ผลกระทบของการใช้เทคนิคการประเมินการอ่านต่างรูปแบบและระดับความสามารถทางภาษาอังกฤษที่มีต่อความเข้าใจการอ่านภาษาอังกฤษของนักเรียนไทยชั้นมัธยมศึกษา

นางสาว ดวงใจ จงธนากร

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรดุษฎีบัณฑิต
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บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย
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THE EFFECTS OF ALTERNATIVE READING ASSESSMENT TECHNIQUES AND ENGLISH LANGUAGE ABILITY ON READING COMPREHENSION OF THAI HIGH SCHOOL STUDENTS

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in English as an International Language
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ดวงใจ จงธนากร : ผลกระทบของการใช้เทคนิคการประเมินการอ่านต่างรูปแบบและระดับความสามารถทางภาษาอังกฤษที่มีต่อความเข้าใจการอ่านภาษาอังกฤษของนักเรียนไทยชั้นมัธยมศึกษา (THE EFFECTS OF ALTERNATIVE READING ASSESSMENT TECHNIQUES AND ENGLISH LANGUAGE ABILITY ON READING COMPREHENSION OF THAI HIGH SCHOOL STUDENTS)
อ. ที่ปรึกษา : ศ. ดร. กาญจนา ปราบพาล, 256 หน้า.

งานวิจัยนี้มีจุดมุ่งหมายเพื่อศึกษาผลกระทบของการใช้เทคนิคการประเมินการอ่านต่างรูปแบบ(การอ่านแบบถ่ายโยงข้อมูลและการอ่านแบบย่อความ) และระดับความสามารถทางภาษาอังกฤษที่มีต่อความเข้าใจการอ่าน รวมทั้งกลวิธีการอ่านและกลวิธีการทำข้อสอบ กลุ่มตัวอย่างเป็นนักเรียนมัธยมศึกษาปีที่ 3 จำนวน 180 คน โดยได้สุ่มให้ทำแบบสอบอย่างใดอย่างหนึ่ง เครื่องมือที่ใช้ ได้แก่ แบบสอบวัดความเข้าใจการอ่านและแบบสัมภาษณ์ การวิเคราะห์ข้อมูล ใช้วิธีวิเคราะห์เชิงปริมาณและเชิงคุณภาพ ได้แก่ การวิเคราะห์ความแปรปรวนแบบสองทาง และการวิเคราะห์คำตอบของแบบสัมภาษณ์

ผลการศึกษาพบว่า(1) แบบสอบวัดการอ่านทั้งสองแบบมีความแตกต่างอย่างมีนัยสำคัญ คะแนนเฉลี่ยที่ได้จากแบบสอบการอ่านโดยการถ่ายโยงข้อมูลต่ำกว่าคะแนนเฉลี่ยที่ได้จากแบบสอบการอ่านโดยการย่อความ (2) คะแนนเฉลี่ยของนักเรียนกลุ่มอ่อนแตกต่างจากกลุ่มปานกลางและกลุ่มเก่ง (3) แบบสอบการอ่านโดยการย่อความมีผลกระทบต่อนักเรียนกลุ่มอ่อนมากกว่านักเรียนกลุ่มปานกลางและนักเรียนกลุ่มเก่ง (4) กลวิธีการอ่านและกลวิธีการทำข้อสอบโดยเฉพาะของนักเรียนกลุ่มเก่งสอดคล้องกับความสามารถในการอ่านที่วัดโดยแบบสอบทั้งสองวิธี นอกจากนี้ นักเรียนมีเจตคติเชิงบวกต่อแบบสอบทั้งสองอีกทั้งยังเห็นว่าแบบสอบการอ่านโดยการถ่ายโยงข้อมูลมีลักษณะทันสมัยคล้ายเกม งานวิจัยนี้ให้ความรู้เรื่ององค์ประกอบของการอ่าน การพัฒนาและการวัดความเที่ยงของแบบทดสอบการอ่าน นอกจากนี้กลวิธีการอ่านและกลวิธีการทำข้อสอบของนักเรียนต่างระดับความสามารถที่ค้นพบในงานวิจัยนี้สามารถส่งผลในเชิงปฏิบัติเกี่ยวกับการสอนการอ่าน ควรมีการออกแบบรายวิชาการอ่านที่ผสมผสานการฝึกฝนกลวิธีการอ่านและกลวิธีการทำข้อสอบเพื่อพัฒนาความสามารถในการอ่านของผู้เรียนให้ดียิ่งขึ้น

สาขาวิชาภาษาอังกฤษเป็นภาษานานาชาติ(สหสาขาวิชา) ลายมือชื่อนิสิต.....
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KEY WORD: READING ASSESSMENT/ LANGUAGE ABILITY/ READING STRATEGIES/ TEST-TAKING STRATEGIES / INFORMATION-TRANSFER / SUMMARY

DUANGCHAI CHONGTHANAKORN: THE EFFECTS OF ALTERNATIVE READING ASSESSMENT TECHNIQUES AND ENGLISH LANGUAGE ABILITY ON READING COMPREHENSION OF THAI HIGH SCHOOL STUDENTS. THESIS ADVISOR : PROF. KANCHANA PRAPPHAL, Ph.D. 256 pp.

The purposes of the study were to investigate (1) the effects of the two reading assessment techniques: the Information-transfer Technique (IT) and the Summary Technique (ST), and the test takers' English language ability on their reading comprehension scores; (2) the test takers' reading and test-taking strategies while responding to the IT and the ST. The subjects were 180 Thai 9th grade high school students. They were randomly selected and randomly assigned to take each assessment technique. The research instruments included the IT, the ST, and the semi-structure interview. The data from the IT and the ST administration were quantitatively analyzed by Two-Way ANOVA and the interview was qualitatively analyzed by content analysis.

The findings of the study were as follows. First, it revealed a significant difference between the IT and the ST. The mean score of the test takers assessed by the IT was lower than that of the test takers assessed by the ST. Second, the mean score of the test takers with low ability was different from the mean score of those with average ability and the mean score of those with high ability. Third, the ST had more of an effect on the test takers with low ability than it did on the test takers with average or high ability. Finally, the test takers' reading and test-taking strategies, particularly those of the test takers with high ability confirmed the constructs of the IT and the ST. In addition, most of the test takers from the three ability groups had positive attitudes towards the IT and the ST. Specifically, the IT was viewed as an innovative and game-like task. This study can offer theoretical and practical implications. It has provided more insights into the theory of reading components, test development and test validation process. The findings of reading and test-taking strategies of the test takers with different levels have implications for reading instruction. Reading courses embedded with the training of reading strategies for global comprehension should be designed to enhance the students' reading ability.

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TABLE OF CONTENTS

page

page

page

page

LIST OF TABLES

page

LIST OF FIGURES

page

CHAPTER I

INTRODUCTION

1.1 Background of the study

Reading comprehension is a process of making sense of texts in order to acquire new knowledge. Particularly, in EFL contexts, the ability to interpret written texts in English provides a reader a useful tool to be exposed to various sources of knowledge that are written in English. With strengthened reading ability, ESL/EFL readers will make greater progress and attain greater development in all academic areas (Anderson, 1999: 1). However, there are two main variables affecting the nature of reading (Alderson, 2002). They are, the reader: aspects of the person doing the reading, and the text: aspects of the text to be read. In detail, reader variables are, for example, readers' background and topic knowledge; readers' reading skills; readers' purpose in reading; readers' target language proficiency, etc. Text variables include, for instance, text readability, text type and text topics, etc. As for a reading teacher's role, these variables need to be taken into account during either reading instruction or reading assessment so as to enhance students' reading ability.

With regard to reading assessment, since it is used to collect information for making judgments about a language learner's knowledge and ability to use the language (Chapelle and Brindley, 2002), it is certainly an important act in language teaching and learning context. There are also variables that can affect the results of the reading tests: assessment techniques; test takers' language ability, reading strategies, test-taking strategies, etc.

Assessment techniques

Alderson (2002: 206) states that, “Good reading tests are likely to employ a number of different techniques. This makes good sense, since in real life reading, readers typically respond to texts in a variety of different ways”. In addition, he has mentioned that in order to assess a reader’s ability for both diagnostic and achievement purposes, there is a variety of alternative techniques or test methods. Apart from multiple-choice techniques, these alternative techniques include matching, ordering, editing, short-answer, free-recall, summary, and information-transfer techniques. These test techniques are varieties of alternative or optional procedures, while some can be used in assessing the process of test takers’ reading ability, and the others in assessing the product of their reading ability.

Among the alternative reading assessment techniques, the summary technique is claimed to be able to assess the test taker’s higher order reading skills (Johns, 1985 ; Bensoussan and Kreindler, 1990). In addition, Alderson (2002: 232) explains that in doing the summary test, the student’s task is to read a text and then he is required to summarize the main ideas and the supporting details. The main ideas refer to the macrostructures of the text whereas the supporting details refer to the microstructures of the text (Gunning, 2003: 316).

Another test technique which is contended to be able to assess the test taker’s ability to grasp the important information in a text – overall gist, main ideas, and important details – is the information-transfer technique (Weir, 1993: 88). The test taker’s task is to identify in the target text the required information and then to transfer it by completing a diagram, a table or a graphic organizer.

Regarding reading test techniques in the standardized tests such as IELTS and TOEFL, there are a number of alternative assessment techniques. For instance, concerning the reading module in IELTS, the tasks are in a variety of formats such as multiple-choices, matching lists or phrases, matching headings to sections/paragraphs, classification, identification of information – True/False, identification of writer's view – Yes/No, locating information in sections/paragraphs, short-answer questions and lists, note/ table/ flow chart completion, sentence completion, summary completion, labeling a diagram/ map/ or plan (O'Connell, 2004).

More interestingly, there are two new test items proposed in the new TOEFL introduced in 2002. These two new test items are called "Prose Summary" and "Schematic Table". They employ 'multiple-selection multiple choices' formats. For the prose summary, test takers are asked to complete a summary of a text with one or two sentences. A list of six sentences that express the most ideas in the passage are provided (Enright and Schedl, 2000). Distracters include ideas that either are not presented in the passage or are deemed as minor details. For the schematic table, test takers must click and move sentences or phrases into a table to complete a schematic representation of the passage. A correctly completed table should reveal an integrated mental model of how the two dimensions fit together conceptually based on the information in the text (Enright and Schedl, 2000). The focus on both of these 'multiple-selection multiple choices' items is on the ability to identify major ideas and important information in a text. These new formats have been expected to elicit somewhat different 'academic-like approaches' to reading than those elicited by the more traditional formats (Cohen and Upton, 2007: 213).

A great number of research studies were carried out to investigate the effects of test methods on reading ability (Shohamy, 1984; Lee, 1987; Carrell, 1991; Wolf, 1993; Riley and Lee, 1996; Huhta and Randell, 1995; Kobayashi, 2002; Sawaki, 2005). Some of these studies compared different test methods in terms of the different response formats on the readers' reading comprehension. For example, Kobayashi (2002) investigated whether cloze tests, open-ended questions and summary writing tests influenced test results. Others investigated the test method effects in terms of the same response formats but different test techniques. For instance, Sawaki (2005) compared the summary writing and free recall on reading results. Both summary writing and free recall are extended production response formats (Bachman and Palmer, 1996). Besides, some studies, such as Huhta and Randell (1995), compared the same selected response formats on reading comprehension: traditional multiple-choice questions and multiple-choice summaries with three and five choices.

Language ability

Alderson (2002:60) states that, for second-language readers, an important component in developing reading ability must be increasing language proficiency.

Moreover, there are a number of research studies examining the factor of test takers' language ability on their reading comprehension scores such as Grabe (1991), Devine (1993), Kobayashi (2002), Nassaji (2003).

Grabe (1991) explains that 'beginning readers' focus on word identification whereas more proficient readers shift attention to more abstract conceptual abilities and make better use of background knowledge, using only as much textual

information as needed to confirm and predict the information in the text (Coady,1979 cited in Grabe,1991)

Nassaji's (2003) study demonstrates that skilled ESL readers are differentiated from less-skilled readers because of their higher language ability: higher-level and lower-level text processing skills. These skills include word recognition, phonological and orthographic processing, syntactic and semantic processes. These studies show that language ability, such as linguistic knowledge, is limited for less-skilled readers so their reading comprehension ability is lower.

Reading strategies and test-taking strategies

Reading and test-taking strategies have been investigated by researchers in their exploration of the reading process through qualitative research techniques (Alderson, 2002).

Particularly, in recent testing literature, there is also a growing number of studies on test takers' reading and test-taking strategies such as Gordon and Hanauer (1995), Rupp *et al*. (2006), Cohen and Upton (2007). These studies required a qualitative investigation of how test takers process and respond to test items. Gordon and Hanauer (1995) used the think aloud technique for elicitation of verbal reports to follow processes the test takers engaged in while completing test tasks. In Rupp *et al*.'s (2006) study, the test takers were prompted using a semi-structure interview format while responding to multiple-choice reading comprehension questions. In Cohen and Upton's (2007) study, the participants were asked to verbalize their reading and test-taking strategies by their concurrent verbal report (think-aloud protocol). These studies gained a better understanding of how reading and test-taking strategies

are used on tests as part of the process of construct validation.

As for the term 'construct validity', Bachman and Palmer (1996:21) define this term that "Construct validity is used to refer to the extent to which we can interpret a given test score as an indicator of the ability(ies), or construct(s), we want to measure". Consequently, as a reading teacher or reading test developer, one may concern with whether the developed test can give an accurate reflection of the students' reading ability from the scores attained in the test. Weir (2005:88) asserts that "If we can identify skills/ strategies that appear to make an important contribution to the reading process, it should be possible to test these and use the composite results for reporting on reading proficiency".

Based on the literature review on the variables mentioned, it can be seen that it is worth studying the effects of different reading assessment techniques and language ability on test takers' reading comprehension scores. In addition, it is worth exploring the reading and test-taking strategies the test takers with different levels of language ability employ because it can provide more insights in the reading process of successful and unsuccessful readers. .

However, in Thai context, not many studies on these variables were conducted: Prapphal (1995); Katib (1997); Jarijitpaibul (2002); Baker and Boonkit (2004); Sucantajan (2006). Prapphal's study was on the relationship between the reading strategies and language background of 3rd year university students in performing summary tests. Katib investigated reading comprehension monitoring strategies of 2nd and 4th year university students. Jarijitpaibul's study was on reading strategies of 11th grade high school students with different English reading comprehension abilities. Baker and Boonkit identified the most frequently used learning strategies between

successful and less successful undergraduate learners. Sucantajan did a survey study of English reading strategies of 1st year university students. Presumably there have not been research studies on these variables for the subjects at lower level specifically at 9th grade high school students.

In terms of reading assessment techniques at Patumwan Demonstration School, where the subjects in this study are studying, normally the reading test techniques employed are either True/False, traditional single-selection multiple choices, or cloze tests. Reading test items are generally on basic comprehension and on discrete points of passages such as questions on local comprehension, i.e. the meaning of lexical items, pronominal references. However, the global comprehension reading tests, which are claimed to be able to assess the ability to read for main ideas and important supporting details, such as those using the information-transfer technique and the summary technique have rarely been utilized. According to Cohen and Upton (2007), the ability to understand main ideas and important information in a text is one of the crucial abilities required in academic reading. Therefore, in this research study, the two reading assessment techniques—the information-transfer technique and the summary technique—were developed by adapting the concept of the new TOEFL test items: the prose summary and the schematic table with the response format of multiple-selection multiple choices.

To conclude, the background of this research study starts from the significance of reading in EFL contexts, the significance of the variables in reading research studies: reading assessment techniques, test takers' language ability and test takers' reading and test-taking strategies while responding to the information-transfer technique and the summary technique, as well as the gap of reading assessment

techniques on global comprehension for Thai high school students. It is hoped that the research findings can shed lights on reading test development and the construct validation of the tests. Moreover, it is expected that the findings of reading and test-taking strategies of the test takers with different levels of language ability can have implications for reading instruction and for research in the testing field.

1.2 Research questions

1. Do different reading assessment techniques (the Information-transfer Technique (IT) and the Summary Technique (ST) have a significant effect on test takers' reading comprehension scores?

2. Do test takers' English language ability have a significant effect on their reading comprehension scores?

3. Is there a significant interaction effect between different reading assessment techniques and test takers' English language ability on their reading comprehension scores?

4. What are the test takers' reading and test-taking strategies when assessed by the two reading assessment techniques?

1.3 Objectives of the study

1. To investigate the effect of the two different reading assessment techniques on test takers' reading comprehension, and to investigate the effect size,

2. To investigate the effect of test takers' levels of English language ability (High (H), Average (A), and Low (L)) on test takers' reading comprehension, and to investigate the effect size,

3. To investigate the interaction effect between the two different reading assessment techniques and test takers' English language ability on their reading comprehension, and to investigate the effect size,

4. To investigate the test takers' reading and test-taking strategies of the two different reading assessment techniques.

1.4 Statements of hypotheses

1. The mean score obtained from the IT is significantly different from that obtained from the ST at the significant level of .05.

2. The mean score obtained from the test takers with high ability is significantly different from that obtained from the test takers with average language ability, and significantly different from that obtained from the test takers with low language ability**.**

3. There is a significant interaction effect between reading assessment techniques and test takers' English language ability on their reading comprehension scores at the significant level of .05.

1.5 Scope of the study

1. The population of the study was 341 Thai 9th grade high school students at Patumwan Demonstration School in Bangkok, Thailand. They have been studying English as a foreign language for about 9 years since their primary level of study. They are about 14-15 years old.

2. The independent variables are reading assessment techniques and English language ability. There are two levels in the first IV: the IT and the ST and there are

three levels in the second IV: high (H), average (A), and low (L).

