence of Stokes' theorem taken up in Section 14.7

proof = การพิสูจน์ โดย - บทบาทเป็นกับ ๆ ว่า conservative = มีค่าเท่ากับ
 consequence = ผล Stokes' theorem = ทฤษฎีของ Stokes section =

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

30. A special glove fitted with sensors covers her right hand and allows her to manipulate objects during the design process.

special glove = ถุงมือพิเศษ fitted = ติดตั้ง sensor = ตัวเซ็นเซอร์ covers = ครอบคลุม
 allows = เปิดโอกาสให้ manipulate = ควบคุม
 design process = กระบวนการออกแบบ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. ค. _____

- ง่ายมาก ๆ
- ง่ายมาก
- ง่าย
- ไม่มีความเห็น
- ยาก
- ยากมาก
- ยากมาก ๆ

Test2

Student's Code _____

Instructions

1. Fill in the missing word(s) that best fits the context of each item in blanks provided
2. After filling in each item, please answer the following questions either by tape – recording or writing your answers on the blanks provided.
3. Feel free to answer the questions. In case you do not know how to answer, some guidelines are provided but you can give more answers according to your opinion.

Question 1: Why did you fill the particular word(s)?

(Below are guidelines for the answers. You can choose more than one or add some of your own.)

- a. I'm familiar with this kind of sentences. I always see them in my textbooks.
- b. I know the subject matter because I used to study it before.
- c. I used to study and see this kind of English sentences before.
- d. I guessed answering.
- e. Others, please specify.

Question 2: What help you to think of the particular word(s)?

(Below are guidelines for your answer. You can choose more than one or add some of your own.)

- a. I used the knowledge of grammar and structure obtained from English classes.
- b. I looked at the neighboring context. Please specify which part or word/s.
- c. Others, please specify.

Test 2

Student's Code _____

คำแนะนำ

1. จงเติมข้อความที่คิดว่าเหมาะสมที่สุดในช่องว่าง
2. หลังเติมคำตอบแต่ละข้อแล้วจงตอบคำถาม 2 ข้อต่อไปนี้ โดยขีดเสียงลงในเทปหรือเขียนคำตอบลงในที่ว่างท้ายข้อ
3. ขอให้แสดงความคิดเห็นตามความเป็นจริง ถ้าไม่ทราบจะตอบอย่างไร จะเลือกแนวทางการตอบที่ให้ไว้ หรือจะตอบทั้งเติมซีกก็ได้

คำถาม 1. ทำไมถึงเติมข้อความนี้?

(เลือกตอบได้มากกว่า 1 ข้อ)

- ก. คู่กันเคยกับข้อความชนิดนี้เพราะเคยอ่านพบในตำราบ่อย
- ข. เคยเรียนวิชานี้มาจึงรู้เนื้อหาวิชา
- ค. เคยเรียนและเคยเห็นประโยคภาษาอังกฤษแบบเดียวกันนี้มาก่อน
- ง. เด่า
- จ. อื่น ๆ โปรดระบุ _____

คำถาม 2. มีอะไรช่วยให้นักศึกษาคิดที่จะเติมข้อความนี้?

(เลือกตอบได้มากกว่า 1 ข้อ)

- ก. ให้ความรู้เกี่ยวกับโครงสร้างของประโยค และไวยากรณ์ที่เคยเรียนมา
- ข. อาศัยข้อความใกล้เคียง โปรดระบุว่าใช้คำหรือข้อความใด

- ค. อื่น ๆ โปรดระบุ

1. In this case we would express the mass as 1.5×10^3 g if there are three significant figures, and 1.500×10^3 g if there are four _____

case = กรณี express = แสดง mass = มวล significant = สำคัญ figures = ตัวเลข

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

2. You should suspect that the law of gravity does not have the inverse square dependence that it should _____

suspect = สงสัย law = กฎ gravity = แรงโน้มถ่วง inverse square dependence = การแปรผกผันกับกำลังสอง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

3. Plot points representing the profile as a function of year, and join them by as smooth a curve as you can _____

plot points = เขียนจุด representing = แสดง profile = กราฟ function = ฟังก์ชัน join = เชื่อมโยง smooth = เรียบ
curve = เส้นโค้ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

4. If the formula holds for $n = k$, does it also hold for $n = k + 1$? The answer is yes, and here's why _____

formula = สูตร holds for = กำหนดค่า... เป็นจริง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

5. If you wish _____, you can instruct the agent to purchase and deliver a present to Ryan (a one-time goal)

wish = ต้องการ instruct = แนะนำ agent = ตัวแทน purchase = ซื้อ deliver = ส่ง present = ของขวัญ

Ryan = (ชื่อคน) ใช้นั้น goal = เป้าหมาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

6. If the velocity of a particle is nonzero, can its acceleration ever be zero?

Explain _____

velocity = ความเร็ว particle = อนุภาค nonzero = ไม่เป็นศูนย์ acceleration = ความเร่ง zero = ศูนย์

Explain = อธิบาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

7. How do we know for sure what the graph looks like between the points we plot? The answer lies in calculus, as we will see in Chapter 3. There we will use a marvelous mathematical tool called derivative to find out a curve's shape between plotted points. Meanwhile we have to settle for plotting points and connecting them as best we can

point = จุด plot, plotted, plotting = กำหนดจุดลงในกราฟ lies in = อยู่ใน marvelous mathematical tool = เครื่องมือทางคณิตศาสตร์ที่ล้ำค่า derivative = อนุพันธ์ find out = หา curve = เส้นโค้ง shape = รูปร่าง connecting = เชื่อมต่อ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

8. Videos are produced as you would _____ any video product (set, actor, and so on), then digitized for storage on CD-ROM.

produced = ผลิต product = ผลิตภัณฑ์ digitized = แปลงสัญญาณเป็นระบบดิจิทัล storage = เก็บ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

9. In 1981, IBM tossed its hat into the personal computer ring with its announcement of the IBM Personal Computer, or IBM PC. By the end of 1982, 835,000 _____ had been sold.

tossed its hat into = (สำนวน) โยนเข้าสู่ personal computer ring = วงเวียนคอมพิวเตอร์ส่วนบุคคล sold = ขาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

10. Which deluxe single hospital rooms, if any _____ will be vacated by the end of the day?

deluxe = พิเศษหรูหรา single = เดี่ยว hospital = โรงพยาบาล vacated = ทำให้อว่าง

คำถาม 1. ก. ข. ค. ง. _____

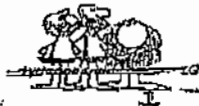
จ. _____

คำถาม 2. ก. ข. _____

ค. _____

- 11.

a.c.



© 1987 by the author of the cartoon 'NO NO STUPID... THE OTHER END.' and 'THAT'S GOTTA BE THE LOWEST ORBIT ON RECORD.'

(จงเติมข้อความในช่องว่างข้างล่างเพื่อให้ประโยคที่นำมาจากภาพที่ 1 สมบูรณ์)

No, no, stupid. _____ the other end.

stupid = โง่ the other end = ปลายอีกข้างหนึ่ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

12. If the piece is cut in half, the two resulting pieces still retain their chemical identity.

But what _____ if the pieces are cut again and again, indefinitely?

cut in half = ตัดครึ่ง resulting pieces = ชิ้นส่วนที่ถูกตัด retain = มีไว้รักษา chemical identity = คุณสมบัติทางเคมี
identity = อย่างไม่มีที่สิ้นสุด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

13. How is a function's differentiability at a point related to continuity there, if _____

_____ at all?

function's differentiability = อนุพันธ์ของฟังก์ชัน point = จุด related to = สัมพันธ์กับ/เกี่ยวข้องกับ continuity = ความต่อเนื่อง

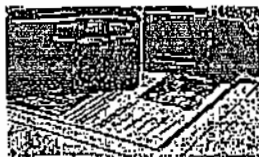
คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

- 14.



Digital camera : Look, _____ no film.

Digital camera = กล้องดิจิทัล

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

15. Vision input offers great promise for the future. Can you imagine traveling by car from your home town to Charleston, South Carolina, without the burden of actually driving?

_____ sound far-fetched? _____ not really?

Vision input offers a great promise for the future. = การมีวิสัยทัศน์ในอนาคตสดใส imagine = ลองจินตนาการ
traveling = การเดินทาง without = ปราศจาก burden = ภาระ actually = จริงๆ sound = ฟังดู far-fetched = ไม่มีความจริง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

16. Repeat this process until you are convinced _____, you have found the shortest path.

repeat = ทำซ้ำ process = กระบวนการ until = จนกระทั่ง convinced = แน่ใจ found = พบ shortest = สั้นที่สุด
path = ทาง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

17. A billionaire offers to give you \$1 billion if you can count it out using only one-dollar bills. Will you accept her offer? Assume _____ you can count one bill every second, and be sure to allow for the fact that you need eight hours a day for sleeping and eating.

billionaire = มหาเศรษฐีพันล้าน offers = เสนอ billion = พันล้าน count = นับ one-dollar bills = เงินตราใบละ 1 ดอลลาร์
second = วินาที be sure to allow for the fact that = ต้องแน่ใจว่าต้องมีเวลาไว้เมื่อ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

18. What does it mean for a function to be differentiable on an open interval?

_____ on a closed interval?

mean = หมายความว่า function = ฟังก์ชัน differentiable = หาอนุพันธ์ได้ open interval = ช่วงเปิด
closed interval = ช่วงปิด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

19. What is a second derivative? _____ a third derivative?

second = ที่สอง derivative = อนุพันธ์ third = ที่สาม

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

20. Smart computer shoppers usually get what they need, _____

not _____ what they think they need. And they can save a lot of money.

Smart computer shoppers = นักชื้อของทางคอมพิวเตอร์ที่เก่ง need = ต้องการ save = ประหยัด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

21. Careful study shows that, as the temperature of an object increases, the thermal

radiation _____ it emits consists of a continuous distribution of wavelengths

from the infrared, visible, and ultraviolet portions of spectrum.

careful = สะเอียด temperaturo = อุณหภูมิ object = วัตถุ increases = เพิ่มขึ้น thermal radiation = การแผ่รังสีความร้อน
emits = แผ่ออกมา consists of = ประกอบด้วย continuous distribution = การกระจายออกมาอย่างต่อเนื่อง
wavelengths = ความยาวคลื่น infrared = อินฟราเรด visible = ซึ่งมองเห็นได้ ultraviolet = อุลตราไวโอเล็ต portions = ช่วง
spectrum = สเปกตรัม

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

22. How many derivatives do the functions _____ you know have?

derivatives = อนุพันธ์ functions = ฟังก์ชัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

23. No matter how far out in the sequence of odd-numbered terms _____ we

begin, we can always add enough positive terms to get an arbitrarily large sum.

no matter how far out = ไม่่ว่าจะยาวเท่าไรก็ตาม sequence = ลำดับ odd-numbered terms = เทอมที่ enough = เพียงพอ
positive terms = เลขบวก arbitrarily large sum = ผลรวมใหญ่

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

24. A joystick is a vertical stick that moves the graphic cursors in the direction _____

the stick is pushed.

joystick = อยุคติก vertical = แนวตั้ง stick = ไม้กอล์ฟ graphic cursors = เค้าชี้/เคอร์เซอร์/ตัวชี้เป็นรูปกราฟิก
direction = ทิศทาง pushed = ผลักดันไป

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

25. However, if you see something on TV _____ you like, you can probably

obtain the rights to use it (usually for fee).

probably = ชances obtain = ใ้ใช้ rights = สิทธิ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

26. The first part of this textbook deals with mechanics, _____

sometimes referred to as either classical mechanics or Newtonian mechanics.

part = ส่วน textbook = ตำรา deals with = พูดถึง mechanics = กลศาสตร์ referred to = อ้างถึง

as = ว่าเป็น either classical mechanics or Newtonian mechanics = วิทยาศาสตร์คลาสสิก

หรือ วิทยาศาสตร์นิวตัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

27. The Faraday constant is the quantity of electricity _____

required to deliver a standard amount of in electrolysis, and the SI unit of capacitance

is the Farad.

Faraday constant = ค่าคงที่ฟาราเดย์ quantity = ปริมาณ electricity = ไฟฟ้า required = ต้องการ deliver = ส่งให้

a standard amount of electrolysis = ปริมาณไฟฟ้าจำนวนหนึ่ง SI unit of capacitance = ความจุมีหน่วยฟาราเดย์

Farad = หน่วยฟาราเดย์

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

28. A chemical in a liquid solution (or _____ dispersed in a gas) runs into a

container holding the liquid (or the gas) with, possibly, a specified amount of the

chemical dissolved as well.

chemical = สารเคมี liquid solution = สารละลายที่เป็นของเหลว dispersed = กระจาย container = ถัง

holding = ใส possibly = เป็นไปได้ specified amount = ปริมาณที่แน่นอน dissolved = ละลาย as well = เช่นนี้

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

29. The second half of the proof, that Eqs. (3) imply that F is conservative, is a consequence of Stokes' theorem, _____ taken up in Section 14.7

second = ครึ่งหลัง proof = หลักฐานที่พิสูจน์ conservative = มีค่าสัมบูรณ์ consequence = ผล Stokes' theorem = ทฤษฎีบท
 section = ตอน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

30. A special glove _____ fitted with sensors covers her right hand and allows her to manipulate objects during the design process.

special glove = ถุงมือพิเศษ fitted = ติด sensor = ตัวจับของ covers = คลุม allows = เปิดโอกาสให้
 manipulate = ควบคุม Design process = กระบวนการออกแบบ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

Test 3

Student's Code _____

Instructions

1. Choose the alternative that best fits the context of each item by circling the letter of your choice.
2. After choosing the answer of each problem, please answer the following questions either by tape – recording or writing your answers on the blanks provided.
3. Feel free to answer the questions. In case you do not know how to answer, some guidelines are provided but you can give more answers according to your opinion.