3. The dependent variable is the mean score of the reading comprehension from the two reading assessment techniques: the IT and the ST.

1.6 Limitations

This study examined reading strategies and test-taking strategies while the test takers with high, average and low ability were responding to the two reading assessment techniques: the Information-transfer Technique (IT) and the Summary Technique (ST). The findings of the reading strategies and test-taking strategies may not be generalized beyond other reading assessment techniques. Moreover, the selected texts used in the reading tests were limited to only the text type of 'problem-solution' because it was claimed to be important for testing global comprehension (Urquhart and Weir, 1998). Therefore, the results cannot be generalized to other text types such as 'description' and 'narration'.

1.7 Definitions of terms

Reading Assessment Techniques

"Reading Assessment Techniques" refers to the Information-transfer Technique (IT) and the Summary Technique (ST). They are the tests that have been designed to measure the macro-level reading comprehension skills or the abilities to read for main ideas and important supporting details. The IT requires the test takers to read a passage before completing a 'graphic organizer' by selecting answers of main ideas and important details from 'multiple-selection' multiple choices. The ST requires the test takers to read a passage and then complete a 'prose summary' by

selecting answers of main ideas and important details from ‘multiple-selection’ multiple choices.

Alternative Reading Assessment Techniques

“Alternative Reading Assessment Techniques” refers to optional reading assessment techniques. In this study, the IT and the ST serve as choices for global comprehension reading assessment techniques

English Language Ability

“English Language Ability” refers to the test takers’ levels of language ability considered by their English achievement scores in the 1st semester of the academic year 2007. The high language ability group was those whose scores were between 1 S.D. to 2 S.D. The average language ability group was those whose scores were between - .5 S.D to .5 S.D. The low language ability group was those whose scores were between -1 S.D. to -2 S.D.

Reading Comprehension

“Reading Comprehension” refers to the ability to read for main ideas and important supporting details of the reading texts. For the IT, it is the ability to complete the graphic organizers of the reading texts with the main ideas and the important supporting details. For the ST, it is the ability to complete the prose summaries of the reading texts with the main ideas and the important supporting details. Therefore, in the present study, “Reading Comprehension” refers to the scores attained in the IT and the ST.

Reading Strategies

“Reading Strategies” refers to test takers’ reading strategies while responding to the IT and the ST. They refer to R1 (skimming); R2 (reading every word of the

passage and of the options establishing main ideas); R3 (distinguishing the main ideas from the supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); and R5 (reading the passage and the options carefully then discarding the options which are irrelevant information or minor details). In this study, the test takers were interviewed whether they used these reading strategies or not.

Test-taking Strategies

"Test-taking Strategies" refers to test takers' test-taking strategies while responding to the IT and the ST. They are T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T3 (grouping the options that are relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist of each portion and looking for specific words in the options); and T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning). In this study, the test takers were interviewed whether they used these test-taking strategies or not.

Reading Attitudes

"Reading Attitudes" refers to test takers' opinions towards the IT and the ST regarding the reading passages, the advantages and the disadvantages of the two tests. In this study, the attitudes were measured by the semi-structure interview.

Thai High School Students

"Thai High School Students" refers to Thai 9th grade high school students at Patumwan Demonstration School in Bangkok, Thailand in the academic year 2007.

1.8 Significance of the study

The results of the study are expected to be significant in many aspects. In terms of theoretical contributions, the findings can provide more insights on the reading theory that reading process can be broken down into skills and strategies. The component skills and strategies can be identified for testing purposes. They can also shed light on reading test development processes. The information from qualitative data can support the construct validity of the tests. In terms of practical contributions, the findings of different ability test takers' reading strategies and test-taking strategies can have implications for reading instruction as well as reading materials and reading tests design.

1.9 An overview of the study

This chapter presents the background of the study, the research questions, the objectives of the study, the statements of hypotheses, the scope of the study, the limitations, the definitions of terms and the significance of the study. Chapter 2 reviews the literature in the following areas: reading, reading skills, reading strategies, test-taking strategies, alternative reading assessment techniques, the development and validation of tests, language ability and previous research in the field. Chapter 3 presents the research methodology. It involves research design, population and sample, research instruments, data collection and data analysis. Chapter 4 displays the findings of the study through the data from the two test administration and the data from the semi-structure interview. Chapter 5 summarizes the study, discusses the results, describes the theoretical and practical implications and offers recommendations for reading teachers and researchers in the assessment field.

CHAPTER II

LITERATURE REVIEW

This chapter presents the literature reviewed in the following areas: reading, reading skills, reading strategies, test-taking strategies, alternative reading assessment techniques, the development and validation of tests, language ability and previous research in the field.

2.1 Reading

Scholars in the field of reading ESL and EFL have defined reading in several ways. For example, Urquhart and Weir (1998: 22) specify that "Reading is the process of receiving and interpreting information encoded in language form via the medium of print". Moreover, Grabe and Carrell (2002: 234) elaborate the definition of reading as follows:

> A definition of reading requires some recognition that a reader engages in processing at the phonological, morphological, syntactic, semantic and discourse levels, as well as engages in goal setting, text-summary building, interpretive elaborating from knowledge resources, monitoring and assessment of goal achievement, making various adjustments to enhance comprehension, and making repairs to comprehension processing as needed. Moreover, these processes are carried out by the integration of activated processes and resources (in working memory) under intense processing-time constraints.

Similarly, Koda contends that (2005: 227), "reading is a complex, multifaceted pursuit requiring the continuous deployment and integration of multiple operations".

Additionally, Alderson and Banerjee's (2002: 84) definition of "reading" is beyond decoding skill. It is relative to not only the readers but also to the text. They assert that "Reading is an interaction between a reader with all that the reader brings with him/her –background knowledge, affect, reading purpose, intelligence, first language abilities and more –and the text, whose characteristics include topic, genre, structure, language (organization, syntax, vocabulary, cohesion) and so on".

Likewise, in more detail, Grabe and Stroller (2002: 18) describe that reading is an interactive process in two ways. First, the various processes involved in reading are carried out simultaneously. As for fluent reading, while readers are recognizing words very rapidly and keeping them active in working memories/ short-term memories, they are also analyzing the structure of sentences to assemble the most logical clause-level meanings, building a main-idea model of text comprehension in their heads, monitoring comprehension and so on. Second, reading is interactive in the sense that linguistic information from the text interacts with information activated by the reader from long-term memory, as background knowledge. The two knowledge sources (linguistic and background) are essential for building the readers' interpretation of the text.

To conclude, reading is an activity of interpreting information from texts. It is a complex process requiring the integration of operations, i.e. decoding, setting purposes for reading and monitoring comprehension. It is also an interactive process between the reader and the text. In comprehending the text, for instance, the reading process relates to the reader's linguistic knowledge and linguistic information of the text. It also relates to the reader's background knowledge on the text's topic and text type.

2.1.1 Reading approaches

Alderson (2005: 119) claims that approaches explaining the reading process are bottom-up approach, top-down approach, and interactive approach. In bottom-up approach, reading proceeds from letter to word identification, from word to sentence meaning and from understanding sentences to understanding whole texts. In top-down approach, reading is the activity that readers approach texts with a series of expectations or predictions of what the text will be about based on their knowledge of the world. In interactive approach, reading is an interactive process, combining both bottom-up and top-down, between the print on the page and what is in the reader's head.

The three approaches are also called the models of reading comprehension. Likewise, Clapham (1996: 13-16) explains that bottom-up models describe reading as being a linear process from graphic symbols to meaning responses, and says that readers check words individually, and sound them out phonetically. In bottom-up models, readers passively perceive input which progresses from the lowest level of reading –the interpretation of symbols—to the higher levels such as assigning of meaning. Top-down models define reading as being driven by hypotheses—readers follow a cyclical procedure of sampling the text, predicting what will come next, testing predictions, and adjusting or confirming them. In top-down models, readers, far from being passive receivers, play an active part in the text interpretation using background knowledge to form inferences, and decoding symbols only when it is necessary for comprehension. Interactive models describe reading as an interactive process which involves a combination of top-down and bottom-up processes. In interactive models, readers move back and forward between the different levels of

processing using the visual stimuli, background knowledge and reading purposes in comprehending a text.

Urquhart and Weir (1998: 121) assert that there has been a current consensus that reading is an interactive process involving both bottom-up and top-down processes.

To conclude, the three models view reading comprehension from the three perspectives: bottom-up perspective, top-down perspective, and interactive perspective.

2.1.2 Reading comprehension as process or product

Reading comprehension can be viewed as process or product. Alderson (2002: 3-7) explains that the process is the interaction between a reader and the text—two variables that affect the nature of reading. Reader variables are such as the reader's background knowledge, skills and abilities, purposes of reading, motivation. The text variables are, for example, text topic and content, text type and genre, text readability, the medium of text presentation.

During the process, many different things are going on when a reader reads; for instance, the reader is looking at the print, thinking about what he is reading, thinking about how useful the text is, etc. The process is likely to be dynamic, variable, and different for the same reader on the same text at a different time or with a different purpose in reading. The process is more likely to be different for different readers on different texts at different times and with different purposes. Understanding the process of reading is a difficult thing to do because it is normally silent, internal, and private. To examine the process of reading is to inspect the

readers' eye movements, to investigate the reading-aloud process, or to use introspection through think-aloud protocols or verbal retrospection in interviews. On the other hand, the product is defined as the result of the reading process. The way to inspect the product of reading is to design a test and administer the test to informants.

Similarly, Koda (2005: 228-229) contends that comprehension can be conceived of as process and as product. The product view presumes that the outcomes of reading are stored in the reader's long-term memory and can be measured by persuading the reader to demonstrate portions of the stored text representation. This product approach places the major emphasis on memory as the dominant factor underlying successful demonstration of comprehension. Memory and comprehension are largely inseparable. Comprehension occurs only if text information is stored in memory, and content retention is possible only when it is adequately understood. The product-based assessment is commonly characterized by post-reading administration methods such as true-false and multiple-choice questions, constructive responses, and free recall. On the other hand, the process-approach views that comprehension is a process of extracting information from print and integrating it into a coherent meaning. This approach distinguishes the ability to comprehend and the ability to remember. To measure comprehension without confounding it with memory, process-based assessment is designated to capture ongoing processing behaviors as they occur during reading, before text information is conveyed to long-term memory. Online processing tasks, think-aloud verbal reports, and eye-movement tracking serve as examples of process-based assessment.

To summarize, there are two aspects conceptualizing reading comprehension as process versus as product. The process-based aspect separates comprehension from memory whereas the product-based aspect emphasizes that memory and comprehension are inseparable. Moreover, different aspects in measuring reading comprehension, as a process or a product of reading, depend on different types of assessment techniques. Reading comprehension product can be assessed by reading tests. On the other hand, reading comprehension process can be examined by the test administrator's investigation on reader's eye movements, think-aloud verbal protocols, or retrospective interviews. With these reading tests and investigating tools, reading strategies and reading skills used by successful and unsuccessful readers can be identified in details.

2.1.3 Reading components

There has been a continual argument whether reading is divisible into component skills or whether it is an indivisible unitary process. However, there has been a stronger claim for the component aspect. According to Weir (2005: 88-89), the process of reading involves the use of different skills and strategies. He asserts that "if we can identify skills and strategies that appear to make an important contribution to the reading process, it should be possible to test these and use the composite results for reporting on reading proficiency".

Similarly, according to Alderson (1990:425), he states that "it is commonplace in theories of reading to seek to identify skills which underlie or contribute to the reading process…it is common practice among teachers, testers and researchers of reading to assume that reading skills can be identified, taught, tested

and researched".

Therefore, for testing purposes, the reading process should be broken down, and the component skills and strategies should be addressed.

2.1.4 Reading skills and reading strategies

Urquhart and Weir (1998: 96-98) mention that there is a fair amount of confusion as to what distinguishes a skill from a strategy. Some writers refer to 'skills/strategies' as if they were interchangeable. However, Urquhart and Weir distinguish skills and strategies by the following possible differences:

- Strategies are reader-oriented e.g., 'interpreting text by going outside it'.
  Skills are text-oriented e.g., 'understanding conceptual meaning'.
- Strategies represent conscious decisions taken by the reader.
  Skills are deployed unconsciously or at the level of automaticity.
- Strategies represent a response to a problem e.g., 'failure to understand a word or the significance of a proposition'.

Finally, Urquhart and Weir mention that they agree with the distinction drawn by Williams and Moran (1989:223) that "A skill is an ability which has been automatised and operates largely subconsciously, whereas a strategy is a conscious procedure carried out in order to solve a problem"(ibid.: 98).

Likewise, Weir *et al.* (2000: 23) admit that reading skills indicate the careful and usually *subconscious* process of applying linguistic skills to extract main ideas and important details, whereas, reading strategies indicate the quick and usually *conscious* process of employing strategies for achieving the purposes of reading efficiently and quickly.

To conclude, reading strategies and reading skills are simply distinguishable by the criterion of '*conscious and automatic*'. However, Grabe and Stroller (2002) caution that sometimes the distinction may become blurred as strategies become automatised in fluent readers. Also, sometimes they are used interchangeably. Urquhart and Weir (1998: 96) have criticized that Munby's taxonomy of reading skills are composed of skills and strategies.

2.1.5 Taxonomy of reading skills

Alderson and Lukmani (1989) have described previous research studies identifying reading skills or sub skills. There were some studies such as Davies' (1968) identifying reading skills by giving subjects a series of passages and asking them questions to test different levels of understanding of the passages. The other studies such as Munby's (1978) identifying reading skills by thinking about the nature of language and speculating on what a reader must logically have to do in order to understand written texts. The reading skills in both researchers' lists relate directly to the level of understanding of texts.

Davies' (1968) list of "reading skills or sub skills" is as follows:

1. Recalling word meanings
2. Drawing inferences about the meaning of a word from context
3. Finding answers to questions answered explicitly or in paraphrase
4. Weaving together ideas in the content
5. Drawing inferences from the content
6. Recognizing a writer's purpose, attitude, tone and mood
7. Identifying a writer's technique

8. Following the structure of a passage

Munby's (1978) list of "microskills" is as follows:

1. Recognizing the script of a language
2. Deducing the meaning and use of unfamiliar lexical items
3. Understanding explicitly stated information
4. Understanding information when not explicitly stated
5. Understanding conceptual meaning
6. Understanding the communicative value of sentences
7. Understanding relations within the sentence
8. Understanding relations between parts of a text through lexical cohesion devices
9. Understanding cohesion between parts of a text through grammatical cohesion devices
10. Interpreting a text by going outside it
11. Recognizing indicators in discourse
12. Identifying the main point or important information in discourse
13. Distinguishing the main idea from supporting details
14. Extracting salient points to summarize (the text, an idea)
15. Selective extraction of relevant points from a text
16. Basic reference skills
17. Skimming
18. Scanning to locate specifically required information
19. Transcoding information to diagrammatic display

Urquhart and Weir (1998: 102-104) offer the following descriptions of different kinds of reading. They are also clarified as skills and strategies.

Skimmimg: Reading for gist. The reader asks: 'What is this text as a whole about?' while avoiding anything that looks like detail.

Search reading: Locating information on predetermined topics. The reader wants information to answer set questions or to provide data, for example, in completing assignments. It differs from skimming in that the search for information is guided by predetermined topics so the reader does not necessarily have to establish a macro-propositional structure for the whole text.

Scanning: Reading selectively, to achieve very specific reading goals, e.g. finding the number in a directory, finding the capital of Bavaria. The main feature of scanning is that any part of the text which does not contain the preselected symbol(s) is dismissed. It may involve looking for specific words/ phrases, figures/ percentages, names, dates of particular events or specific items in an index.

Careful reading: This is the kind of reading favored by many educationalists and psychologists to the exclusion of all other types. It is associated with reading to learn, hence with the reading of textbooks. The defining features are that the reader attempts to handle the majority of information in the text, that is, the process is not selective; that the reader adopts a submissive role and accepts the writer's organization, including what the writer appears to consider the important parts; and that the readers attempts to build up a macrostructure on the basis of the majority of the information in the text.

In addition, they present a four-part matrix of careful and expeditious reading skills and strategies at the global and local levels (Urquhart and Weir ,1998: 123)

	Global Level	**Local Level**
Careful Reading	Establishing accurate comprehension of explicitly stated main ideas and supporting details. Making propositional inferences.	Identifying lexis. Understanding syntax.
Expeditious Reading	Skimming quickly to establish discourse topic and main ideas, or structure of text, or relevance to needs. Search reading to locate quickly and understand information relevant to predetermined needs.	Scanning to locate specific points of information

Weir *et al.* (2000: 23-24) clarify the definitions of careful reading and expeditious reading. They mention that both careful reading and expeditious reading can be at the global and local level, and then define the meanings of them as follows:

'Careful reading' refers to a slower overall process involving the use of probably different subconscious reading skills such as accessing mental lexicon, syntactic parser and thematic organizer.

'Expeditious reading' refers to a quicker process involving the use of reading strategies as well as using careful reading skills as and when appropriate. The reader will not usually attempt to understand every word

in a passage but focuses on overall meaning.

'Global comprehension' refers to the understanding of propositions beyond the level of microstructure, that is, any macropropositions in the macrostructure, including main ideas and important details.

'Local comprehension' refers to the understanding of propositions at the level of microstructure, i.e., the meaning of lexical items, pronominal reference, etc.

Weir (2005:91) concludes that the above mentioned skills and strategies are obviously still theoretical constructs, with only a hypothesized existence. Their separate nature or the extent to which they interact with other reading skills need to be empirically investigated. One way the teacher might do this is to get students to introspect through think-aloud protocols or verbal retrospection about the processes or the strategies they are using to solve questions set on the various skills.

2.1.6 Exploring reading strategies

Alderson (2002) states that reading strategies have usually been investigated by researchers in their exploration of the reading process through qualitative research techniques. He has exemplified two pieces of study using different techniques to gather data. Allan (1992) employed introspections to investigate strategies used in answering multiple-choice questions on a TOEFL reading test. Nevo (1989) had the students do checklists of strategies.

In addition, one more example of a study exploring reading strategies through qualitative research technique –think-aloud protocols – is the work of Hosenfeld (1987, cited in Alderson: 310). In this study, a description of reading strategies of a

successful contextual guesser has been presented. These reading strategies are claimed to distinguish successful from unsuccessful second language readers. They can be illustrated as follows:

- Keep the meaning of a passage in mind while reading and use it to predict meaning.
- Skip unfamiliar words and guess their meaning from remaining words in a sentence or later sentences.
- Circle back in the text to bring to mind previous context to decode an unfamiliar word.
- Identify the grammatical function of an unfamiliar word before guessing its meaning.
- Examine the illustration and use information contained in it in decoding.
- Read the title and draw inferences from it.
- Refer to the side gloss.
- Recognize cognates.
- Use knowledge of the world to decode an unfamiliar word.
- Skip words that may add relatively little to total meaning.

(Hosenfeld, 1987:24 cited in Alderson, 2002: 310)

Anderson (1999: 82-83) develops a reading strategy checklist which has been broken into three different groups: (a) cognitive reading strategies (thinking), (b) metacognitive reading strategies (thinking about your thinking/ planning), and (c) compensating reading strategies.

(a) Cognitive Reading Strategies

1. Predicting the content of an upcoming passage or section of the text.
2. Concentrating on grammar to help you understand unfamiliar constructions.
3. Understanding the main idea to help you comprehend the entire reading.
4. Expanding your vocabulary and grammar to help you increase your reading.
5. Guessing the meanings of unfamiliar words or phrases to let you use what you already know about English.
6. Analyzing theme, style, and connections to improve your comprehension.
7. Distinguishing between opinions and facts in your reading.
8. Breaking down larger phrases into smaller parts to help you understand difficult passages.
9. Linking what you know in your first language with words in English.
10. Creating a map or drawing of related ideas to enable you to understand the relationships between words and ideas.
11. Writing a short summary of what you read to help you understand the main ideas.

(b) Metacognitive Reading Strategies

12. Setting goals for yourself to help you improve areas that are important to you.
13. Making lists of relevant vocabulary to prepare for new reading.
14. Working with classmates to help you develop your reading skills.
15. Taking opportunities to practice what you already know to keep your

progress steady.

16. Evaluating what you have learned and how well you are doing to help you focus your reading.

(c) Compensating Reading Strategies

17. Relying on what you already know to improve your reading comprehension.
18. Taking notes to help you recall important details.
19. Trying to remember what you understand from a reading to help you develop better comprehension skills.
20. Reviewing the purpose and tone of a reading passage so you can remember more effectively.
21. Picturing scenes in your mind to help you remember and understand your reading.
22. Reviewing key ideas and details to help you remember.
23. Using physical action to help you remember information you have read.
24. Classifying words into meaningful groups to help you remember them more clearly.

So far, it can be concluded that reading strategies can be investigated through qualitative studies by checklists, think-aloud protocols, or other types of introspective or retrospective procedures including verbal reports and semi-structure interviews (Wenden, 1991). In addition, the procedures can also be used to investigate test-taking strategies. There have been a number of research studies employing verbal reports and semi-structure interviews to identify test takers' reading strategies as well as test-taking strategies while responding to the test items.

2.17 Strategies in testing situations: reading strategies and test-taking strategies

Cohen (1998) specifies that the insights gained from looking at strategies used in testing situations can help both to improve the assessment techniques themselves and to improve the success that learners have in responding to the instruments. This is agreed with Cohen and Upton's (2006:2) assertion that "it is important to have good insights into what it is people who take reading comprehension tests do in order to complete them".

Cohen and Upton (ibid.) investigate test takers' reading strategies and test-taking strategies while responding to the new TOEFL reading tasks by asking the test takers to do the verbal reports. They claim that the analysis of reading strategies can provide insights as to how readers interact with the text and how their choice of strategies influences their comprehension of the text. They also define test-taking strategies as those test-taking processes that the test takers have selected and are conscious of. In their study (ibid.: 92, 98), the most frequently used reading strategies and test-taking strategies for the new two test items called 'Prose Summary' and 'Schematic Table' are as follows:

Reading strategies:

(1) reading a portion of the passage carefully

(2) reading a potion of the passage rapidly, looking for specific information

(3) repeating, paraphrasing, or translating words, phrases, or sentences – or summarizing paragraphs/ passage – to aid or improve understanding

Test-taking strategies:

(1) selecting option(s) through vocabulary, sentence, paragraph, or passage overall meaning

(2) considering the option(s) and postponing consideration of the opinion(s)

(3) discarding option(s) based on vocabulary, sentence, paragraph, or passage overall meaning as well as discourse structure

(4) going back to the question for clarification: paraphrases (or confirms) the question or task

Cohen and Upton (ibid.) give some samples of the test takers' verbal reports while responding to the prose summary task. They represent two most frequently used test-taking strategies: selecting and discarding multiple options. The samples are as follows:

- *[Reads option1] " This is true because the passage talked about increasing human population and how human population wants more food, so they'll be using more land for agricultural growth."*
- *[Reads option2] "I think that's one of the main ideas because in the passage the author explains that. [Read option3]No, there is nothing related to this passage, so it cannot be one of the main ideas."*

The sample verbal report of a reading strategy: reading a portion of the passage carefully is as follows:

- *[Reads question and introductory sentence. Reads first summary sentence option] "This is correct, so I chose this. [Reads through options*

2-6, selecting option 4 after reading option 6] Let's go back to the passage.

As for the 'Schematic Table' task, Cohen and Upton (ibid.) explain that, like in the 'Prose Summary', the test takers have to select and discard options because the TOEFL test designers intend them to take into account the entire text in selecting possible options. They also present samples of verbal reports consisting of the most frequently used reading strategies and test-taking strategies as follows:

- *[Reads option3] "The passage said sand prevents rock erosions. So this is not right…[Read option7]Yes, the passage said acid rain causes erosion, so weather process is destructive…The passage did not mention Sentence 2 and Sentence 4, so they are not right."*
- *"Based on the paragraph, earthquakes are also constructive. Again, based on the paragraph, the option 'wind-driven sand' is also destructive."*

The sample of verbal reports of three most frequently used reading strategies: paraphrasing or translating words ; reading carefully ; and looking for specific information can be seen as follows:

- *[Rereads paragraph] "This paragraph talks about mountains. And this paragraph talks about volcanoes. [Rereads next paragraph] The story of mountain is earthquake. Earthquake forms…What? Let's go back.*

To conclude, Cohen and Upton's study provides a large amount of information on reading strategies and test-taking strategies. They reflected the test takers' reading process while responding to the 'prose summary' and the 'schematic table'. These two tasks are used in the 'Reading to learn' test items in the new TOEFL. They are claimed to be designed to simulate the academic skill of forming a comprehensive and coherent representation of an entire text, rather than focusing on discrete points in the text.

In terms of reading and test-taking strategies while the test takers are responding to multiple-choice questions, a study by Rupp *et al.* (2006) can also provide useful information on strategies used in a testing context. In their study, the test takers' samples of responses of strategy use are as follows:

- Scan and read the first paragraph of the text to get an idea of the topic and the type of text. Then scan or read the questions first and look for or underlie key words that help to locate information in related paragraphs. Then answer the questions sequentially.
- Scan or read the first paragraph of the text to assess the difficulty of the text. If the text is perceived to be easy, read the text first completely and look for or underline key words. Then answer the questions sequentially. If the text is perceived to be difficult, scan the questions first and look for or underline key words.

Both Cohen and Upton's study and Rupp *et al.*'s study of reading strategies and test-taking strategies can be used as a framework in developing the semi-structure interview in the present research study.

So far, in conclusion, the reviewed literature includes the information about reading: reading approaches; reading comprehension as process and product; reading components; reading skills and reading strategies; taxonomy of reading skills; and the ways to explore reading strategies and test-taking strategies. The information offers the theoretical views of reading, reading skills, reading strategies and test-taking strategies which are useful for designing the tests in this research study.

2.2 Alternative reading assessment techniques

There are diverse ways of conceptualizing how reading comprehension can be measured. According to Brown and Hudson (1998: 657), the phrase "alternative assessments" implies three things that they are: (a) somehow a completely new way of doing things; (b) somehow completely separate and different; (c) somehow exempt from the requirements of responsible test construction and decision making. Meanwhile, Norris *et al.* (1998 cited in Brown and Hudson, ibid: 657) suggest that there are two similar terms dealing with the word "alternative". They are "alternative assessments" and "alternatives in assessment". For example, in Brown and Hudson's point of view, portfolios; conferences; diaries; self-assessments; and peer assessments are not viewed as "alternative assessments", but rather as "alternatives in assessment". In short, "alternative" may refer to "optional/ separate/ different/ new/ innovative" depending on test constructor's point of views.

As for the types of reading assessment techniques, Brown and Hudson (ibid.) contend that the various kinds of language assessments are classified into three broad categories: (a) selected-response assessments (including true-false, matching, and

multiple-choice assessments); (b) constructed-response assessments (including fill-in, short-answer, and performance assessments); and (c) personal-response assessments (including conference, portfolio, and self- or peer assessments).

Similarly, Bachman and Palmer (1996) distinguish types of tests under the characteristics of 'expected response'. They are (a) selected response (typically multiple-choices or true-false); (b) limited production response (short-answer questions, typically requiring up to a single sentence or utterance); (c) extended production response (longer than a single sentence but ranging from two sentences to virtually free written composition).

Koda (2005) divides alternative reading assessment techniques in terms of (a) formal assessment techniques and (b) informal classroom assessment techniques. Formal assessment techniques are, for example, multiple-choice comprehension questions, open-ended questions, cloze, free recall, cued recall, and summary. Meanwhile, oral miscue analysis, and observation survey serve as examples of informal classroom assessment techniques.

Likewise, Alderson (2002) classifies techniques for testing reading in terms of formal and informal techniques. Formal reading assessment techniques are, for instance, multiple-choice; matching; dichotomous items; editing tests; cloze elide tests; short-answer; free-recall; summary; information-transfer techniques. Informal reading assessment techniques are, for instance, checklists; miscue analyses; interviews; self-report techniques; think-aloud techniques; diaries; reader reports.

Aebersold and Field (1997: 167) explain that, "the assessments in the L2/FL reading class encompass a variety of measures, from the most informal, alternative, developmental, learning-based, student-centered types to the most formal,

teacher-controlled, traditional, and standardized methods". In their point of view, they classify the reading measures into two main types: alternative methods and traditional methods. They exemplify six alternatives to traditional methods: journals (audio and written); portfolios; homework; teacher assessment through observation; self-assessment; and peer assessment. They also give six examples of commonly used traditional methods: multiple-choice questions; vocabulary tests; cloze tests; completion tasks; short answer and open-ended questions; and contextualized or authentic tasks.

Klingner (2004) discusses various traditional and innovative reading comprehension assessment measures. The traditional measures are standardized norm-referenced tests, e.g. the California Achievement Test; the Stanford Achievement Test, measuring students' comprehension by multiple-choice or short-answer questions. The innovative measures are informal reading inventories; interviews and questionnaires; anecdotal records and observations; oral retelling; freewriting; think-aloud procedures. Klingner (ibid. : 59) asserts that " Traditional measures of reading comprehension only provide a general indication of how well a student understands texts, failing to provide information about how the student uses cognitive and metacognitive processes or sufficiently explain why a student may be struggling".

In sum, the alternative reading assessment techniques can be classified either by the characteristics of 'expected response', the 'formal/informal' assessment techniques, or the 'traditional/ alternatives to traditional' assessment techniques. Obviously, reading assessment techniques exist in large numbers. They are distinct in their types of tasks and response formats. And they are requisite or needed for a

particular purpose. For each assessment type, it has advantages and disadvantages. For instance, ‘multiple-choice’, which is the most familiar response format of reading assessment, has advantages in terms of the ease of administration and scoring as well as objectivity. Particularly, it is better to test receptive skills, i.e. reading, listening, grammar knowledge, and phoneme discrimination (Brown and Hudson, 2004). Nevertheless, it has a drawback that test takers may sometimes get correct answers by merely guessing (Aebersold and Field, 1997).

2.2.1 Global comprehension reading test techniques

Weir *et al.* (2000) define that ‘global comprehension’ refers to the understanding of propositions beyond the level of microstructure--main ideas and important details, meanwhile, local comprehension refers to the understanding of propositions at the level of microstructure—lexical items, pronominal reference, etc. Thus, global comprehension reading test techniques should refer to the test techniques that measure the ability to understand the major ideas of the text, not the micro linguistic elements, i.e. cohesion markers, lexis and structural elements.

Weir and Urquhart (1998) state that “There are serious question marks against the value of testing directly the specifically linguistic elements. The evidence from the literature throws some doubt on the value of including any items which focus on specific linguistic elements (e.g. individual words or cohesive devices) in tests which purport to make direct statements about a candidate’s reading ability”. They conclude that the test focusing on microlinguistic elements may not constitute an adequate predictor of reading ability.

There is no precise evidence showing that the test items measuring global

comprehension can better predict reading ability. But, in terms of the skills tested by the global comprehension test items, they refer to the skills (i.e., skimming for main ideas, summarizing the texts) needed in academic-like approaches (Cohen and Upton, 2007). Therefore, global comprehension reading tests have been brought into focus in this study. As for the types of global comprehension test techniques, open-ended questions, free recall, information-transfer and summary serve as examples. Those that are in the interest of the researcher are the information-transfer and the summary.

2.2.1.1 The information-transfer

Alderson (2002: 242-248) describes that the information-transfer technique is a fairly common testing technique often associated with graphic texts, such as diagrams, charts and tables. The student's task is to identify in the target text the required information and then to transfer it, often in some transposed form, on to a table, map or whatever. Sometimes the answers consist of names and numbers and can be marked objectively; other times they require phrases or short sentences and need to be marked subjectively. One of the problems with these tasks is that they may be cognitively or culturally biased. For example, a candidate might be asked to read a factual text and then to identify in the text relevant statistics missing from a table and to add them to that table. Students unfamiliar with tabular presentation of statistical data often report finding such tasks difficult to do – this may be more an effect response than a reflection of the 'true' cognitive difficulty of the task, but whatever the cause, such bias would appear to be undesirable. One could, however, argue that since people have to carry out such tasks in real life, this bias is justified

and is, indeed, an indication of validity, since such candidates would be disadvantaged by similar tasks in the real world. A possibly related problem is that such tasks can be complicated. Sometimes the candidates spend so much time understanding what is required and what should go where in the table that performance may be poor on what is linguistically a straightforward task – the understanding of the text itself. In other words, the information-transfer technique adds an element of difficulty that is not in the text. (ibid.: 248)

Urquhart and Weir (1998: 160-162) explain that the information-transfer techniques are direct language tests that can provide the tester with information concerning the test taker's ability to cope with reading. Information-transfer tasks can be in non-verbal forms like labeling a diagram, completing a chart, or numbering a sequence of events. They can also be in the form of short-answer questions which require test takers to write down answers in spaces provided on the question paper. These answers are normally limited in length either by using short lines to indicate the number of words, restricting the space made available to test takers through boxes, or by controlling the amount that can be written by deleting words in an answer that is provided for the candidate. All of these techniques help keep the answers brief and reduce writing to a minimum in an effort to avoid possible contamination from test takers having to write answers out in full.

Instead of asking the test takers to do a task such as labeling a diagram or completing a chart, the information-transfer technique can also be a task of asking the test takers to draw a graphic organizer. Graphic organizers can be used for reading assessment (Fisher and Frey, 2004: 112). They offer an opportunity for students to construct an answer while allowing the teacher to assess the students' understanding.

Forms of graphic organizers are various, but they all have a few things in common. Each of them portrays a process or structure in a way that relies on relative positions and juxtaposition of words or phrases that are bound by a shape or line. Frequently, they also feature lines depicting associations between and among ideas. Semantic webs, concept maps, flowcharts, and diagrams serve the examples of types of graphic organizers (ibid.: 108).

Similarly, Rebecca and Sokolik (2000: 103) admit that a graphic organizer can help students visualize and remember the information they read. They define a 'graphic organizer' as 'a chart or drawing of important ideas in a reading text'. They say that it is called 'graphic' because it lets the reader visualize the most important ideas in a text, and it is called an 'organizer' because it shows the relationship between those ideas.

Chang *et al.*'s study (2002) supports that 'Graphic organizer' can enhance text comprehension. It is a visual method that gives readers a clearer, more substantial understanding of what is being read. Also, Trites and McGroathy (2005:200), similarly, advocate that "Graphic organizers have good potential for use in assessment if students are familiar with them and if appropriate scoring systems can be developed".

Weir (1993: 88) explains that information-transfer tasks are probably best seen as a useful variant of short-answer questions. They require the test takers to write down answers in spaces provided on the question paper. The answers are normally limited in length either by space made available to candidates or by controlling the amount that can be written by deleting words in an answer that is provided for the candidate. He further confirms that this information-transfer technique is extremely

useful for testing reading comprehension. He adds that the questions set in this format normally try to cover the important information in a text (overall gist, main ideas and important details) and understanding of structures and lexis that convey this.