Question 1: Why did you choose the particular choice?

(Below are guidelines for the answers. You can choose more than one or add some of your own.)

- a. I'm familiar with this kind of sentences. I always see them in my textbooks.
- b. I know the subject matter because I used to study it before.
- c. I used to study and see this kind of English sentences before.
- d. I guessed answering.
- e. Others, please specify.

Question 2: What help you to choose the particular answer?

(Below are guidelines for your answer. You can choose more than one or add some of your own.)

- a. I used the knowledge of grammar and structure obtained from English classes.
- b. I looked at the neighboring context. Please specify which part or word/s.
- c. Others, please specify.

Test 3

Student's Code _____

คำแนะนำ

1. จงเลือกคำตอบที่คิดว่าถูกที่สุดโดยวงกลมล้อมรอบหัวข้อที่เลือก
2. หลังเลือกคำตอบแต่ละข้อแล้วจงตอบคำถาม 2 ข้อต่อไปนี้ โดยขีดเสียงลงในเทปหรือเขียนคำตอบลงในที่ว่างห้อยข้อ
3. ขอให้แสดงความคิดเห็นตามความเป็นจริง ถ้าไม่ทราบจะตอบอย่างไร จะเลือกแนวทางการตอบที่ให้ไว้ หรือจะตอบเพิ่มเติมซีกก็ได้

คำถาม 1. ทำไมถึงเลือกเดิมข้อความไว้?

(เลือกตอบได้มากกว่า 1 ข้อ)

- ก. คู่กันเคยกับข้อความชนิดนี้เพราะเคยอ่านพบในตำราบ่อย
- ข. เคยเรียนวิชานี้มาจึงรู้เนื้อหาวิชา
- ค. เคยเรียนและเคยเห็นประโยคภาษาอังกฤษแบบเดียวกันนี้มาก่อน
- ง. เด่า
- จ. อื่นๆ โปรดระบุ _____

คำถาม 2. มีอะไรช่วยให้นักศึกษาคิดและเลือกเดิมข้อความนี้?

(เลือกตอบได้มากกว่า 1 ข้อ)

- ก. ใช้ความรู้เกี่ยวกับโครงสร้างของประโยค และไวยากรณ์ที่เคยเรียนมา
- ข. อาศัยข้อความใกล้เคียง โปรดระบุไว้คำหรือข้อความใด

- ค. อื่น ๆ โปรดระบุ

1. In this case we would express the mass as 1.5×10^3 g if there are three significant figures, and 1.500×10^3 g if there are four _____.

a. masses

b. cases

c. 1.500×10^3 g

d. significant figures

case = กรณี express = แสดง mass = มวล significant = สำคัญ figures = ตัวเลข

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

2. You should suspect that the law of gravity does not have the inverse square dependence that it should _____.

a. have

b. suspect

c. inverse square dependence

d. have the inverse square dependence

suspect = สงสัย law = กฎ gravity = แรงโน้มถ่วง inverse square dependence = การแปรผกผันยกกำลังสอง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

3. Plot points representing the profit as a function of year, and join them by as smooth a curve as you can _____.

e. do

b. join them

c. plot points

d. plot points representing the profit as a function of year and join them as smooth a curve

plot points = จุดบนกราฟ representing = แสดง profit = กำไร function = ฟังก์ชัน join = เชื่อมโยง smooth = เรียบ curve = เส้นโค้ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

4. If the formula holds for $n = k$, does it also hold for $n = k + 1$? The answer is yes, and here's why _____.

- a. the formula holds for $n = k$ b. it also holds $n = k + 1$
 c. the answer is yes d. does it also hold for $n = k + 1$

proof = สูตร holds for = กำหนดว่า... เป็นจริง

คำถาม 1. ก. ข. ค. ง. _____
 จ. _____

คำถาม 2. ก. ข. _____
 ค. _____

5. If you wish _____, you can instruct the agent to purchase and deliver a present to Ryan (a one-time goal).

- a. to do so
 b. to instruct the agent
 c. to purchase and deliver a present to Ryan (a one-time goal)
 d. to instruct the agent to purchase and deliver a present to Ryan (a one-time goal)

wish = ต้องการ instruct = แนะนำ agent = ตัวแทน purchase = ซื้อ deliver = ส่ง present = ของขวัญ
 Ryan = (ชื่อคน) ไชยันต์ goal = เป้าหมาย

คำถาม 1. ก. ข. ค. ง. _____
 จ. _____

คำถาม 2. ก. ข. _____
 ค. _____

6. If the velocity of a particle is nonzero, can its acceleration ever be zero?

Explain _____

- a. why or why not its acceleration can ever be zero
 b. about velocity and acceleration of a particle
 c. why the velocity of a particle is nonzero
 d. why or why not it is so

velocity = ความเร็ว particle = อนุภาค nonzero = ไม่เป็นศูนย์ acceleration = ความเร่ง zero = ศูนย์
 Explain = อธิบาย

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

7. How do we know for sure what the graph looks like between the point we plot? This answer lies in calculus, as we will see in Chapter 3. There we will use a marvelous mathematical tool called derivative to find out a curve's shape between plotted points. Meanwhile we have to settle for plotting points and connecting them as best we can

a. have to settle for plotting points and connecting them

b. plot points and connect them

c. settle

d. do

point = จุด plot, plotted, plotting = กำหนดจุดลงในกราฟ lies in = อยู่ใน marvelous mathematical tool = เครื่องมือทางคณิตศาสตร์ที่สำคัญ derivative = อนุพันธ์ find out = หา curve = เส้นโค้ง settle = ปรึกษา connecting = เชื่อมต่อ

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

8. Videos are produced as you would _____ any video product (set, actor, and so on), then digitized for storage on CD-ROM.

a. produce

b. produce

c. be produced

d. are produced

produce = ผลิต product = ผลิตภัณฑ์ digitized = แปลงข้อมูลจากอนาล็อกเป็นระบบดิจิทัล storage = เก็บ

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

9. In 1981, IBM tossed its hat into the personal computer ring with its announcement of the IBM Personal Computer, or IBM PC. By the end of 1982, 835,000

_____ had been sold.

- a. IBMs
- b. personal computer rings
- c. the IBM Personal Computers, or IBM PCs
- d. announcement of the IBM Personal Computer, or IBM PC

tossed its hat into = (ใส่หมวก) โดดเข้าสู่อุตสาหกรรม personal computer ring = แข่งขันในตลาดคอมพิวเตอร์ส่วนบุคคล sold = ขาย