In high-stakes tests such as TOEFL, the information-transfer technique is also employed in their reading session. In new TOEFL (LanguEdge Courseware, 2002 cited in Cohen and Upton, 2007), the test takers' task is to select five out of seven noun phrases and to drag them into a schematic table according to some organizing principle. The response format of this new TOEFL test item is multiple-selection multiple-choices. The item type is called 'The Reading to Learn-schematic table' in which the test takers are called on to read through the entire text in order to complete the table. Cohen and Upton (2006:98) explain that "this item type is intended to measure examinees' ability to conceptualize and organize major ideas and other important information from across the text…Correctly completed formats of these types reflect an able reader's mental framework of the text".

To conclude, the information-transfer technique is an alternative or an option of reading assessment technique. The information-transfer tasks can include student-completed diagrams, student-constructed graphic organizers, student-labeled graphic organizers, or multiple-selection multiple-choice graphic organizers. The information-transfer technique can provide students with an opportunity to demonstrate what they know from the reading passage, especially the main points of the reading text.

2.2.1.2 The summary

Alderson (2002: 232) states that summary technique is a variant of the free-recall technique. The student's task is to read a text and then they are required to summarize the main ideas, either of the whole text or of a part, or those ideas in the text that deal with a given topic. It is believed that students need to understand the main ideas of the text, to separate relevant from irrelevant ideas, to organize their thoughts about the texts and so on, in order to be able to do the task satisfactorily. Moreover, Johns (1985: 495) cites that Kintsch and van Dijk (1978) and Johnston (1981) specifying " a summary provides insights into students' comprehension abilities, in the broadest sense by indicating whether they are able to grasp the main ideas, focus and viewpoint of the author, while avoiding subjective comments and interpretations". In addition, Brown (2004: 214) defines the summary test as a task that the test taker is required to have an overview of the text. In short, the summary writing task is a type of "higher order" reading and writing task.

According to Johns (1985: 497-498), "Kintsch and van Dijk (1978) and van Dijk (1979) have developed a text processing model which includes a number of theories. Regarding the summary test, there is a theory positing the relationships between micro-structures and macro-structures as essential to the explanation of how semantically complex information can be reduced. Central to this reduction process are macro-operators which function under the control of schemata as 'the theoretical formulations of the comprehender's goals. Schemata guide the processor in selecting the propositions which are essential to the gist. Macro-operators include very general concepts such as production plans and more specific operations such as the

reproduction of micro-propositions from the original text, paraphrase of or addition to propositions, combinations of propositions, and insertion of metastatements or opinions". To conclude, in the summary test according to the Kintsch and van Dijk model, a test taker is required to read a text then select the macro- and micro-propositions, plan to write, and reproduce the text.

Positively, Cohen (1994: 342-343) points out that the summarizing task on reading comprehension test has a natural appeal as "authentic" test in the era of communicative language testing. It simulates a real world task in which nonnative readers are called upon to read and write a summary of the main ideas of a text. However, he claims that tests of summarization are complex. The reading portion entails identifying topical information, distinguishing superordinate from subordinate material, and identifying redundant and trivial information. The writing of the summary involves the selection of topical information (or generating it if it is not provided), deleting trivial and redundant information, substituting superordinate material, and restating the text so that it is coherent and polished. In order to summarize successfully, respondents need both reading and writing skills.

Regarding the requirement of the writing ability, Alderson (2002: 236) adds that an obvious problem in utilizing the summary test is that test takers may understand the text, but be unable to express their ideas in writing adequately, especially within the time available for the task. Summary writing risks testing writing skills as well as reading skills. One solution might be to allow candidates to write summary in their first language rather than the target language, or to provide them with a task of multiple-choice summary and let them select the best summary out of the answers on offer.

Kobayashi (2002) allows the test takers in her study to write the summary in their first language. In her research study, she employs three response techniques: summary writing, cloze tests and open-ended questions. She claims that according to Kintsch and Yaborough (1982), open-ended questions can measure the reader's comprehension of main ideas of the text, whereas cloze tests will touch only upon local understanding and will not reflect the reader's overall comprehension. However, according to her pilot study results, summary writing is supposed to be even more sensitive to overall understanding than open-ended questions. Kobayashi's research study is one of a number of studies that utilizes summary writing in measuring reading comprehension.

Huhta and Randell (1995) use 'multiple-choice summary' tasks in their study. They compare four types of tasks: traditional multiple-choice, open-ended questions, a summary in L1 and a multiple-choice summary with three and five choices. One of their findings concerns the multiple-choice summary is that the five alternative summaries per text work better than three.

Alderson (2002: 232) raises another important issue concerning the summary test. That is the "scoring" system. He states that scoring the summaries may present problems: does the rater count the main ideas in the summary, or does she rate the quality of the summary on some scale? If the latter, the obvious problem that needs to be addressed is that of subjectivity of marking. He further describes that agreeing on the main points in a text may be impossible, even for expert readers. However, one way of reaching agreement on an adequate summary of a text is to get the test constructors and the markers to write their own summaries of the text, and then to accept only the 'main ideas' of an agreed proportion of the respondents in a

certain percent such as 75% or 100%.

With the similar point of view, Cohen (1994: 343) agrees that there are undoubtedly differences of perception regarding what a main idea consists of and the appropriate way to write about it. He claims that if such differences are not eliminated through prior training and/or through careful instructions on the test, there could be a gap between the way the summary task is executed and the criteria used by the raters to evaluate it. In other words, these differences can be eliminated through prior training among the raters and through careful instructions on the test.

Also in the new TOEFL, the summary technique is employed in their reading session. The item type is called “The Reading to Learn-prose summary”. The response format is the multiple-selection multiple choices. The test takers’ task is to select three out of six statements that represent the major ideas in the text. In other words, they are called on to read through the entire text in order to select those three statements that served to describe the text in a summary fashion (Cohen and Upton, 2006).

To conclude, the summary technique is an alternative reading assessment technique which can measure reading comprehension. The test taker’s task is to read a text, and then summarize its main ideas and supporting details. To avoid the contamination of writing skill on reading comprehension and the subjectivity of the scoring procedure, multiple-selection multiple-choice format can be utilized in the same way as that in the TOEFL.

2.3 The development and validation of tests

A construct is a psychological concept which derives from a theory of the ability to be tested. It is defined for a specific assessment purpose. Therefore, test designers should be aware of the constructs that underlie their tests. (Alderson, 2002) With the similar view, according to Bachman and Palmer (1996:21), "Construct validity refers to the extent to which we can interpret a given test score as an indicator of the ability(ies) or construct(s) we want to measure".

There are different ways in conceptualizing a construct or constructs of a designed test. In this research study, the framework of task characteristics (Bachman and Palmer, 1996) has been applied to confirm the task characteristics of the two global comprehension reading tests: the information-transfer technique (the IT) and the summary technique (the ST).

2.3.1 Framework of task characteristics

Bachman and Palmer (1996) propose a descriptive framework of task characteristics and assert that it is useful for test developers to design and develop tests of language ability. The framework of task characteristics describes characteristics of the setting, the test rubrics, the input, the expected response, and relationship between input and response. By applying this framework to describe the characteristics of the "Information-transfer" task in the IT and the "Summary" task in the ST, the distinct differences between the two tasks can be seen in bold in Table 2.1.

Table2.1: The differences between the "Information Transfer" task in the IT and the "Summary" task in the ST described by using Bachman and Palmer's framework of task characteristics (Bachman & Palmer 1996)

	Information-transfer	**Summary**
1.Setting		
1.1 physical setting:	normal classrooms in air-conditioning environment with lighting, test-situation seating conditions, test-situation paper-pencil tests which are familiar for the test takers	
1.2 participants:	test takers are 9th grade high school students, the researcher is the test administrator.	
1.3 time of task:	40 minutes, the test is administered when the test takers are fresh in the morning periods	
2. Test rubric		
2.1 instructions		
2.1.1 language	the test takers are informed about the procedures for taking a test with an example by listening to the test administrator's explanation in native language and seeing the instructions in the target language in the written form on the test booklet.	
2.1.2 channel	aural : listening to explanation, and visual : seeing the written instructions	
2.1.3 specification of procedures and tasks: the procedures for doing the tasks are explicitly specified with an example provided entirely in the first part or the front page of the test booklet.	**Read each passage. Then complete the graphic organizer according to the chronology of the passage by selecting the appropriate sentence which fits each gap in the graphic organizer. There are two extra sentences which you do not need to use. Sample answers (i), (ii), or (iii) have been given to you.**	**Read each passage. Then complete the summary according to the chronology of the passage by selecting the three answer choices that express main ideas and important supporting details. Do not choose minor details or ideas that are not presented in the passage.**

Table2.1: The differences between the "Information Transfer" task in the IT and the "Summary" task in the ST described by using Bachman and Palmer's framework of task characteristics (continued)

	Information-transfer	**Summary**
2.2 structure		
2.2.1 number of parts/tasks:	There are 4 parts 4 passages	
2.2.2 salience of parts/tasks: the different parts of the test are clearly distinguished by a clearly defined number of separate parts: Passage 1, Passage 2, Passage 3, Passage 4. The different tasks are clearly distinguished in different booklets	**Booklet 1: FormA (Information-transfer)**	**Booklet 2: FormB (Summary)**
2.2.3 relative importance of parts/ tasks:	The four reading passages for both tasks are comparable in terms of the level of difficulty and the length of the passages.	
2.2.4 number of items per part:	**10 items per one passage, altogether 40 items**	**3 items per one passage, altogether 12 items**
2.3 time allotment:	40 minutes for each form of task.	
2.4 scoring method		
2.4.1 criteria for correctness:	**objective scoring & same idea units 10 choices total scores = 3**	**objective scoring & same idea units 3 choices total scores = 3**
2.4.2 number of raters	1 rater	
2.4.3 explicitness of criteria and procedures:	the test takers are informed about the nature of the scoring criteria and procedures: the information on how the test will be scored will be explained both in aural and visual forms on the front page of the test booklet	

Table2.1: The differences between the "Information Transfer" task in the IT and the "Summary" task in the ST described by using Bachman and Palmer's framework of task characteristics (continued)

	Information-transfer	**Summary**
3. Input		
3.1 format:		
3.1.1 channel :	visual: in a paper test	
3.1.2 form :	4 passages in target language for each form of task	
3.1.3 length:	211-234 words for each passage	
3.1.4 type of input:	**A prompt of four reading passages including a graphic organizer and 12 options for each passage in the form of 'multiple-selection' multiple-choices.**	**A prompt of four reading passages including an introductory sentence of the prose summary and 6 options for each passage in the form of 'multiple-selection' multiple-choices.**
3.1.5 degree of speededness:	the amount of time is 40 minutes for doing the test which is composed of four reading passages	
3.2 language of input		
3.2.1 language characteristics	reading passages in target language	
3.2.2 topical characteristics	problem-solution text type	
4. Expected response:		
4.1 format		
4.1.1 channel	visual	
4.1.2 form	target language	
4.1.3 language	target language	
4.1.4 type	selected response: 'multiple selection' multiple-choices	
4.1.5 degree of speededness	the amount of time is 40 minutes for doing the test which is composed of four reading passages	
4.2 language of expected response	target language	

Table2.1: The differences between the "Information Transfer" task in the IT and the "Summary" task in the ST described by using Bachman and Palmer's framework of task characteristics (continued)

	Information-transfer	**Summary**
5. Relationship between input and response		
5.1 reactivity:	non-reciprocal task, no feedback and interaction between language	
5.2 scope of relationship	broad scope: the test taker requires to process an entire passage for the main ideas, and important supporting details.	
5.3 directness of relationship	direct: the response includes information supplied in the input	

From Table 2.1, the differences between the "Information-transfer" and the "Summary" are at some parts of the test rubric and the input.

Under the characteristics of the test rubric, first, the specification of procedures and tasks are different. That is, the instructions of how to do the tests are different. Next, the "Information-transfer" is in the Booklet 1: Form A, and the "Summary" is in the Booklet 2: Form B. Third, the "Information-transfer" has 10 items per passage whereas "Summary" has 3 items per passage. Fourth, at the criteria for correctness, both of them use objective scoring procedure. The correct answers are the same idea units. The total scores are 3. However, the number of options in the "Information-transfer" and the "Summary" are different. The "Information-transfer" has 10 correct choices with 2 distracters, but the "Summary" has 3 correct choices with 3 distracters.

Under the characteristics of the input, the type of input for the "Information-transfer" task is a prompt of four reading passages including a graphic

organizer and 12 options for each passage in the form of 'multiple-selection' multiple choices. The type of input for the "Summary" task is a prompt of four reading passages including an introductory sentence of the prose summary and 6 statements for each passage in the form of 'multiple-selection' multiple-choices.

2.3.2 Reading skills tested by the information-transfer

Weir (2005: 131) has made a comment on the information-transfer task. He describes that the information-transfer task is a useful variant of short-answer questions. The questions set in this task normally try to cover the important information in a text (overall gist, main ideas and important details). Most skills and strategies in expeditious reading can be assessed by the Information-transfer task. As for the expeditious reading skills, Urquhart and Weir (1998) describe them at the global and local levels as follows:

Expeditious reading skills at global level

- Skimming quickly to establish discourse topic and main ideas, or structure of text, or relevance to needs.
- Search reading to locate quickly and understand information relevant to predetermined needs.

Expeditious reading skills at local level

- Scanning to locate specific points of information

Trites and McGroarty (2005: 180) describe that in completing a chart, the test takers have to recall, identify, and categorize information from the text on a chart reflecting macro-rhetorical structures.

2.3.3 Reading skills tested by the summary

Edge (2006) has claimed that reading skills required for a summary task are as follows:

- Extracting salient points to summarize
- Skimming to obtain the gist of the text
- Scanning to locate specifically required information

Cohen and Upton (2007) describe the reading and test-taking strategies that test takers used on the 'Reading' section of the new TOEFL. In the response format concerning "summary", they assert that a summary task is intended to measure examinees' ability to understand the major ideas and relative importance of information in a text, or to distinguish the superordinate statements from the subordinate, usually more detailed ones. However, in this new TOEFL, the 'prose summary' is not a truly summarization task as no writing is called for and the set of possible main points is provided for the respondents so that they only need to select and drag into a box. They explain that in a truly summary task, the test takers have to generate their own statements of the key ideas of the text.

Johns (1985) and Bensossan and Kreindler(1990) contend that a summary task assesses higher reading skills: reading for main ideas and supporting details.

To summarize, the reading skills that could be tested by the information-transfer task and by the summary task are likely to assess global reading comprehension skills such as skimming, scanning, distinguishing main ideas from important supporting details.

2.3.4 Constructs of the IT and the ST

From the reviewed literature, it is supported that test developers need to define the construct(s) of their developed test. The construct is assessment specific and is determined through item design and text selection. (Rupp *et al.*, 2006) Thus, the researcher in this study has developed the constructs of the IT and the ST. Then at the priori validation process, three experts in the field have been asked to give their judgment on the constructs of the two tests. At the posteriori validation process, the constructs were confirmed by observing and interviewing the test takers about their reading strategies (and test-taking strategies) at the pilot study for the development of the semi-structure interview questions.

The constructs of the two tests are presented in the following table.

Table 2.2 Constructs of the IT and the ST

<table>
<tr><th></th><th>IT</th><th>ST</th></tr>
<tr><td rowspan="3">Reading Strategies</td><td>Skimming</td><td>Reading carefully for important ideas and important details</td></tr>
<tr><td colspan="2">Distinguishing the main ideas from the supporting details</td></tr>
<tr><td>Scanning for specific words or phrases</td><td>Rejecting irrelevant information</td></tr>
</table>

It can be seen that the reading skills tested by the IT are skimming, distinguishing the main ideas from the supporting details and scanning for specific words or phrases. Meanwhile, the skills tested by the ST are reading carefully for

important ideas and important details, distinguishing the main ideas from the supporting details and rejecting irrelevant information.

2.3.5 Selection of reading texts

In developing a reading test, the selection of reading texts is another important procedure. Urquhart and Weir (1998) mention that selecting an appropriate text is a crucial step in test development. In this research study, the texts were selected from a variety of sources: textbooks, and authentic reading materials such as those on the websites. Then they were simplified for the suitable level of difficulty and asked for judgment from three experts in the field. At the priori validation process, they were also tried out to find the suitability of the texts.

2.3.5.1 Text type

Carrell (1984, cited in Kobayashi, 2002) exemplifies four types of text according to Meyer and Freedle's categories of expository organization. The four text types are 'Collection', 'Causation', 'Problem/Solution', and 'Comparison'.

Kobayashi (2002) elaborates the types of text, and renames some of them. Her identified text types are 'Association', 'Description', 'Causation', and 'Problem/Solution'. She states that these types of rhetorical organization represent the degree of interconnectedness of ideas, from loosely-organized to tightly-organized.

Urquhart and Weir (1998:141) point out that 'Problem/Solution' lend themselves better to testing reading carefully for main idea(s) comprehension than more descriptive texts with lots of detailed information.

Therefore, in this study, the researcher has focused the type of texts in the IT and the ST on 'Problem/Solution'.

2.3.5.2 Topic familiarity

'Topic familiarity' is another important issue in the text selection procedure. According to Weir *et al.* (2000: 59), the topic should be selected at an appropriate level of familiarity, not too familiar and not too obscure to all candidates. On the one hand, bias in the content background knowledge can be avoided if all candidates share the necessary background knowledge for reading the text. On the other hand, a certain degree of unfamiliarity is necessary to attract readers' attention, to arouse their interest and to prevent them from answering questions from background knowledge without recourse to the text. Therefore, texts with experts' judgment on topic familiarity level of medium are preferable.

In this study, at the priori validation, the expert's judgment on the topic familiarity was also taken into consideration.

2.3.5.3 Language difficulty

There have been readability formulas that can be used to estimate text difficulty. Nonetheless, Carrell (1987) argues against using readability formulas as only one text selection criterion. She contends that the valid measures of a text comprehensibility require consideration of a number of factors: intensively or extensively used texts; readers' interest, motivation, and prior knowledge; readers' maturity; texts' cohesiveness, coherence, and propositional density; syntactic and lexical choices; rhetorical structure of texts; readers' background knowledge; and readers' purpose of reading. Kobayashi (2002) suggests that other criteria that can be

used in considering the language difficulty of the chosen texts are the experts' judgment, and the pilot study of the chosen texts.

In this study, the chosen texts were considered by readability formulas, pilot studies, and experts' judgment. The readability formula that has been used is 'the Automated Readability Index' from an on-line software tool. The readability score calculated by the Automated Readability Index refers to the U.S. grade level. For example, the score '7' indicates that the text is expected to be understandable by 7th grade U.S. students (http://www.online-utility.org/english/readability). In this study, the level of difficulty of the texts is in the range of 6.28-7.72. After considering the readability scores, the texts were also tried out at the preliminary stage before the pilot study and the main study. The participants were not the same subjects involving the pilot study and the main study.

To conclude, the IT and the ST have been developed by using Bachman and Palmer's (1996) framework to specify the task characteristics. In addition, the constructs of the tests have also been identified clearly before administering the tests. At the priori validation process, text selection process and the experts' judgment have importantly been taken into account.

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2.4 Language ability

Devine (1993: 263) states that the students' efficiency in using reading skills is directly dependent upon their overall language proficiency—their general language ability. In other words, it is believed that L2 reading ability is related to L2 general language ability. There are a number of research studies examining the role of

language proficiency in L2 reading, with an eye to determine if a significant relationship exists between the level of language competence and the level of reading ability in the second language.

For instance, Wolf (1993) found out in her study that “learners with higher levels of target language experience consistently receive higher reading comprehension scores than lower-level learners, regardless of the task or the language of assessment”. This evidence supports the significance of “language ability” on comprehension scores.

Nassaji’s (2003) study demonstrates that skilled ESL readers are differentiated from less-skilled readers because of their higher language ability: higher-level and lower-level text processing skills. These skills include word recognition, phonological and orthographic processing, syntactic and semantic processes. These studies show that language ability e.g., linguistic knowledge is limited for less-skilled readers so their reading comprehension ability is lower.

Regarding the reading strategies, according to Block (1992 cited in Alderson 2002), skilled readers have more control over their awareness of comprehension monitoring operates than less-skilled readers. They tend to use meaning-based cues to evaluate whether they have understood what they read, meanwhile, less-skilled readers tend to use or over-rely on word-level cues, and to focus on intra-sentential rather than inter-sentential consistency.

From Block’s (1992) and Nassaji’s (2003), it can be assumed that the test takers with higher ability are likely to have higher-level text processing skills. Therefore, their reading performances are likely to be better.

Previous research studies examining the effects of ‘language ability’ on

reading performance were such as Wolf (1993), Kobayashi (2002), Nassaji (2003).

In sum, 'language ability' is a significant variable which has a great effect on the test takers' reading comprehension scores.

2.5 Previous research studies

2.5.1 Previous research studies on test method effects

The test method effect means the method used for testing a language ability may affect the students' scores (Alderson *et al.*, 1996). The 'test method' is an active variable that the researcher can manipulate directly; therefore, a number of research studies seek to provide the evidence supporting the role of this important variable. These studies suggest that different assessment tasks yield different results.

Shohamy (1984 cited in Alderson 2002) compared two test formats: multiple-choice questions and open-ended questions in L1 and L2. She found that multiple-choice questions in L1 were easier than the same questions translated into the L2. Similarly, open-ended questions in L1 were easier than open-ended questions in L2.

Wolf (1993) compared different kinds of assessment tasks in measuring FL reading. She examined three variables whether they affected readers' ability in demonstrating their reading comprehension. The three variables were assessment task type, language of assessment, and target language experience. The types of tasks which were multiple choice questions, open-ended questions, and rational deletion cloze were selected to examine task effects. The languages of assessment were Spanish and English. The two levels of target language experience were beginning and advanced levels. The results of the study showed that all the three

variables affected learners' ability to demonstrate their reading comprehension.

Likewise, Riley and Lee (1996) compared two global response modes, the summary and the recall protocol in their research study. Half of the 80 subjects were asked to read a passage and to write a summary of the passage and the other half were asked to read the passage and to do a free- written recall task. The subjects were native speakers of English and were in two levels of early-stage L2 readers of French. The results of the study indicated that scores on the summary protocols were generally higher than those on the recall protocols. However, there was no significant difference for either tasks or levels. There was no difference in the length of the summary and the recall protocols, but there was a significant qualitative difference. The summaries contained significantly more main ideas than the recall protocols. Furthermore, the summaries contained a higher percentage of main ideas than details whereas the recall protocols contained a higher percentage of details than main ideas.

Similar to Riley and Lee's (1996) study, Sawaki (2005) investigated the test method effects on reading comprehension scores. The test takers were assessed their reading comprehension of Japanese by free-recall test and summary test. The result of her study supported Riley and Lee's study that the test takers' summary contained more idea units than the recall.

Kobayashi (2002) also investigated the effects of two factors: text organization and response formats on second language learners' performance in reading comprehension tests. She modified Meyer's framework of text organization and used four types of top-level rhetorical structure: 'association', 'description', 'causation', and 'problem-solution'. Cloze tests, open-ended questions, and

summary writing were selected as the response formats. The objective of her study was to explore whether text organization and response format influenced on reading test results. She also included learners' language proficiency level as a third variable in her study. One of the most important of her findings supported that test methods did affect the reading comprehension scores.

To conclude, the studies were carried out to explore if assessment techniques affected reading comprehension scores. Their findings revealed that test methods had effects on reading comprehension scores.

2.5.2 Previous research studies on reading and test-taking strategies

Reading and test-taking strategies have been investigated in a number of studies. Researchers in some studies explored them as part of the construct validation of the developed tests. Others searched for the relationship between test task characteristics and test takers' reading performance.

Cohen and Upton (2007:210) collected data from 32 subjects representing four language groups : Chinese, Japanese, Korean and 'Other'. They did the reading tasks of the new TOEFL test from the *LanguEdge* Courseware materials. Their verbal reports were evaluated to determine the use of their reading and test-taking strategies. The findings provided insights into the response behaviors prompted by the reading tasks. For example, in the 'Reading to Learn-prose summary' and 'Reading to Learn-schematic table', the strategy that occurred at the highest rates was 'examining the options one by one and selecting and discarding them'. There was one more interesting finding worth mentioning. In responding to the R2L-prose summary item, a Japanese subject illustrated the ease of the multiple-choice summary

task. She illustrated the task was easy and she did not have to return to the text for clues about choices, but just employed the test-taking strategies of **'selecting' and 'discarding'** the choices. Cohen and Upton's findings of the strategies supported Nevo's (1989) study which investigated test-taking strategies on a multiple-choice test. In Nevo's study, there were 15 strategies for answering multiple-choice reading comprehension questions. These strategies were involving with reader's using of background knowledge; guessing; returning to the passage; looking for answers in chronological order; looking for clues to answer; ceasing search at plausible choice; eliminating choices; suspecting an option which is different from others; suspecting an option which is longer/ shorter; suspecting an option by its location; choosing an option with common words; choosing an option with key word in the text; matching the stem with an option; selecting an option with a word associating with a native language word; and matching the option with the text.

Gordon and Hanauer (1995) investigated the interrelationship between meaning construction and testing tasks. They studied both the product and the process of the test takers. Think-aloud data were obtained as subjects responded to both multiple-choice and open-ended comprehension questions written in both Hebrew and English. The subjects were 28 tenth grade high school students studying EFL.

Rupp *et al.* (2006) collected qualitative data by analyzing 10 non-native adult English readers' interviews. They were given three passages with several multiple-choice questions from the *CanTEST*, a large-scale language test used for admission and placement purposes in Canada. The analyses showed that

1) There exist multiple different representations of the construct of 'reading

comprehension' that are revealed through the characteristics of the items;

2) learners view responding to multiple-choice questions as a problem-solving task rather than a comprehension task;

3) learners select a variety of unconditional and conditional response strategies to deliberately select choices; and

4) learners combine a variety of mental resources interactively when determining an appropriate choice.

The most interesting part of the findings in this study was the reading and test-taking strategies reported by the test takers. A semi-structure interview was used to collect the data while they were responding to the multiple-choice reading test. The samples of unconditional strategies and conditional strategies reported in their findings as follows:

Unconditional Strategies

1) Scan or read the first paragraph of the text to get an idea of the topic and type of text. Then scan or read the questions first and look for or underline key words that help to locate information in related paragraphs. Then answer the questions sequentially.

2) Scan or read the entire text to get an idea of the topic and type of text and look for or underline key words that might help to answer questions later. Then scan or read the questions and look for or underline key words that help to locate information in relevant paragraphs. Then answer the questions sequentially.

Conditional Strategies

1) Scan or read the first paragraph of the text to assess the difficulty of the

text. If the text is perceived to be easy, read the text first completely and look for or underline key words. Then answer the questions sequentially. If the text is perceived to be difficult, scan the questions first and look for or underline keywords.

2) Scan or read the questions first before reading the text to assess their difficulty. If the questions are perceived to be easy, answer the first question first and then proceed sequentially. If the questions are perceived to be difficult, scan the text and look for or underline keywords first. Then answer the questions sequentially.

In short, all the studies concerned reading and test-taking strategies and they provided the evidence of how test takers responded to the tests. The evidence was collected by qualitative approach using test takers' verbal reports, think-aloud protocols, semi-structure interviews or checklists. These studies provided plenty of data of reading and test-taking strategies which are useful for developing the questions in the semi-structure interview of the present study.

2.5.3 Previous research studies on reading assessment techniques, language ability and reading and test-taking strategies in Thailand

Prapphal (1995) studied the relationship between the reading strategies and language background of 3rd year university Thai students in performing summary tests. The subjects were divided into four groups based on their language background and reading strategies. As for language background, previous grades from two general Foundation English Courses were used to differentiate the subjects into low

proficiency and high proficiency. Regarding reading strategies, a checklist of strategies for processing top-level rhetorical organization was employed to classify the subjects into less-skilled readers and skilled readers. Summary tests were used in the study. They were graded using the same criteria, namely, content and language. The content component covered the topic sentence and main ideas while the language component was evaluated for grammar and organization. Content and language received equal weights. In conclusion, the study examined reading strategies of 'formal schemata' and language background as predictors of performance on EAP summary tests of thirty 3rd year university students. It was found that reading strategies and language background worked independently rather than interdependently when content and language were used as criteria. Skilled readers and less-skilled readers did not differ significantly in performing the EAP summary tests at the end of an EAP course. This implied that exposure to more EAP texts might enhance Thai science students' reading comprehension, especially for less-skilled readers. The study also suggested that more proficient students were able to transfer some general English language skills to academic English. Finally, the researcher recommended for further research studies using more subjects due to the small sample size in the study.

Regarding the checklist of strategies for processing top-level rhetorical organization in Prapphal's study (ibid.), the reading strategies were classified into three stages: pre-reading activities; during-reading activities; and post-reading activities. The reading strategies at the pre-reading stage were (1) read the title of the article; (2) look at the illustrations; (3) read the first paragraph; (4) read the last paragraph; (5) ask some questions about the title. The reading strategies at the

during-reading stage were (1) don't pay equal attention to every sentence; (2) find the topic sentence of each paragraph; (3) find the hierarchy of the sentences in each paragraph; (4) find the answer to the question raised before reading; (5) make symbols to show the relationships between main ideas and supporting details. The reading strategies at the post-reading stage were (1) check whether you have found the answer to the questions raised; (2) write an outline of the article; (3) check whether the outline relates to the title; (4) check whether the major ideas support the main ideas; (5) rewrite the outline to make it correspond to the content.

Katib (1997: abstract) investigated reading comprehension monitoring strategies of 2nd and 4th year university Thai students. There were 16 subjects who were placed into two levels of language proficiency assessed by their grades in English and TOEFL scores. The subjects were asked to verbalize their thoughts while reading, using the think-aloud technique. They were also asked to summarize the text after the completion of the think-aloud task. In the first analysis, 28 strategies were identified and were arranged into six categories according to their functional purposes. In the second analysis, the study explored whether different English proficiency levels had an effect on the subjects' strategy use. The results demonstrated that there were only three strategies which had statistically significant differences between the two groups of proficiency. The findings also showed the six most frequently used strategies for each proficiency group were the same in rank order. The findings suggest that differences in English proficiency may not have much impact on strategies used by Thai readers who are successful in their academic performance. They may use their acquired learning strategies and their high cognitive and academic abilities to compensate for their limited English language

competence. The third analysis investigated whether a two-year time difference in academic setting between the second and fourth year students would have an effect on different strategy usage. The findings showed that there was not much difference in strategies used between these two groups. The findings suggest that a two-year time difference in the foreign language academic setting may not play an important role in different reading behaviors.

In Katib's study (ibid. 206-207), the three strategies which had statistically significant differences between the two groups of proficiency were rereading; expressing intention to return to an earlier part of the text; using world knowledge. The lower proficiency group used 'rereading' and 'expressing intention to return to an earlier part of the text' more frequently than the high proficiency group due to their more limited English knowledge. Regarding the use of 'world knowledge', the lower proficiency group used it less frequently than the higher proficiency group because the lower proficiency subjects were overwhelmed by information and busy trying to figure out the meaning of the text. The other three strategies which are sensitive to the comparison of the 2nd and 4th year university students are reaction to the text content and to world knowledge, with the lower proficiency 4th year subjects using it more frequently than the lower proficiency 2nd year subjects ; association, with the higher proficiency 4th year subjects using it more frequently than the lower proficiency 2nd year subjects; expressing confusion (content and vocabulary), with the lower proficiency 2nd year subjects using it more frequently than the lower proficiency 4th year subjects.

In addition, Katib (ibid.: 215) specified that there were four strategies pertaining only to her study. She elaborated that they have not been identified in any

other studies. They were translation; knowledge of grammatical structure and text organization; identifying vocabulary; and comments on vocabulary. These strategies occurred as a result of readers' reporting their thoughts in Thai and the way Thai students have learned English as a foreign language in Thai contexts.

Jarijitpaibul's study (2002) was on English reading strategies of 11th grade Thai high school students with different English reading comprehension abilities. The subjects were 48 students: 24 students with advanced reading comprehension ability and 24 students with low reading comprehension ability. They were asked to verbalize their thoughts immediately after completing a reading test constructed by the researcher and approved by three language-teaching specialists. The results were (1) the students used the cognitive reading strategies more frequently than the compensatory reading strategies and the matacognitive reading strategies. The affective reading strategies were the least frequently used strategies (2) the students with advanced reading comprehension ability used the cognitive reading strategies at the most frequently and used the affective reading strategies at the least frequently. Similarly, the students with low reading comprehension ability used the cognitive reading strategies at the most frequently and used the affective reading strategies at the least frequently.

In details, both groups of students with advanced and low reading comprehension ability differed in their use of cognitive reading strategies, metacognitive reading strategies and compensatory reading strategies. In terms of cognitive strategies; they differed in their use of translating; summarization; inferencing; questioning about the text; reaction to the text content. As for metacognitve strategies, they differed in their use of self-monitoring. And under

compensatory reading strategies, they differed in their use of background knowledge; knowledge of grammatical structure and context clues (ibid.: 100-101).

In terms of test-taking strategies: test-wiseness strategies; rereading; skipping; skimming; scanning; underlining or circling the specific point to aid comprehension; lowering reading speed, both groups of students with advanced and low reading comprehension ability differed in their use at the .05 level. Particularly, both groups differed in their use of test-wiseness strategies and scanning at the .05 level (ibid.: 101).

With regard to the reading comprehension test in this study (ibid.: 98), it was composed of three parts in four response formats: (Part 1) seven multiple-choice test items and three short answer test items; (Part 2) ten cloze test items in multiple-choice format; (Part 3) ten test items using the information-transfer technique in the format of identifying whether the test items were main ideas or supporting details.

In sum, the three studies mentioned: Phapphal's (1995); Kratib's (1997); and Jarijitpaibul's (2002), provide the information on reading assessment, language ability, reading strategies and test-taking strategies of Thai university students and of Thai upper secondary school students.

In addition, there are also a few research studies in the Thai contexts regarding the survey of reading strategies of the university students, i.e. Baker and Boonkit (2004); Sucantajan (2006), and the instruction of reading strategies, i.e. Mejang (2004).

Baker and Boonkit's (2004) study was on learning strategies in reading and writing in EAP contexts. The study aimed to identify the most frequently used learning strategies and different strategies used between successful and less successful

university students. Regarding the reading strategies, the questionnaire was composed of 34 reading strategies which were divided into pre, during and post reading stages and classified into 7 categories: cognitive(C) ; memory(M); compensation(CP); metacognitive (MC); social (S); affective (A); and negative (N). The following strategies are sample strategies in each category.

- I read the whole passage quickly to understand the main idea (C).
- I take notes on all the new words and phrases for my vocabulary bank (M).
- I try to predict what the passage will be about (CP).
- I read the topic or heading of the passage (MC).
- I discuss what I understand with my friends or teacher (S).
- I give myself a reward when I have finished (A).
- I translate the sentences into Thai for the main idea of the passage (N).