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

10. Which deluxe single hospital rooms, if any _____ will be vacated by the end of the day?

- a. deluxe single hospital rooms
- b. of such rooms
- c. deluxe single hospital room
- d. room

deluxe = พิเศษ พูลuxe single = เดี่ยว hospital = โรงพยาบาล vacated = นำไปว่าง

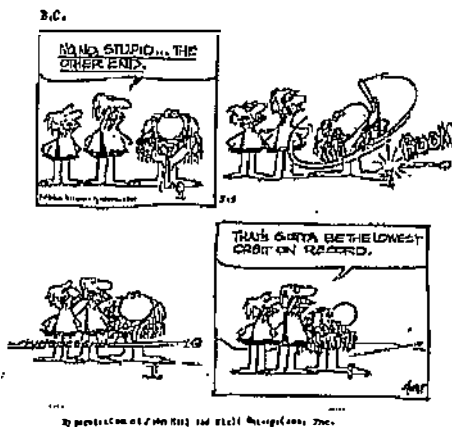
คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

11.



(จงเติมข้อความในช่องว่างข้างล่างเพื่อให้ประโยคที่นำมาจากภาพที่ 1 สมบูรณ์)

No, no, stupid. _____ the other end.

- a. Change b. Take c. Find d. Use

stupid = โง่ the other end = ปลายอีกข้างหนึ่ง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

12. If the piece is cut in half, the two resulting pieces still retain their chemical identity.

But what _____ if the pieces are cut again and again, indefinitely?

- a. is it b. will happen
- c. will the pieces be d. will the pieces retain

cut in half = หั่นครึ่ง resulting pieces = ชิ้นส่วนที่หั่นได้ retain = มีงอกไว้ chemical identity = คุณสมบัติทางเคมี

indefinitely = อย่างไม่มีที่สิ้นสุด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

13. How is a function's differentiability at a point related to continuity there, if _____
_____ at all?

a. a function's differentiability is at a point related to continuity there

b. there is a point related to continuity there

c. there is a function's differentiability

d. it is related to continuity

function's differentiability = จุดตัดของเส้นสัมผัส point = จุด related to = สัมพันธ์กับ/เกี่ยวข้องกับ continuity = ความต่อเนื่อง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

14.



Digital camera : Look, _____ no film.

a. have

b. there is

c. use

d. with

Digital camera = กล้องดิจิทัล

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

15. Vision input offers great promise for the future. Can you imagine traveling by car from your home town to Charleston, South Carolina, without the burden of actually driving?

_____ sound far-fetched? _____ not really?

- a. Does it / Does it b. It is / It is
c. Is it / Is it d. Does it / Is it

Vision input offers a great promise for the future. = ภาพที่เห็นก่อนมีอนาคตสดใส Imagine = ลองคิดดูว่า
traveling = การเดินทาง without = ปราศจาก burden = ภาระ actually = จริง ๆ sound = ฟังดู far-fetched = โทษความจริง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

16. Repeat this process until you are convinced _____ you have found the shortest path.

- a. yourself b. to repeat this process
c. that d. to find the shortest path

repeat = ทำซ้ำ process = กระบวนการ until = จนกระทั่ง convinced = แน่ใจ found = พบ shortest = สั้นที่สุด
path = ทาง

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

17. A billionaire offers to give you \$1 billion if you can count it out using only one-dollar bills. Will you accept her offer? Assume _____ you can count one bill every second, and be sure to allow for the fact that you need eight hours a day for sleeping and eating.

- a. if b. you accept her offer
c. it is possible d. that

billionaire = เศรษฐีที่มีล้าน offers = เสนอ billion = พันล้าน count = นับ one-dollar bills = ธนบัตรใบละ 1 ดอลลาร์
second = วินาที be sure to allow for the fact that = ต้องแน่ใจว่าต้องมีการไว้เผื่อ

คำถาม 1. ก. ข. ค. ง. _____

๑. _____
คำถาม 2. ก. ข. _____
 ค. _____

18. What does it mean for a function to be differentiable on an open interval?

_____ on a closed interval?

- a. What does it mean for a function to be differentiable
 b. Can a function be differentiable
 c. And for it to be differentiable
 d. Is a function differentiable

mean = หมายความว่า function = ฟังก์ชัน differentiable = ซึ่งนำอนุพันธ์ได้ open interval = ช่วงเปิด
 closed interval = ช่วงปิด

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

19. What is a second derivative? _____ a third derivative?

- a. What is
 b. And what about
 c. And how about
 d. Is it related to

second = ที่สอง derivative = อนุพันธ์ third = ที่สาม

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

20. Smart computer shoppers usually get what they need, _____

not _____ what they think they need. And they can save a lot of money.

- a. They / get
 b. They do / need
 c. Smart computer shoppers do / usually get
 d. Smart computer shoppers do / usually need

Smart computer shoppers = ผู้ซื้อของทางคอมพิวเตอร์ที่เก่ง need = ต้องการ save = ประหยัด

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

21. Careful study shows that, as the temperature of an object increases, the thermal radiation _____ it emits consists of a continuous distribution of wavelengths from the infrared, visible, and ultraviolet portions of spectrum.

a. that b. of c. when d. at

careful = ละเอียด temperature = อุณหภูมิ object = วัตถุ increases = เพิ่มขึ้น thermal radiation = การแผ่รังสีความร้อน
emits = แผ่ออกมา consists of = ประกอบด้วย continuous distribution = การกระจายของค่าอย่างต่อเนื่อง
wavelengths = ความยาวคลื่น infrared = อินฟราเรด visible = รั้งมองเห็นได้ ultraviolet = อัลตราไวโอเล็ต portions = ส่วน
spectrum = สเปกตรัม

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

22. How many derivatives do the functions _____ you know have?

a. for b. that c. whose d. if

derivatives = อนุพันธ์ functions = ฟังก์ชัน

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

23. No matter how far out in the sequence of odd-numbered terms _____ we begin, we can always add enough positive terms to get an arbitrarily large sum.

a. are b. do c. that d. when

no matter how far out = ไม่ว่าจะยาวเท่าไรก็ตาม sequence = ลำดับ odd-numbered terms = เลขที่ enough = เพียงพอ
positive terms = เลขบวก arbitrarily large sum = ใหญ่มาก

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม 2. ก. ข. _____

ค. _____

24. A joystick is a vertical stick that moves the graphic cursors in the direction _____
the stick is pushed.

- a. of b. while c. where d. that

joystick = อยุสติก vertical = แนวตั้ง stick = ไม้กอล์ฟ graphic cursors = เคอร์เซอร์/ตัวชี้ที่เลือกภาพ
direction = ทิศทาง pushed = ผลัก/ดันไป

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

25. However, if you see something on TV _____ you like, you can probably
obtain the rights to use it (usually for fee).

- a. if b. when c. that d. so

probability = ความน่าจะเป็น obtain = ใ้ rights = สิทธิ

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

26. The first part of this textbook deals with mechanics, _____
sometimes referred to as either classical mechanics or Newtonian mechanics.