The results were that the three categories: cognitive, compensation, and metacognitive strategies were the most frequently used. The frequency of social and affective strategies was not high. The use of negative strategies such as translating was high. When each strategy use was compared on the basis of category, a statistical analysis showed no significant difference of use for each strategy category between the high and low groups. However, the findings indicated that students in the high group used strategies appropriately than those in the low group.

Sucantajan (2006) did a survey study of English reading strategies of 1st year Thai university students at Chakrabongse Bhuvanath Campus. His study utilized a rating-scale questionnaire examining the respondents' reading strategies classified by Anderson (1999). The findings revealed that the students employed the cognitive reading strategies, the metacognitive reading strategies, and the compensating reading

strategies. However, the metacognitive reading strategies were employed less often than the other two strategies.

Apart from the two studies investigating the reading strategies of Thai university students, Mejang (2004: abstract) developed an English reading strategy instructional model based on collaborative learning principles and did her research study with two groups of university students. The instruction model focused on teaching 5 reading strategies: making connection; predicting; clarifying; questioning; and summarizing. The instructional processes involved 4 steps: introducing the strategy – to activate students' interest about the strategy; building an understanding – to familiarize students with the strategy; applying the strategy – to practice the strategy in a new context; and wrapping up – to assess students' comprehension of the text and their understanding about the strategy. Throughout the processes students work collaboratively in group discussions in which they expressed their ideas about the text and the strategies while the teacher acted as a facilitator who provided guidance and support.

To summarize, there have not been many research studies in Thai context on reading assessment techniques, language ability, reading strategies and test-taking strategies. Particularly, most of them are the studies of students at tertiary level. Presumably, few research studies of students at the lower level such as lower secondary schools i.e., 9th grade Thai high school students have been conducted. Most of the students at this level would further their studies taking English reading courses in the upper levels, therefore, it is worth conducting a study on these variables. The study of the students at this level, as presented in the present study, would provide insights for further research studies in the field.

In conclusion, this chapter presents the literature reviewed on reading; reading skills, reading strategies, test-taking strategies, alternative reading assessment techniques; the development and validation of tests; language ability as well as previous research studies in the field.

CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the research methodology under the topics: Research Design, Population and Sample, Research Instruments, Data Collection, and Data Analysis.

3.1 Research design

The research design in this study was “a Factorial Design--a design in which the researcher can simultaneously assess the effect of two or more independent variables on the dependent variable as well as the effect of the interaction of the two independent variables on the dependent variable. The independent variables may be one of the two types: active or attribute. An active independent variable is one that the researcher can manipulate directly such as methods of teaching. An attribute independent variable is one that the researcher cannot actively manipulate such as achievement” (Ary *et al.*, 2006: 335). In this study there were two independent variables: Reading Assessment Techniques and English Language Ability. Reading Assessment was the active IV, and Language Ability was the attribute IV. There were two levels for the first IV: the IT, the ST and three levels for the second IV: High, Average and Low as shown in Table 3.1 below.

Table 3.1: 2 x 3 Factorial Design for the study

Reading Assessment Techniques	English Language Ability		
	High (H)	Average (A)	Low (L)
IT	IT (H)	IT (A)	IT (L)
ST	ST (H)	ST (A)	ST(L)

The study posed three research questions to investigate the main effects and the interaction effect of these two independent variables: assessment techniques and language ability, on the dependent variable: reading comprehension scores.

1. Do different reading assessment techniques have a significant effect on test takers' reading comprehension scores?

2. Do test takers' English language ability have a significant effect on their reading comprehension scores?

3. Is there a significant interaction effect between different reading assessment techniques and test takers' English language ability on their reading comprehension scores?

In addition, the research design was supplemented with qualitative approach. The fourth research question was posed to investigate the test takers' reading and test-taking strategies as seen below.

4. What are the test takers' reading and test-taking strategies when assessed by the two reading assessment techniques?

3.2 Population and sample

The population was Thai 9th grade high school students in the EFL context. They were from Patumwan Demonstration School in the second semester of the academic year 2007. The total number of the population was 341. The sample was selected by a stratified randomly sampling technique. The total number of the sample was 180. As shown in Figure 3.1, first, all the population was categorized into three levels of language ability according to their English achievement scores in the first semester of the academic year 2007. Then, 60 subjects from each language ability group were randomly selected.

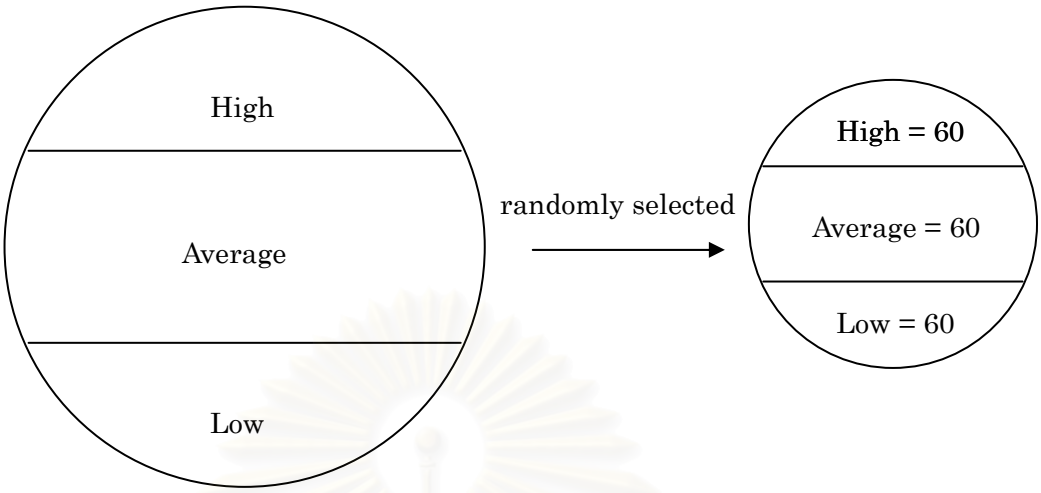


Figure 3.1: Stratified random sampling technique and random selection

Next, 60 subjects from each language ability group were divided into two groups using random assignment as shown in Figure 3.2.

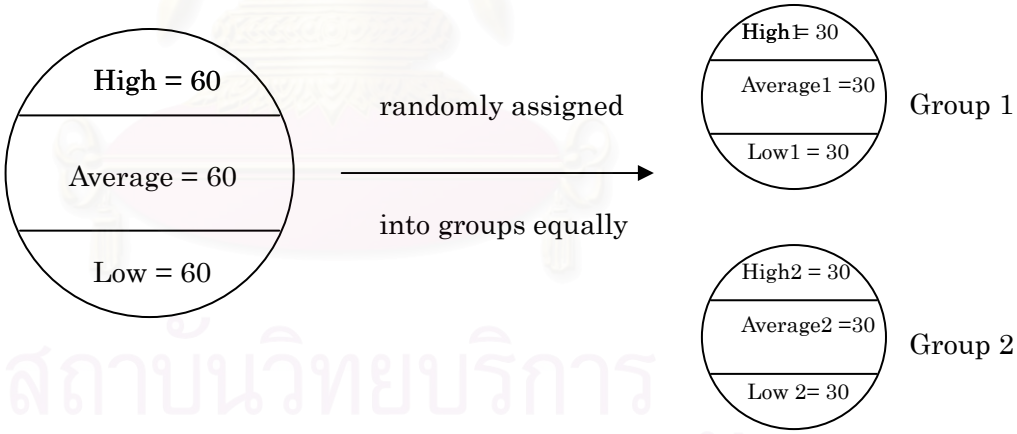


Figure 3.2: Random assignment into groups

To conclude, 180 subjects were selected from the population by a stratified random sampling technique and then they were randomly assigned into groups equally. Obviously, each sample was a random subset of the population it represented. This is the concept of "Randomized Block Design" (Leary, 2004). Moreover, Huck

(2004) supported that the equal number of the sample from each language ability group (30 subjects in each group) and the concept of random selection and random assignment can make the Two-Way ANOVA test (*F* test) robust. The next sections are about tests of equivalence of the sample before receiving the treatment and tests of normal distribution of the sample.

3.2.1 Tests of equivalence of the sample

The equivalence of the two groups of each language ability (H1 and H2; A1 and A2; L1 and L2) was confirmed by the mean scores and the Independent Samples *t* Tests as shown in Table 3.2- Table 3.7.

Table 3.2 illustrates the mean scores of two high ability groups, and Table 3.3 illustrates the Independent Samples *t* test of two high ability groups.

Table 3.2: Mean scores of the two high ability groups

Group Statistics

	Group	N	Mean	Std. Error Mean
scores	H1	30	**60.73**	**.54**
	H2	30	**60.77**	**.55**

From analysis of Table 3.2, it can be seen that the mean scores of the two high ability groups were 60.73 and 60.77. The standard deviations of the means were .54 and .55.

Table 3.3: The independent samples *t* test of the two high ability groups

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	sig.	t	df	sig.(2-tailed)	Mean Difference
scores	Equal variances assumed	**.012**	**.915**	-.043	58.00	.966	-.033
	Equal variances. Not assumed			-.043	57.99	.966	-.033

From Table 3.3, Levene's Test of Equality of Variances indicates that both groups of high ability had equal variances. It can be seen that $F = .012$, $p > .05$; therefore, it was ascertained that the two groups were not significantly different (Hinton *et al*., 2004).

Also, Table 3.4 presents the mean scores of two average ability groups, and Table 3.5 presents the Independent Samples *t* test of two average ability groups.

Table 3.4: Mean scores of the two average ability groups

Group Statistics

	Group	N	Mean	Std. Error Mean
scores	A1	30	**48.47**	**.488**
	A2	30	**48.47**	**.490**

From Table 3.4, the mean scores of the two average ability groups were equal at 48.47. The standard deviations of the means were very similar, that is, they were .488 and .490.

Table 3.5: The independent samples *t* test of the two average ability groups

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	sig.	t	df	sig.(2-tailed)	Mean Difference
scores	Equal variances assumed	**.106**	**.746**	-.000	58.00	1.000	.000
	Equal variances. Not assumed			-.000	57.99	1.000	.000

From Table 3.5, Levene's Test of Equality of Variances shows that both average ability groups had equal variances. It can be seen that $F = .106$, $p > .05$; therefore, it was assured that the two average groups were not significantly different (Hinton *et al*., 2004).

Likewise, Table 3.6 presents the mean scores of two low ability groups, and Table 3.7 presents the Independent Samples *t* test of two low ability groups.

Table 3.6: Mean scores of the two low ability groups

Group Statistics

	Group	N	Mean	Std. Error Mean
scores	L1	30	**32.77**	**.93**
	L2	30	**32.83**	**.91**

Table 3.6 indicates that the mean scores of the two low ability groups were 32.77 and 32.83. The standard deviations of the means were .93 and .91.

Table 3.7: The independent samples *t* test of the two low ability groups

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	sig.	t	df	sig.(2-tailed)	Mean Difference
scores	Equal variances assumed	**.109**	**.742**	-.051	58.00	.959	-.067
	Equal variances. Not assumed			-.051	57.99	.959	-.067

Levene's Test of Equality of Variances in Table 3.7 presents that both low ability groups had equal variances. It can be seen that $F = .109$, $p > .05$; therefore, it was ascertained that the two low ability groups were not significantly different (Hinton *et al*., 2004).

To summarize, the two groups of subjects from each language ability: High, Average and Low, were proved that they were not significantly different before they received the treatment of the reading tests.

3.2.2 Tests of normal distribution

Randomness and independence are basic assumptions underlying Two-way ANOVA which was the statistical test used in this study. They were already mentioned earlier in 3.2. There is another important basic assumption for the *F* test. That is, the test of normal distribution called Komogrov-Smirnov test (Huck, 2004).

One-Sample Komogrov-Smirnov tests for the six groups of subjects: High 1, High 2, Average 1, Average 2, Low 1 and Low 2, were carried out by SPSS software. The results were summarized and shown in Table 3.8.

Table 3.8: Results of Komogrov-Smirnov Tests

Subjects	Komogrov-Smirnov Z	Asymp.Sig. (2-tailed)
Group H1	.48	.98*
Group H2	.53	.94*
Group A1	.89	.41*
Group A2	.88	.42*
Group L1	.76	.62*
Group L2	.56	.92*

*Test distribution is normal

From Table 3.8, it can be seen that Asymp.Sig. (2-tailed) values of all six groups were more than .05. Therefore, it could be assumed that all groups had a normal distribution. (Hinton *et al.*, 2004).

To conclude, in this study the sample in three levels of language ability were randomly selected and randomly assigned to take either one of the two reading tests. And before receiving the treatment of the two tests, each pair of the three levels of language ability was tested to be equal by the Independent Samples *t* test. Also, each of the six groups of subjects was tested for their normal distribution which is an important basic assumption underlying Two-Way ANOVA.

3.3 Research instruments

Research instruments consisted of two reading tests: the Information-transfer Technique (IT) and the Summary Technique (ST) as well as a semi-structure interview.

3.3.1 The IT and the ST

The IT and the ST were designed to measure the "Global Reading Comprehension" which refers to "the understanding of propositions beyond the level of microstructure, that is, any macropropositions in the macrostructure, including main ideas and important details" (Weir *et al.*, 2000: 23). In other words, the tests were designed to measure the macro-level reading comprehension skills which could be investigated by two types of test techniques: Information-transfer and Summary. The IT required the test takers to complete a 'graphic organizer' by selecting answers of main ideas and important details from 'multiple-selection' multiple choices. The ST required the test takers to complete a 'prose summary' by selecting answers of main ideas and important details from 'multiple-selection' multiple choices.

Table 3.9 below displays an overview of the final versions of the IT and the ST for the main study. Both tests were composed of the same four 'problem-solution' reading passages. There were three main parts in each passage: Part 1 as 'Problem', Part 2 as 'Solutions (1)' and Part 3 as 'Solutions (2)'. As for the IT, in each passage there was a 'graphic organizer' with 10 test items and 12 choices (adding with 1 or 2 given sample answers) including 2 distracters. As for the ST, in each passage there was an introductory sentence of a 'prose summary' with 3 test items and 6 choices including 3 distracters (see Appendix A). The rationale for

assigning scores for the correct options was that the correct answers were the same idea units representing the main ideas and the important supporting details of the passages (see Table 3.11). Therefore, the score weight for each passage of the two tests was equal to 3 scores. The total scores for both final versions of the IT and the ST were equal to 12 scores.

Table 3.9: An overview of the final versions of the IT and the ST

Passage 1	**'Problem-Solutions'**	**IT** **(10 test items + 1 / 2 given sample answers)**	**ST** **(3 test items)**	**Scores**
	Problem	(1) (2) (3)	(1)	1
	Solutions (1)	(4) (5) (i) (6) (7)	(2)	1
	Solutions (2)	(8) (9) (ii) (10)	(3)	1

Table 3.9: An overview of the final versions of the IT and the ST (continued)

Passage 2	**'Problem-Solutions'**	**IT**	**ST**	**Scores**
	Problem	(1) (2) (3)	(1)	1
	Solutions (1)	(i) (4) (5) (6) (7)	(2)	1
	Solutions (2)	(8) (9) (10)	(3)	1
Passage 3	**'Problem-Solutions'**	**IT**	**ST**	**Scores**
	Problem	(1) (2) (3) (4) (i)	(1)	1
	Solutions (1)	(5) (6) (ii)	(2)	1

Table 3.9: An overview of the final versions of the IT and the ST (continued)

	Solutions (2)	(7) (8) (9) (10)	(3)	1
Passage 4	**'Problem-Solutions'**	**IT**	**ST**	**Scores**
	Problem	(1) (2)	(1)	1
	Solutions (1)	(3) (i) (4) (5) (6) (7)	(2)	1
	Solutions (2)	(8) (9) (ii) (10)	(3)	1
				Total scores = 12

*(i) and (ii) were the items of the sample answers given in the test.

From Table 3.9, the rationale for producing test items of the IT and of the ST was also based on the same idea units of the main ideas and the important supporting details in three parts of each passage: Part 1 ‘Problem’, Part 2 ‘Solutions (1)’ and Part 3 ‘Solutions (2)’. After the texts had been selected, the idea units (or propositions) of the passages were analyzed and classified as main ideas, important supporting details, or minor details. Then, for the ST, 3 test items were the idea units representing the idea units of main ideas and important supporting details in the three parts. Meanwhile, for the IT, 10 test items including given sample answers were also the idea units representing the same idea units of main ideas and important supporting details as those in the ST.

The rationale for choosing which idea units to be given sample answers in the IT was mainly depending on the number of the idea units in parts of the graphic organizer. For example, in Passage 1 there were 3 supporting details in ‘Solutions (1)’, thus one of them (i) was given as a sample answer (see test items (i), (6) and (7) of Passage 1 in Appendix A). Also, in Passage 1 there were 4 main ideas, for ‘Solutions (1) and ‘Solutions (2)’, thus one of them (ii) was given as a sample answer (see test items (4), (5), (8) and (ii) of Passage 1 in Appendix A).

The rationale for including 2 distracters in the IT and 3 distracters in the ST was from the preliminary try out of the first developed versions of both tests with the students who were not the participants of the main study. The first pilot versions of them were composed of 12 choices in the IT and 8 choices in the ST. According to the opinions of the test takers and their test results, it was found out that the number of choices of the IT (12) was suitable. However, the number of choices of the ST was too large. The test takers (who should have got better scores) assessed by the

ST reported that they were confused by the similarity of the options and the large number of choices. Consequently, the number of choices of the final versions of both tests was 12 and 6 for the IT and the ST respectively. This was also consulted with the experts' judgment.