- a. which is b. although c. we d. it is

part = ส่วน textbook = ตำรา deals with = ทุ่มเท/ทุ่มเทกับ mechanics = กลศาสตร์ referred to = อ้างถึง as = คำอื่น
either classical mechanics or Newtonian mechanics = กลศาสตร์คลาสสิกหรือกลศาสตร์นิวตัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

27. The Faraday constant is the quantity of electricity _____
required to deliver a standard amount of in electrolysis, and the SI unit of capacitance
is the Farad.

- a. is b. which is c. that d. it is

Faraday constant = ค่าคงที่ฟาราเดย์ quantity = ปริมาณ electricity = ไฟฟ้า required = ต้องการ deliver = ส่งให้

a standard amount of electrolysis = ปริมาณโคโรไลต์จำนวนหนึ่ง SI unit of capacitance = ความจุเป็นหน่วยของฟาราด Farad = หน่วยฟาราด

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

28. A chemical in a liquid solution (or _____ dispersed in a gas) runs into a container holding the liquid (or the gas) with, possibly, a specified amount of the chemical dissolved as well.

a. a chemical b. a liquid solution c. if it is d. that is

chemical = สารเคมี liquid solution = สารละลายที่เป็นของเหลว dispersed = กระจายตัว container = ภาชนะ holding = ใส่ possibly = เป็นไปได้ specified amount = ปริมาณที่กำแนบ dissolved = ละลาย as well = ด้วยกัน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

29. The second half of the proof, that Eqs. (3) imply that F is conservative, is a consequence of Stokes' theorem, _____ taken up in Section 14.7

a. a consequence b. Stokes' theorem

c. which it was d. that was

proof = การพิสูจน์ imply = บ่งชี้หรือหมายความว่า conservative = มีค่าเท่ากับ consequence = ผล Stokes' theorem = ทฤษฎีของสโตกส์ section = ตอน

คำถาม 1. ก. ข. ค. ง. _____

จ. _____

คำถาม 2. ก. ข. _____

ค. _____

30. A special glove _____ filled with sensors covers her right hand and allows her to manipulate objects during the design process.

a. which is b. is c. that d. was

special glove = ถุงมือพิเศษ (glove) = ถุงมือ sensor = ตัวเซ็นเซอร์ covers = ครอบคลุม allows = อนุญาตให้ manipulate = ควบคุม design process = กระบวนการออกแบบ

คำถาม 1. ก. ข. ค. ง. _____

๑. _____

คำถาม ๒. ก. ข. _____

ค. _____

Students' Transcript

Following are transcripts of students' responses, which were either tape-recorded or written on the answer sheets.

Test 1

The questions for every item are:

1. Why did you interpret the sentence that way? And,
2. What helped you to interpret that way?

The following responses are from a student in the high scoring group (HSG). His answers are as follows:

Item 1

1. I'm familiar with this type of sentences. I often see them when I read. I used to study them before.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context 'there are three significant figures.'

Item 2

1. I used to see this kind of sentences before.
2. I used my knowledge of grammar and structure obtained from English classes.

Item 3

1. I used to see this kind of sentences before.
2. I used my knowledge of grammar and structure obtained from English classes.

Item 4

1. I used to see this kind of sentences before.
2. I know the vocabulary.

Item 5

1. I used to see this kind of sentences when I read my textbooks.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 6

1. I used to see this kind of sentences when I read my textbooks.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 7

1. I used to study this matter before.
2. The word is very common and simple.

Item 8

1. I used to see this kind of sentences when I read my textbooks.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context and translated the sentence.

Item 9

1. I often see this kind of sentences.
2. I looked at the neighboring context.

Item 10

1. I used to study this topic before.
2. I'm familiar with the sentence.

Item 11

1. I'm familiar with the sentence.
2. I often see it in cartoon books.

Item 12

1. I often see this kind of sentences.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 13

1. I'm familiar with this kind of sentence.
2. I always see this kind of sentences when I read.

Item 14

1. I used to study this topic before.
2. I know the vocabulary.

Item 15

1. I am familiar with the sentence.

Items 16–21

1. I often see this kind of sentences.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 22

1. I used to study this topic before.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 23

No response.

Items 24-25

1. I often see this kind of sentences.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 26

1. I used to study this topic before.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 27

1. I often see this kind of sentences.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 28

1. I used to study this topic before.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Item 29

1. I used to study this kind of sentences before.
2. I looked at the neighboring context and the words 'conservative' and 'Stokes' theorem.'

Item 30

1. I often see this kind of sentences.
2. I used my knowledge of grammar and structure obtained from English classes. I looked at the neighboring context.

Following are the responses from one of the low scoring group (LSC) students.

Item 1

1. I used to study this matter in physics class but I don't know how to interpret so I guessed answering.

Item 2

1. I'm familiar with this matter. I used to study in physics class.
2. I looked at the neighboring context.

Item 3

1. I don't understand the structure of the sentence. I used my knowledge of mathematics to answer the test.

Item 4

1. I used to study this matter before.
2. I think the meaning should be like I said.

Item 5

1. I guessed answering.
2. The underlined part is very difficult. I don't understand the structure. I can't interpret it. But I looked at the word 'purchase' too.

Item 6

1. I used to study this matter before.
2. I used the grammar and structure knowledge learned from English classes.

Item 7

1. The sentence and vocabulary are quite difficult. I guessed the answer.

Item 8

1. I guessed answering.
2. I looked at the last sentence.

Item 9

1. I'm familiar with this matter
2. I looked at the word 'sold.'

Item 10

1. I'm familiar with this matter.
2. I used the grammar and structure knowledge learned from English classes.

Item 11

1. I looked at the picture and then interpreted.

Item 12

1. I used to study this matter before. I used the knowledge of chemistry to help.

Item 13

1. I don't understand the underlined part 'if a tall.' I never see it before. So I guessed answering.

Item 14

1. I noticed and compared the ordinary camera and the digital one and thought that the answer should be like I had answer.

Item 15

1. I guessed answering. I don't understand the vocabulary.

Item 16

1. I guessed answering. It seems familiar to me.

Item 17

1. I guessed answering.

Item 18

1. I guessed the answer. I could not answer this problem.

Item 19

1. I used to study this matter before.
2. I looked at the word 'derivative.'

Item 20

1. I guessed answering.

Item 21

1. I used to study this matter before.
2. I looked at the neighbouring context especially the words 'wavelength' and 'ultraviolet.'

Item 22

1. I used to study this matter before.
2. I looked at the word 'derivative.'

Item 23

1. I'm familiar with this matter.

Item 24

1. I guessed answering.
2. I looked at the word 'cursors.'

Item 25

1. I'm familiar with this matter.
2. The words 'probably' and 'rights' helped me.

Item 26

1. I guessed.

Item 27

1. I used to study this matter before.
2. The word 'Faraday' helped me.

Item 28

1. I used to study this matter before.
2. I used my knowledge of chemistry

Item 29

1. I guessed answering.

Item 30

1. I'm familiar with this matter. But I don't understand the sentence. So I guessed.

Test 2

The questions for the test are:

1. Why did you fill the particular word(s)?
2. What helped you to think of the particular word(s)?

The following responses are from one of the students in the HSG.

Item 1

1. I know the subject matter because I used to study it before.
2. I looked at the neighbouring context. I looked at the words 'three significant figures.'

Item 2

1. I used to see this kind of sentences before.
2. I looked at the neighbouring context, 'does not,' and I thought about the fact.

Item 3

1. I used to see this kind of sentences before.
3. I looked at the first sentence.

Item 4

1. I used to see this kind of sentences before.
2. I thought about the fact.

Item 5

1. I used to see this kind of sentences before.
2. I looked at the last part of the sentence.

Item 6

1. I know the subject matter because I used to study it before.
2. I used the preceding sentence as a clue.

Item 7

1. I used to see this kind of sentences before.
2. I looked at the whole preceding context.

Item 8

1. I used to see this kind of sentences before.
2. I looked at both preceding and following contexts as clues.

Item 9

1. I used to see this kind of sentences before.
2. I looked at the neighboring context 'sold.'

Item 10

1. I used to see this kind of sentences before.
2. I looked at the preceding context.

Item 11

1. I used to see this kind of sentences before.
2. I looked at the picture and used the surrounding context.

Item 12

1. I used to see this kind of sentences before.
2. I looked at both preceding and following context.

Item 13

1. I used to see this kind of sentences before.
2. I looked at both preceding and following context.

Item 14

1. I guessed the answer
2. I looked at both preceding and following context. And I know about digital cameras.

Item 15

1. I used to see this kind of sentences before.
2. I looked at the whole context.

Item 16

1. I used to see this kind of sentences before.
2. I looked at the whole context.

Item 17

1. I used to see this kind of sentences before.
2. I looked at the following context.

Item 18

1. I used to see this kind of sentences before.
2. I looked at the first sentence.

Item 19

1. I used to see this kind of sentences before.
2. I looked at the first sentence.

Item 20

1. I used to see this kind of sentences before.
2. I looked at both sentences.

Item 21

1. I used to see this kind of sentences before.
2. I looked at the surrounding context.

Item 22

No response.

Item 23

1. I used to see this kind of sentences before.
2. I looked at the surrounding context.

Item 24

1. I used to see this kind of sentences before.
2. I looked at the preceding and the following sentences.

Item 25

1. I know the subject matter.
2. Both preceding and following sentences accorded with each other.

Item 26

1. I guessed the answer.
2. The sentences accorded with each other and I looked at the punctuation mark, comma, and both sentences.

Item 27

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 28

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 29

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure and I looked at the neighboring context.

Item 30

1. I'm familiar with this kind of sentences. I always see them in my textbooks.
2. I used the knowledge of grammar and structure obtained from English classes.

Following are the responses from one of the LHG students.

Item 1

1. I'm familiar with the subject matter.
2. I looked at the first sentence.

Item 2

No response.

Item 3

1. I looked at the context and guessed.

Item 4

1. I think it should be an introduction to a salesperson and it gave a reason why. So I guessed the answer.

Item 5

1. I guessed.

Item 6

1. I guessed.

Item 7

1. I'm familiar with this matter.
2. I looked at the words 'we can.'

Item 8

1. I guessed

Item 9

1. I'm familiar with this matter.
2. The number/amount (of something left unsaid, which is ambiguous) sold helped me to answer.

Item 10

1. I think (...Something unsaid) is the performer of the action.

Item 11

1. I think it is the instruction of how to use so I guessed the answer

Item 12

No response.

Item 13

1. I guessed by using my knowledge of grammar and structure learned from English classes.

Item 14

1. I understand the sentence but I could not find the word to fill in.

Item 15

No response.

Item 16

1. I used to study this kind of sentence before.

2. I used my knowledge of grammar and structure obtained from English classes.

Item 17

No response.

Item 18

1. The questions seems to ask for the answer 'can' or 'can't' so I guessed.

Item 19

1. I used to study this kind of sentences before.

2. I looked at the neighbouring context.

Item 20

No response.

Item 21

1. I think the sentence is about how the heat forms. So I guessed the answer.

Item 22

1. I guessed by using my knowledge of grammar and structure learned from English classes.

Item 23

1. I guessed by using my knowledge of grammar and structure learned from English classes. I think I should supply a verb in the sentence.

Item24

I. I think it is the result of the usage. I guessed answering.

Item25

I. I think it should be a place for sitting and watching something. I guessed the answer.

Item 26

I. I think it should be the subject of the sentence who was referred to. I guessed answering.

Item27

I. The subject of the sentence is missing. I guessed the answer

Item 28

I. Its property helped me to guess the answer.

Item 29

I. I guessed.

Item 30

I. I guessed.

Test 3

The questions for this test are:

1. Why did you choose the particular choice? And
2. What helped you to choose the particular choice?

Below are the responses from one of the HSG students.

Item 1

1. I know the subject matter because I used to study it before.
2. The words ' have significant' helped me to decide.

Item 2

1. I used to study and see this kind of sentences before.
2. The words ' does not have the' helped me to decide.

Item 3

1. I guessed answering.
2. I looked at the neighbouring context.

Item 4

1. I used to study and see this kind of sentences before.
2. I don't know the meaning of the answers.

Item 5.

1. I used to study and see this kind of sentences before.
2. The detail in the sentence helped me to answer as such.

Item 6

1. I guessed answering. I don't understand the sentence.

Item 7

1. I used to study and see this kind of sentences before.
2. The last sentence helped me.

Item 8

1. I guessed answering. I think this word is appropriate.

Item 9

1. I used to study and see this kind of sentences before.
2. The word IBM PC helped me to decide.

Item 10

1. I used to study and see this kind of sentences before.
2. The preceding and following contexts helped me.

Item 11

1. I used to study and see this kind of sentences before.
2. I looked at the picture.

Item 12

1. I used to study and see this kind of sentences before.
2. The first sentence is the clue.

Item 13

1. I used to study and see this kind of sentences before.
2. I used the first sentence to help me to choose the answer

Item 14

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 15

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 16

1. I used to study and see this kind of sentences before.
2. I looked at the neighbouring context.

Item 17

1. I used to study and see this kind of sentences before.
2. The word 'assume' helped me.

Item 18

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 19

1. I used to study and see this kind of sentences before.
2. The preceding sentence helped me.

Item 20

1. I used to study and see this kind of sentences before.
2. The preceding sentence helped me.

Item 21-27

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 28

1. I know the subject matter because I used to study it before.
2. I used the preceding and the following sentences to help me to decide.