3.3.1.1 Reading texts

There were six passages in the first developed versions of the IT and the ST. These passages were adapted from different sources. Table 3.10 shows the topic of the texts, the number of words, the readability scores and the sources of texts.

Table 3.10: Reading texts

Topics	Number of words	Readability	Sources of texts
1.Household hazardous wastes	201	13.96*	http://www.epa.gov/garbage/hhw.htm
2.Recycling can reduce pollution	232	6.82	Timed Reading Plus in Science
3.Stress	218	7.29	http://www.healthline.com/adamcontent/stress-and-anxiety
4.Protection from the sun	234	7.70	Timed Reading Plus in Science
5.Understanding motion sickness	211	7.72	More Reading Power: reading for pleasure, comprehension skills, thinking skills, reading faster.
6.Safety in cyberspace	181	11.94*	http://life.familyeducation.com/safety/computers/48196.html?detoured=1&for_printing.

* the scores show the texts were difficult so they were not used in the main study

From Table 3.10, the texts were from different sources. The number of words of the selected four texts (Text 2 to Text 5) was in the range of 211-234. This indicated that the texts had similar number of idea units. The Automated Readability Index indicated the readability of the texts. The readability score calculated by the Automated Readability Index refers to the U.S. grade level (http://www.online-utility.org/english/readability_test_and_improve.jsp). It can be seen that Text 2 to Text 5 were in the similar level of difficulty with the range of 6.82-7.72. These scores indicated that the texts were expected to be understandable by 6th or 7th grade U.S. students. However, the subjects in the present study were 9th grade Thai high school students. Therefore, the four selected texts were piloted to confirm the suitable level of difficulty with 9th grade Thai students who were not participants in the main study. As for the readability scores of Text 1 and Text 6, they indicated that they were difficult (13.96 and 11.94.) Thus, Text 1 and Text 6 were not used as reading texts in the main study, but they were used as examples of test tasks in the pilot and the main study (see Appendix A and B).

3.3.1.2 Idea units in the IT and the ST

The idea units of the passages were the same in the IT and the ST (see Appendix C for idea units of the four selected passages). They have been validated by the three experts in the field. The idea units in the present study referred to the macro-propositions or the main ideas and important supporting details of the passage (Weir *et al.*, 2000). The sample of the idea units of passage 1 “Recycle can reduce pollution” can be seen in Table 3.11.

Table 3.11: Idea units in the test items of the IT and the ST

Passage 1: Recycle can reduce pollution	**Idea Units in the test items**	
	IT	**ST**
Part 1 : Problem	(1)Waste can cause pollution. (2)Waste disposed in landfills produces chemicals that can cause water pollution. (3)Waste disposed at incineration plants produces gas that can cause air pollution.	(1) waste can cause pollution. Waste disposed in landfills produces chemicals that can cause water pollution, while, waste disposed at incineration plants produces gas that can cause air pollution
Part 2: Solutions (1)	(4)People should decrease the amount of garbage they produce to reduce pollution. (5) By reducing (i)People should limit the amount of new goods (6)People should use both sides of paper and cloth shopping bags. (7)People should purchase products made from recycled materials.	(2) people should decrease the amount of garbage they produce to reduce pollution. They should limit the amount of new goods, use both sides of paper, and cloth shopping bags, and purchase products made from recycled materials
Part 3: Solutions (2)	(8)By reusing (9)People should use things such as containers, clothing and toys more than once. (ii) By recycling (10)People should treat waste materials by separating recyclable things from trash.	(3) people should reuse things—use things such as containers, clothing and toys more than once, and they should recycle things—treat waste materials by separating recyclable things from trash

*(i) and (ii) were the items of the sample answers given in the test.

From Table 3.11, it can be seen that the idea units of the test items in the IT and those in the ST were the same in the three parts: Part 1 'Problem', Part 2 'Solutions (1)' and Part 3 'Solutions (2)'. Thus, as mentioned earlier, the score weight for each passage of the two tests was the same at 3 scores.

3.3.1.3 The IT and the ST specifications

Purpose of the tests:

To assess the test takers' reading comprehension for main ideas and important supporting details

Descriptions of the IT and the ST:

The first developed versions of the IT and the ST were composed of six passages. They were Text 1: "Household hazardous wastes", Text 2: "Recycling can reduce pollution", Text 3: "Stress", Text 4: "Protection from the sun", Text 5: "Understanding motion sickness", and Text 6: "Safety in cyberspace". Since Text 1 and Text 6 were too difficult at the readability scores 13.96 and 11.94 respectively (see 3.3.1.1), they were not used for reading texts in the main study. As a result, for the pilot versions (see Appendix B), Text 1 was chosen to be a sample passage with answer key and presented in the test booklets in order to minimize the risk of misunderstanding of how to do the tests. For the main study version, Text 1 was discarded, and Text 6 was moved to be the sample passage instead. Thus, in the main study versions (see Appendix A), there were four passages. They were Text 2, Text 3, Text 4 and Text 5.

Table of specifications:

The skills tested in the IT and the ST in the test items can be seen in Table 3.12.

Table 3.12: Test items number and the skills tested in the IT and the ST

Test	Passage	Skills	Test Items
IT	1.Household hazardous wastes	Understanding main ideas	1, (i), (ii), 4, 6, 8
		Understanding important supporting details	2, 3, 5, 7, 9, 10, (iii)
ST	1.Household hazardous wastes	Understanding main ideas and important supporting details	1, 2, 3
IT	2.Recycling can reduce pollution	Understanding main ideas	1, 4, 5, 8, (ii)
		Understanding important supporting details	2, 3,(i), 6, 7, 9, 10
ST	2.Recycling can reduce pollution	Understanding main ideas and important supporting details	1, 2, 3
IT	3.Stress	Understanding main ideas	1, (i), 4, 6, 8
		Understanding important supporting details	2, 3, 5, 7, 9, 10
ST	3. Stress	Understanding main ideas and important supporting details	1, 2, 3
IT	4.Protection from the sun	Understanding main ideas	1, 5, 7
		Understanding important supporting details	2, 3, 4, (i), 6, (ii), 8, 9, 10
ST	4.Protection from the sun	Understanding main ideas and important supporting details	1, 2, 3
IT	5.Understanding motion sickness	Understanding main ideas	1, 3, (i), 6,8
		Understanding important supporting details	2, 4, 5, 7, 9, (ii), 10
ST	5.Understanding motion sickness	Understanding main ideas and important supporting details	1, 2, 3

Table 3.12: Test items number and the skills tested in the IT and the ST (continued)

Test	Passage	Skills	Test Items
IT	6.Safety in cyberspace	Understanding main ideas	1, (ii), 4, 7, 9
		Understanding important supporting details	2, i, 3, 5, 6, (iii), 8, 10
ST	6.Safety in cyberspace	Understanding main ideas and important supporting details	1, 2, 3

* (i), (ii) and (iii) were the items of the sample answers given in the test.

From Table 3.12, the skills tested in each item of the IT were either understanding main ideas or understanding important supporting details. The skills tested in each item of the ST were the integration of understanding main ideas and important supporting details.

3.3.1.4 Test validation

The IT and the ST were developed using priori and posteriori validation processes. The priori validation process included the specification of the constructs and the development of the tests. The posteriori validation process was in three stages: the trial of the pilot versions of tests at the pilot stage; the calculation for reliability coefficient (KR-20), item discrimination (ID), the item facility (IF); and the process of revision.

3.3.1.4.1 Priori validation

In the priori validation process, at first, the reading tests were developed starting from the selection of the texts. As mentioned earlier, the criteria to select the passages were the type of text structure, the topic familiarity, the readability level and the number of words. The text type of the six passages was 'problem-solution', the most tightly text structure which was claimed to be important for global comprehension test (Urquhart and Weir, 1998; Kobayashi, 2002). 'Topic familiarity' is another important issue in the text selection procedure. The topics were selected at an appropriate level of specificity-- not too obscure and not too familiar in order to avoid bias in the background knowledge and to attract readers' attention (Weir, 1993; Weir *et al*., 2000). For 'readability level', there are several types of readability formulas that can be used to estimate text difficulty. In this study, the researcher used 'the Automated Readability Index.' using an on-line software tool (http://www.online-utility.org/english/readability_test_and_improve.jsp). The selected texts length was decided upon the number of idea units. The number of the words of the four selected passages for the main study versions was in the range of 211-234. After the texts had been selected, the test items were produced.

Next, the constructs of the reading tests were specified. The specification of the constructs was established through theoretical literature review of reading process. Since the IT and the ST were developed to measure the test takers' understanding of main ideas and important details. From the reviewed literature, some reading theorists believe reading is made up of separable components. The reading skills for reading at the global levels can be both 'careful reading : establishing accurate comprehension of explicitly stated main ideas and supporting details' and 'expeditious

reading : skimming quickly to establish main ideas; search reading to locate quickly and understand information relevant to predetermined needs' (Urquhart and Weir, 1998: 123). Accordingly, the researcher defined the reading skills as the constructs of the IT and the ST as follows. The IT measured the ability to skim, to distinguish main ideas from supporting details and to scan by reading selectively for specific words or phrases; whereas the ST measured the ability to read carefully establishing main ideas, to distinguish main ideas from supporting details and to reject irrelevant information or minor details. These reading skills reflect in the process of doing the tasks of the IT and the ST. In doing the task of the IT, first the test takers need to read the passage then distinguish main ideas from supporting details. Next, in completing the graphic organizer, they need to scan the passage and the options then look for specific words in the passage and the options that fit to the blanks of the graphic organizer. In doing the summary task of the ST, first the test takers need to read the passage then distinguish main ideas from supporting details. Next, in completing the prose summary, they need to again read the passage and the options carefully, and reject irrelevant information or minor details appearing in the incorrect options.

The next step of the development of the IT and the ST was the stage of seeking for experts' judgment. The tests were validated for the content and construct validation. Test validation form (Appendix G) was provided with the two forms of tests (the IT and the ST). Three experts in the field were asked to give their judgment on the topic familiarity; the language difficulty; the constructs of the two tests—the skills tested in the Information-transfer task and the Summary task and the skills tested in each item of the tests. Also, they were asked to give their comments

on the overview of the tests: the instructions of the tests, the response time, etc. There was no major revision. Some minor revision was made such as a few wordings in the options, the passages and the instructions. After the revision, the pilot study of the tests was conducted. The test takers were also 9th grade students at Patumwan Demonstration School who did not participate in the main study.

3.3.1.4.2 Posteriori validation

Three groups of test takers with three levels of language ability participated in the pilot study. They were randomly assigned to take either the IT or the ST. The pilot versions of the IT and the ST were composed of five reading passages (see Appendix B). The total scores for both pilot versions of tests were 15.

Then, the reliability coefficient (KR-20), item discrimination (ID) and item facility (IF) were calculated by the *Excel* spreadsheet program. (see Appendix H). The KR-20 of the IT was .87 and that of the ST was .82. This indicated that the two tests were satisfying with the high reliability from internal consistency (Brown, 2005). As for the values of item discrimination (ID) and item facility (IF), from 15 test items, 13 test items had satisfying values (ID: > .40 and IF: .30-.80) (Brown, 2005). However, 2 test items did not have satisfying values. They were **(1)** test item 9 (Passage 3) from the IT (ID =.08 and IF =.08) and **(2)** test item 13 (Passage 5) from the ST (ID = .08 and IF = .97). (see Appendix H)

The **first** test item [**(1)** test item 9 (Passage 3) from the IT] was revised as follows:

- In the IT, the option (A):‘Rubbing **suntan lotion**’ was revised to ‘Rubbing skin with **sunscreen**’

- In the ST, the option (C): ‘The skin can be protected when we wear proper covered clothing with enough thick fabric, rub **suntan lotion**, and avoid spending too many hours in the sun’ was revised to ‘The skin can be protected when we wear proper covered clothing with enough thick fabric, rub skin with **sunscreen**, and avoid spending too many hours in the sun’

The reason to revise this item was because only a few test takers chose this option even though it was a correct answer. Most of the test takers chose the distracter (M): **Sunscreen** can help prevent sun damage to skin if a person stays out of the sun all the time.

The **second** test item [**(2)** test item 13 (Passage 5) from the ST] was not revised because the readability score of Passage 5 (11.94) showed it was not appropriate to be used as a reading text in the main study. Thus, it was chosen to be used as an example of reading tasks instead.

After the revision, the main study versions of the IT and the ST were composed of four reading passages (see Appendix A). The readability mean score of the four passages was 7.38 (with the range of 6.28-7.72) indicated by the Automated Readability Index. This score indicated that the texts were expected to be understandable by 7^{th} grade U.S. students. However, the subjects in the present study were 9^{th} grade Thai high school students. Therefore, the four selected texts were piloted to confirm the suitable level of difficulty with 9^{th} grade Thai students who were not participants in the main study. The mean length of the texts indicated by the number of the words was 223.75 (with the range of 211-234). It indicated that the texts had similar number of idea units.

3.3.2 A semi-structure interview

A retrospective semi-structure interview comprised of questions on test takers' reading and test-taking strategies. The interview was conducted in the native language (Thai), and the test takers' responses were recorded for data analysis. The questions were developed and tried out in the pilot phase. The sample questions in the semi-structure interview are "Which reading strategies did you use while responding to the prompt passage, expeditious reading at global level; expeditious reading at local level; careful reading at global level; or careful reading at local level?" "Did you skim the passage and the options while responding to the IT?" "Did you read every word of the passage and of the options while responding to the IT?" The final version of the questions can be seen in Appendix D and E.

3.4 Data collection

3.4.1 The IT and the ST administration

The IT and the ST were administered by the researcher. As mentioned in 3.2, 180 subjects were randomly selected from each language ability group: High, Average and Low. Thus, there were 60 subjects in each of the three groups. Then 30 subjects in each language ability group were randomly assigned to take either of the two tests: the IT or the ST. Table 3.13 shows the random assignment of the six groups.

Table 3.13: Random assignment of the six groups

Tests	High Ability	Average Ability	Low Ability
IT	Group 1(30)	Group 2(30)	Group 3(30)
ST	Group4 (30)	Group 5(30)	Group 6(30)

It can be seen that there were 30 subjects in each of the three language ability groups. The subjects were randomly assigned to take the IT or the ST. Group 1, 2 and 3 took the IT and Groups 4, 5 and 6 took the ST.

The formats of the IT and the ST were unfamiliar for the subjects in this study. Normally, their reading comprehension tests at the school were traditional multiple-choices basic comprehension questions. To minimize the risk of misunderstanding of how to do the tests, the test instructions were written in the native language and a sample passage with answer key was presented at the front of each of the test booklets. To eliminate an order effect of the passages, the order of the four texts in the test booklets was counterbalanced. The time for the test administration was set at 40 minutes based on the experience gained in the pilot study.

3.4.2 A semi-structure interview

One week after the reading test administration, a retrospective semi-structure interview was conducted individually. 10 test takers were randomly selected from each language ability group to participate in the interview as illustrated in Table 3.14.

Table 3.14: Six groups of test takers participating in the semi-structure interview

Tests	High Ability	Average Ability	Low Ability
IT	5	5	5
ST	5	5	5

From the table, five test takers from each language ability group who took the IT were interviewed about their reading strategies while responding to the prompt passage and their reading and test-taking strategies while responding to the assessment task. Similarly, five test takers from each language ability group who took the ST were interviewed about their reading strategies while responding to the prompt passage and their reading and test-taking strategies while responding to the assessment task. The rationale to use the semi-structure interview was due to the fact that the subjects in this study are young and are at the 9th grade high school level. According to Klingner (2004), younger readers may be unable to articulate the processes they are using while responding to tasks, but the interview can promote reader awareness of the underlying process involved in responding to reading tasks.

3.5 Data analysis

3.5.1 Data analysis for research questions 1, 2 and 3

There were four research questions in this study. The first three research questions were as follows:

RQ1: “Do different reading assessment techniques (the IT and the ST) have a significant effect on test takers’ reading comprehension scores?”

RQ2: “Do test takers’ English language ability have a significant effect on reading comprehension scores?”

RQ3: “Is there a significant interaction effect between reading assessment techniques and test takers’ English language ability on their reading comprehension scores?”

The data analysis for these questions was composed of descriptive statistics

and the Two-Way ANOVA or *F* test.

First, the basic assumptions underlying the Two-Way ANOVA test were examined. As mentioned earlier, the assumption of randomness was utilized in the sampling process and the task assignment process. The assumption of independence was also attainable because all the subjects were independent. The normal distribution of scores of the six groups of subjects was also examined by the Komogrov-Smirnov test. Particularly, tests of equivalence of the sample called the Independent Samples *t* Tests were also carried out before the subjects received the treatment.

Next, the ANOVA test was carried out by SPSS software. The effect size value, called *eta squared* was also calculated. According to Tabachnick and Fidell (2001: 17), measures of effect size assess how much association there is by assessing the degree of relationship between the IV(s) and DV. Eta squared varies between 0 and 1 and is interpreted in the usual way, i.e. 0-0.1 is a small effect, 0.1-0.3 is a modest effect, 0.3-0.5 is a moderate effect and >0.5 is a large effect (Muijs, 2004: 194). In addition, the post hoc analysis called Tukey HSD was conducted to find the differences among groups.

3.5.2 Data analysis for research question 4

The fourth research question was, “What are the test takers’ reading and test-taking strategies when assessed by the two reading assessment techniques?” The data was from the semi-structure interview. It was conducted individually and the responses of the test takers were recorded for data analysis. The first passage in the main study was used to elicit each test taker’s response to the semi-structure interview.