Item 29

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 30

1. I'm familiar with this kind of sentences. I always see them in my textbooks.
2. I used the knowledge of grammar and structure obtained from English classes.

Following are the responses from one of the LHG students.

Item 1

1. I looked at the words 'three significant' and I guessed.

Item 2

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 3

1. I'm familiar with this matter. I remember the sentence from tests 1 and 2.

Item 4

1. I used to study and see this kind of sentences before.
2. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 5

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 6

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 7

1. I used the last sentence to guess the answer.

Item 8

1. I'm familiar with this matter.
2. I looked at the first sentence.

Item 9

1. I'm familiar with this matter.

Item 10

1. I'm familiar with this matter.
2. I looked at the word 'deluxe.'

Item 11

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer because I think the answer should be as such.

Item 12

1. I used to study and see this kind of sentences before.
2. I looked at the words 'chemical identity.'

Item 13

1. I'm familiar with this kind of sentence so I guessed so.

Item 14

1. I'm familiar with this matter.
2. I used the world knowledge to help guessing the answer.

Item 15

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 16

1. I guessed.

Item 17

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 18

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Item 19

1. I used to study and see this subject matter in mathematics class before.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 20

1. I guessed.

Item 21

1. I don't understand and don't know what to fill in, so I guessed.

Item 22

1. I guessed.

Item 23

1. I used the knowledge of grammar and structure obtained from English classes to guess the answer.

Items 24-25

1. I'm familiar with this matter.
2. I used the knowledge of grammar and structure obtained from English classes.

Item 26

1. I'm familiar with this matter. I want to understand more but I don't know how to start.

Item 27

1. I guessed.

Item 28

1. I looked at the neighboring context and the words 'liquid solution' and guessed the answer.

Items 29-30.

1. I guessed.

**APPLICATION TO UNDERTAKE RESEARCH
INVOLVING HUMAN SUBJECTS**
(To be completed for all research involving human subjects)

STUDENT RESEARCHER/S

Student N°: 3994353 Course N°: LST 7100

NAME/S	DESIGNATION Msc/PhD student or Honours	SCHOOL/FACULTY
Mrs. Sripen Srestasathien	Ph.D. student	School of Language and Literature Faculty of Community Services, Education, and Social Sciences

2. TITLE OF PROJECT:

DATA CODE N°.....

Ellipsis in Science and Technology Texts in English: Implications for Thai Students

CONTACT ADDRESS	PH. HOME	PH. BUSINESS
King Mongkut's Institute of Technology North Bangkok, 1518 Piboonsongkram Road, Bangsue Bangkok 10900, THAILAND	662- 5613949 662- 5610838	662 -5878262
Or 338 Amornpan 4, Wipawadi-Rangsit 42, Jatujak, Bangkok 10900, THAILAND		

3. NAME OF SUPERVISOR (students) or HEAD OF SCHOOL (staff)

1. Dr. Graham McKay
2. Prof. Ian Malcolm

4. EXPECTED DURATION OF PROJECT

FROM: February 1999

TO: March 2001

5. FUNDING. Is this project the subject of a grant?

YES: ✓

NO:

If 'yes', what is the Agency or Agencies?

King Mongkut's Institute of Technology North Bangkok

6. REVIEW OF ETHICAL CONSIDERATIONS

Has the research proposal previously been submitted to the Committee for the Conduct of Ethical Research, or to the Ethics Committee of any other Institution?

YES:

NO: ✓

7. AIMS OF THE PROJECT

Please give a concise description of the aims of the project using LAY TERMS.

1. To survey what types of elliptical sentences frequently occur in scientific and technical textbooks read by students in KMITNB.
2. To investigate students' performance in interpreting elliptical sentences,
3. To check students' understanding of elliptical sentences,
4. To find out whether students can recover the elliptical elements,
5. To investigate what promotes or obstruct students' ability to interpret and recover elliptical sentences, and,
6. To find out which types of elliptical sentences are difficult to Thai students.

8. RESEARCH QUESTION

State clearly in lay terms your research question(s).

- 1 To what extent do students interpret elliptical sentences correctly?
- 2 Are students aware of ellipses where they occur?
- 3 Are students capable of recovering ellipted elements?
- 4 What factors are associated with students'
 - 4.1 ability / inability to interpret ellipses correctly?
 - 4.2 Ability / inability to provide the ellipted elements?

9. SUBJECT GROUP

Please specify any relevant details about the participants. Include the number to be included and whether minors, mentally ill individuals, persons in dependent relationships, or from different cultural groups will be used. (Please see Section 2.2 in the Policy Document)

Subjects of the study are 60 first year students from Faculties of Engineering, Applied Science, and Technical Education of King Mongkut's Institute of Technology North Bangkok, Thailand. They are physically and mentally normal.

Please state from where and how the subjects are to be recruited.

The subjects are recruited from Faculties of Engineering, Applied Science, and Technical Education, King Mongkut's Institute of Technology North Bangkok. Percentile rank is applied to draw 30 top and 30 bottom students from the population of the first year students who have completed English for Science and Technology I & II., compulsory courses in KMITNB.

10. FORM/S OF DISCLOSURE AND INFORMED CONSENT

a. *All research should obtain written consent from each participant to protect the researcher and this institution. Please attach a copy of the forms of disclosure and informed consent which will be given to and signed by all participants. This form should describe in clear, simple terms, the procedures proposed, the anticipated benefits, and any possible risks. (Please see Appendix for guidelines).*

b. *If you do not intend to use a consent form please explain why.*

The subjects are just to do the simple tests and respond to a few questions concerning with the tests. The tests and the question won't do any harm to anyone. And all subjects are the students in the institute where the researcher works. They are supposed to cooperate in the staff's researches.

II. DETAILS OF RESEARCH PROCEDURES

Please describe briefly the procedures to which humans will be subjected with emphasis on procedures with possible adverse consequences

Note: A copy of any questionnaire or interview schedule must be provided.

The subjects are to do 3 English tests of the same content but different pattern. They have to interpret the elliptical sentences in the first test, supply the ellipted elements in the second one, and choose the correct answer to fill in the blanks in the third. The number of test items of each test is 30. After each item, the subjects are required to answer 2 questions and record their answer with the tape recorder. The questions are

1. Why do you interpret like that? (Test 1)
2. Why do you think that word(s) suit the slot? (test 2,3)
3. What helps you to get your answer? (Test 1,2,3)

There should be no adverse consequences.

12. CONFIDENTIALITY OF RECORDS

Records are required to be preserved for a minimum of five (5) years.

a. How will the confidentiality of records be maintained during the study?

They will be kept confidentially at the researcher's house.

b. How will the confidentiality of the records (primary or original data) be protected during the period of their preservation?

By Thai law.

c. How will the original materials be destroyed after the study is completed?

The tests will be cut into pieces by a machine and then recycled. The tape cassettes will be erased thoroughly.

- d. *Who else will have access to confidential materials (e.g. transcribers)? How will these people be included in the assurance of confidentiality?*

No one.

13. ETHICAL ISSUES

- a. *Have you read the policy document?*

YES: ✓

NO:

Please indicate what in your view are the ethical issues involved in this research. The following is a checklist of possible ethical issues.

- b. *Is any financial remuneration or other reward being offered to subjects for participation in the study?*

YES: ✓

NO:

If yes, please state how much will be offered and for what purposes, eg. to cover travelling expenses, time spent, etc.

100 Thai baht for time spent.

- c. *Is any information to be withheld from the participants?*

YES:

NO: ✓

- d. *Will material which identifies subjects be recorded eg. photographs, video recordings or any sound recordings?*

YES: ✓

NO:

- e. *If interviews are to be conducted will they be tape-recorded?*

YES: ✓

NO:

- f. Will participants be asked to commit any acts which might diminish self-respect or cause them to experience shame, embarrassment or regret?

YES:	NO: ✓
------	-------

- g. Does the research involve any stimuli, tasks, investigation or procedures which may be experienced by subjects as stressful or unpleasant?

YES:	NO: ✓
------	-------

- h. Will the research involve the use of no-treatment or placebo control conditions?

YES:	NO: ✓
------	-------

- i. Will the conduct of the research disturb or influence in a negative way the working relationship of the subjects and other groups of participants in their settings?

YES:	NO: ✓
------	-------

- j. Are there in your opinion any other ethical issues involved in the research?

YES:	NO: ✓
------	-------

If the answer to any of the questions from 'b' to 'j' is 'yes', please amplify below.

- | |
|---|
| b. The researcher'd just like to reward them for their cooperation. Actually, it is not necessary in Thai culture since the subjects are students in the researcher's workplace. They are to cooperate in the institute and staff's researches for the benefit of themselves and the institute. |
|---|

14. POTENTIAL RISKS AND BENEFITS

- a. What in your view are the possible risks of this research to the participants?

No

<i>Outline briefly any management plans which have been made in the event of this risk occurring.</i>

b. What are the possible benefits of this research.

(i) To the subject?

The subjects will have a chance to test their ability of reading English. The result of the study will be taken to Department of Language and Social Science, and KMITNB academic affair committee, of which the researcher is a member, so that they will take action in improving the curriculum and materials to help the subjects/students to have more suitable access to English language and textbooks.

(ii) To humanity generally?

The authors of textbooks will be more careful when writing textbooks. Ambiguity caused by ellipsis will be reduced. Readers will have less difficulties in comprehending English texts.

15 NH&MRC STATEMENT AND SUPPLEMENTARY NOTES 1992

a. ALL RESEARCH PROJECTS MUST COMPLY WITH THE GUIDELINES CONTAINED IN THE STATEMENT ON HUMAN EXPERIMENTATION.

Please indicate if any of the Supplementary Notes, as listed, apply to the research proposal:

b. Supplementary Note 2 - Research on children, the mentally ill and those in dependent relationships or comparable situation (including unconscious patients)

YES	NO ✓	N/A
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c. Supplementary Note 3 - Clinical Trials

YES	NO ✓	N/A
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d. Supplementary Note 4 - In vitro fertilisation and embryo transfer.

YES	NO ✓	N/A
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e. Supplementary Note 5 - Research involving the human foetus and the use of human foetal tissue.

YES	NO ✓	N/A
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f. Supplementary Note 6 - Epidemiological research.

YES	NO ✓	N/A
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g. Supplementary Note 7 - Somatic cell gene therapy.

YES	NO ✓	N/A
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DECLARATION

- (i) *I have read and agree to abide by the conditions and constraints set out in the Policy Statements on Ethical Research; and*
- (ii) *I agree to address any ethical issues which may arise from evolving change in procedures and to notify the undersigned of such changes.*

APPLICANT:

Name: Mrs. Sripen Srestasathern

Signature:

Date:

We the undersigned have read the proposal, and authorise the research methodology and use of nominated resources.

SUPERVISOR (for Students)/HEAD OF SCHOOL (for Staff)

Name: Dr. Graham McKay

Signature:

Date:

APPROVED BY:

(for students) HIGHER DEGREES COMMITTEE
(for staff) i) RESEARCH & DEVELOPMENT COMMITTEE
or ii) FACULTY RESEARCH COMMITTEE/HEAD OF SCHOOL

Name:

Designation:

Signature:

Date:

Letter of Information and Consent

Dear students,

We have been approached by Assoc. Prof. Sripen Srestusathien, who is one of our lecturers and now studying Ph.D. in Edith Cowan University, Perth, Australia, to conduct a research at our institute.

She is hoping to find out about how students handle with reading English textbooks in science and technology

This research is important because it will help us to know students' performance when reading textbooks in English. This will eventually help us to improve our curriculum, materials of English courses and teaching methodology. The more we can understand these things the more we can help students through our teaching.

The research will also give each student a chance to test his/her ability to read English textbooks and to share his/her ideas and perception of reading English textbooks.

You are selected to participate in this research and we hope that you will be cooperative.

In the study all you have to do is response to the simple English tests and tape-record your comment on each item as asked. This will not take too long and won't cause any stress because the researcher has provided you with a glossary. If for some reason you feel uncomfortable, you can stop immediately.

The data collected will be treated with the strictest confidence. You will not be identified by name either in the test or in any reports of this research.

If you are pleased to participate in this research, could you please complete the form below and return it to the institute. If you do not wish to participate, we respect your right. If this is the case do not return the form to the institute. You needn't do anything.

If you have any queries about this research, please contact Assoc. Prof. Sripen Srestusathien in Department of Languages & Social Science, King Mongkut's Institute of Technology North Bangkok, 1518 Piboonsongkram Rd., Bangkok 10800. Phone (02) 587-8262.

Thank you.

Yours Sincerely,

(Assoc. Prof. Banleng Somil)

President

King Mongkut's Institute of Technology North Bangkok

**ELLIPSIS IN SCIENCE AND TECHNOLOGY TEXTS IN ENGLISH ;
IMPLICATIONS FOR THAI STUDENTS**

ADULT CONSENT FORM

I am satisfied with the information provided to me on the language research project to be conducted by Assoc. Prof. Sripen Srestasathien, a Ph.D. student of Edith Cowan University and KMITNB lecturer.

I'm happy to take part in the project. I understand that no personal or identifiable reference will be made without my permission in any publication connected with the project.

NAME

SIGNATURE