The test taker's reading and test-taking strategies coding rubric was shown in Appendix F. The procedures can be described in three steps as follows. First, the test taker was asked to choose which reading strategy (RS) he used while reading the prompt passage: expeditious reading at global level/ skimming for main ideas (RS1); expeditious reading at local level/ scanning for specific words (RS2); careful reading at global level/ reading carefully establishing main ideas (RS3); or careful reading at local level/ reading carefully identifying lexis and syntax (RS4). Second, the reading and test-taking strategies were observed while the test taker was responding to the reading assessment task either the IT or the ST. His verbal protocol was recorded for further information. Third, to confirm the observation, he was interviewed on whether he used these reading strategies: skimming (R1); reading every word of the passage and of the options establishing main ideas (R2); distinguishing main ideas from supporting details (R3); scanning the passage and the options by reading selectively for specific words or phrases (R4); and reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details (R5). He was also interviewed on whether he used these test-taking strategies: considering the graphic organizer so as to conceptualize major ideas from across the passage (T1) ; considering the introductory sentence of the prose summary so as to understand the overview of the passage (T2); grouping options that are relevant to each portion of the passage (T3) ; dividing the passage into portions, getting the gist then looking for specific words in the options (T4); and selecting options through vocabulary, sentence, paragraph overall meaning (T5).

The content of the questions in the semi-structure interview was developed from the information at the preliminary stage and the reviewed literature on reading

and test-taking strategies such as the studies of Cohen and Upton's (2006; 2007).

The sample questions at the preliminary stage were open-ended questions as follows:

- First, how did you read the passage, e.g. 'read carefully' or 'read rapidly'?
- What were your reading strategies while responding to the assessment task, e.g. 'read the passage and the options carefully then discard the options which contain irrelevant information or minor details'?
- What were your test-taking strategies while responding to the assessment task, e.g. 'group options that are relevant to each portion of the passage'?

According to Cohen and Upton's (2006) study, the frequently used reading and test-taking strategies were, for instance, as follows:

- 'select option through vocabulary, sentence, paragraph, or passage overall meaning'
- ' read a portion of the passage rapidly looking for specific information'

In conclusion, this chapter presents the research methodology of the study. The next chapter is the findings of the study.

CHAPTER IV

RESULTS

This chapter presents the results of the study. They are from two sources of data: (1) data from the Information-transfer Technique (IT) and the Summary Technique (ST) and (2) data from the semi-structure interview. The data were analyzed through quantitative and qualitative approaches. The data from the IT and the ST were analyzed through Two Factors Independent Measures (Two-Way ANOVA). The data from the semi-structure interview were analyzed through content analysis and presented in numbers and percentages.

4.1 Findings of the data from the IT and the ST

4.1.1 Descriptive statistics

There are two independent variables (IVs) in this study: Reading Assessment Techniques and English Language Ability Groups. There are two levels in the first IV: the IT and the ST. There are three levels in the second IV: High, Average and Low. Table 4.1 displays the mean scores obtained from the three groups of test takers with high, average and low language ability assessed by the IT and the ST. The table also gives the standard deviation and number of participants in each group as follows:

Table 4.1: Descriptive statistics of the three groups

GROUP	TECHNIQUE	Mean	Std.Deviation	N
High	IT	10.03	1.73	30
	ST	10.57	1.38	30
	Total	**10.30**	**1.58**	**60**
Average	IT	7.80	1.58	30
	ST	8.50	2.22	30
	Total	**8.15**	**1.95**	**60**
Low	IT	3.17	2.09	30
	ST	5.40	2.39	30
	Total	**4.28**	**2.49**	**60**
Total	IT	7.00	3.39	90
	ST	8.16	2.94	90
	Total	**7.58**	**3.22**	**180**

From the table when the factor of “GROUP” is considered, it can be seen from the Total row that the mean score obtained from the test takers with high ability (10.30) is more than that of average ability (8.15), and more than double that of low ability test takers (4.28). In addition, when the factor of “TECHNIQUE” is considered, the mean score obtained from the high group assessed by the IT (10.03) is slightly lower than that obtained by the ST (10.57). The mean score obtained from the average group assessed by the IT (7.80) is also slightly lower than that obtained by the ST (8.50). However, the mean score obtained from the low group assessed by the IT (3.17) is lower by almost 50% than that obtained by the ST (5.40). Moreover, by observing the Total in the bottom row, it can be seen that the overall mean score obtained by Assessment Techniques, irrespective of whether the test takers have high, average or low ability, does show some differences. That is the mean score of the test takers assessed by the IT (7.00) is lower than that of the test takers assessed by the ST (8.16).

The standard deviations show that when comparing the overall mean scores of the three ability groups, the low ability group has the largest spread of scores (2.49) and the high ability group has the most closely related scores (1.58). Also, when we consider the factor of Assessment Techniques, the test takers assessed by the ST in the low ability group has the largest spread of scores (2.39).

4.1.2 Tests of two main effects and interaction effect between the two IVs

There are three hypotheses in this research study. To test the hypotheses, Two-Way ANOVA was conducted by SPSS software. The output of SPSS containing the important information of the three hypotheses can be seen from the Tests of Between-Subjects Effects Table (Table 4.2) shown below. In addition, the post hoc test was conducted to find the differences among the three levels of the factor "GROUP". These differences can be seen from the Multiple Comparison Table (Table 4.3) and the Homogeneous Subsets Table (Table 4.4) as follows.

Table 4.2: Tests of between-subjects effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1201.911(a)	5	240.382	64.348	.000	.649
Intercept	10336.089	1	10336.089	2766.891	.000	.941
GROUP	1115.478	2	557.739	149.302	**.000**	**.632**
TECHNIQUE	60.089	1	60.089	16.085	**.000**	**.085**
GROUP*TECHNIQUE	26.344	2	13.172	3.526	**.032**	**.039**
Error	650.000	174	3.736			

$p < .05$

1st Main Effect

The first hypothesis posited in Chapter 1 is "The mean score obtained from the IT is significantly different from that obtained from the ST."

From Table 4.2 for the factor "TECHNIQUE", it can be seen that there is a significant main effect, $F(1,174) = 16.085$, $p < .05$. In other words, there is a significant difference between the two different reading assessment techniques.

The value of "Partial Eta Squared" is the effect size index. For the factor "TECHNIQUE", the value is .085 which represents a small effect size (Muijs, 2004). Therefore, there is not a lot of variance among reading scores assessed by the two reading assessment techniques although there is a difference between the two means.

2nd Main Effect

For the second hypothesis, it was hypothesized that "The mean score obtained from the test takers with high ability is significantly different from that obtained from the test takers with average language ability, and significantly different from that obtained from the test takers with low language ability."

From analysis of Table 4.2 for the factor "GROUP", it can be seen that there is a significant main effect, $F(2,174) = 149.302$, $p < .05$. In other words, there is a significant difference among the groups of high, average and low ability.

The value of "Partial Eta Squared" for the factor "Group" is .632. It refers to a large effect size (Muijs, 2004). Thus, there is a lot of variance in reading scores among the three language ability groups.

The differences among the three levels of the factor "GROUP" can be seen from the Multiple Comparison Table (Table 4.3) as follows.

Table 4.3: Multiple comparisons

Tukey HSD

					95%Confidence Interval	
(I)GROUP	(J)GROUP	Mean Difference(I-J)	Std.Error	Sig.	Lower Bound	Upper Bound
high	average	2.15*	.35	.000	1.32	2.98
	low	6.02*	.35	.000	5.18	6.85
average	high	-2.15*	.35	.000	-2.98	-1.31
	low	3.87*	.35	.000	3.03	4.70
low	high	-6.02*	.35	.000	-6.85	-5.18
	average	-3.87*	.35	.000	-4.70	-3.03

From analysis of Table 4.3, in the column “Mean Difference”, it can be seen that the difference in mean scores between the high group and the average group is 2.15. The difference in mean scores between the high group and the low group is 6.02. The difference in mean scores between the average group and the low group is 3.87. All the p-values are highly significant at the .05 level. Therefore, all the three ability groups differ from one another.

The differences among the three levels of the factor “GROUP” can also be illustrated from the Homogeneous Subsets Table (Table 4.4) as follows.

Table 4.4: Homogeneous subsets

Tukey HSD

		Subset		
GROUP	N	Low	Average	High
low	60	4.28*		
average	60		8.15*	
high	60			10.30*

$\bar{x}_H > \bar{x}_A > \bar{x}_L$ $\quad p \leq .05$

From analysis of Table 4.4, it can be seen that the mean score for the test takers with low ability is 4.28, with average ability is 8.15 and with high ability is 10.30.

Therefore, it can be concluded that the mean scores obtained from the three groups of test takers with high language ability, average language ability and low language ability are significantly different.

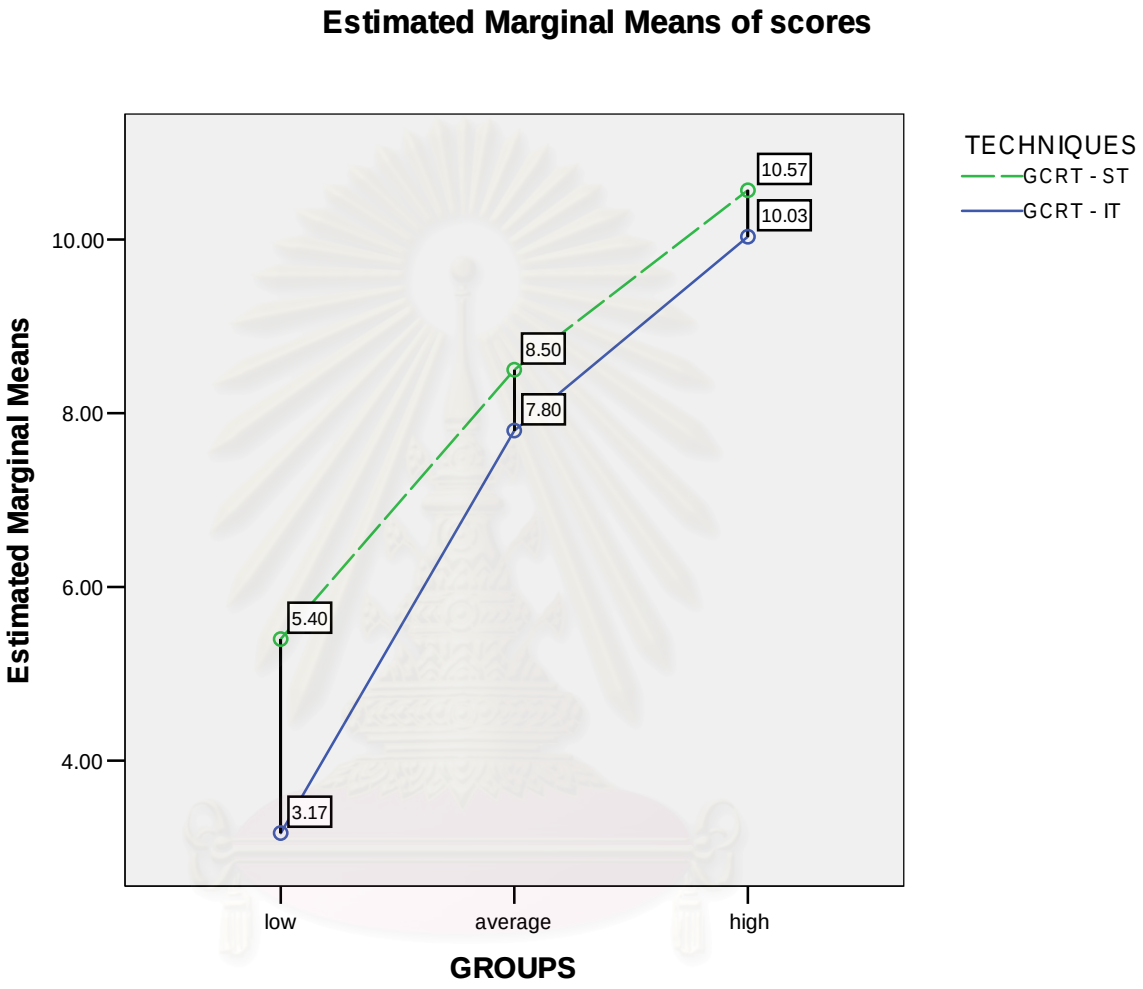
Interaction Effect

The interaction effect was examined by answering the third hypothesis stating, "There is a significant interaction effect between reading assessment techniques and test takers' English language ability on their reading comprehension scores."

From analysis of Table 4.2, it can be seen that there is a significant interaction effect between the two factors "GROUP*TECHNIQUE", $F(2,174) = 3.526$, $p < .05$. In other words, the interaction effect between the two variables is evident. This supports Hinton *et al.*'s study (2004:221). It identifies that the types of assessment techniques have more of an effect on the test takers with low ability than they do for the test takers with average ability or than they do for the test takers with high ability as reported by Muijs (2004: 198). However, since the value of "Partial Eta Squared" is only .039, it indicates a very small effect size (Muijs, 2004).

In order to see the interaction effects clearly, a graph has been plotted (Figure 4.1) as shown below.

Figure 4.1: Estimated marginal means of scores



From Figure 4.1, the graph shows the two main effects and the interaction effect that have been identified as part of the ANOVA analysis. The plot indicates that there are significant differences among the mean scores obtained from the test takers with high, average, and low ability assessed by the ST and the IT. The mean

score obtained from the low group assessed by the ST (5.40) is higher than that obtained by the IT (3.17). Similarly, the mean score obtained from the average group assessed by the ST (8.50) is higher than that obtained by the IT (7.80). Also, the mean score obtained from the high group assessed by the ST (10.57) is higher than that obtained by the IT (10.03).

Although the two lines do not cross, they are not exactly parallel. They indicate that the ST has more of an effect on the test takers with low ability than it does on the test takers with average or high ability. Obviously, the test takers with low ability have much more mean score when they are assessed by the ST than by the IT. In other words, the difference of the mean scores of the high groups assessed by the ST and the IT (10.57-10.03 = 0.44) and that of the average groups assessed by the ST and the IT(8.50-7.80 = 0.70) are not as much as that of the low groups assessed by the two assessment techniques (5.40-3.17 = 2.23).

4.2 Findings of the data from the semi-structure interview

There were 30 test takers taking part in the retrospective semi-structure interview. Five test takers from each language ability group assessed by each assessment technique were selected by means of random sampling as shown in Table 4.5 below:

Table 4.5: Test takers taking part in the semi-structure interview

	High	Average	Low
IT	5	5	5
ST	5	5	5

In order to investigate a test taker's reading and test-taking strategies, a retrospective semi-structure interview was conducted individually and the responses of the test takers were recorded for data analysis. The first passage in the main study was used to elicit each test taker's response to the semi-structure interview. The test taker's reading and test-taking strategies coding rubric was shown in Appendix F. As mentioned in 3.5.2 of Chapter 3, the procedures were in three steps as follows. First, the test taker was asked to choose which reading strategy (RS) he used while reading the prompt passage: expeditious reading at global level (RS1); expeditious reading at local level (RS2); careful reading at global level (RS3); or careful reading at local level (RS4). Second, the reading and test-taking strategies were observed while the test taker was responding to the reading assessment task either the IT or the ST. His verbal protocol was recorded for further information. Third, to confirm the observation, he was interviewed on whether he used these reading strategies: skimming (R1); reading every word of the passage and of the options establishing main ideas (R2); distinguishing main ideas from supporting details (R3); scanning the

passage and the options by reading selectively for specific words or phrases (R4); and reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details (R5). He was also interviewed on whether he used these test-taking strategies: considering the graphic organizer so as to conceptualize major ideas from across the passage (T1) ; considering the introductory sentence of the prose summary so as to understand the overview of the passage (T2); grouping options that are relevant to each portion of the passage (T3) ; dividing the passage into portions, getting the gist then looking for specific words in the options (T4); and selecting options through vocabulary, sentence, paragraph overall meaning (T5).

4.2.1 Reports on the use of reading strategies while responding to the prompt passage

The 30 test takers from high, average, and low language ability groups reported their use of reading strategies differently while they were responding to the prompt passage. The data of the reading strategies were presented in numbers and percentages as shown in the following table.

Table 4.6: Test takers' reading strategies while responding to the prompt passage

Reading Strategies(RS)	high ability	average ability	low ability
RS1.Expeditious reading at global level (skimming for main ideas)	6 (60%)	5 (50%)	1 (10%)
RS2.Expeditious reading at local level (scanning for specific words)	1 (10%)	1 (10%)	2 (20%)
RS3.Careful reading at global level (reading carefully, establishing main ideas)	2 (20%)	2 (20%)	1 (10%)
RS4.Careful reading at local level (reading carefully, identifying lexis, syntax)	1 (10%)	2 (20%)	6 (60%)

Table 4.6 shows the reading strategies used by the 30 test takers from high, average and low ability groups. Among the four reading strategies, the test takers with high ability reported they read the prompt passage expeditiously for global comprehension at the highest percentage (60%), whereas, 50% of the test takers with average ability used this strategy, and the test takers with low ability used this strategy at the least percentage (10%).

On the contrary, the test takers with low ability reported they read the prompt passage carefully for local comprehension at the highest percentage (60%) whereas the test takers with average ability and those with high ability used this strategy at the percentages of 20 and 10 respectively.

For careful reading at global level, the test takers with high ability and those with average ability reported they used this strategy at the same percentages of 20, which is higher than that of the test takers with low ability (10%).

For expeditious reading at local level, the test takers with low ability reported they used this strategy at the percentage of 20, which is higher than that of the test takers with high ability and average ability who reported they used this strategy at the same percentages (10%).

To conclude, 80% of the test takers with high ability used reading strategies at global level (RS1, RS3), but oppositely, 80% of the test takers with low ability used reading strategies at local level (RS2, RS4). Almost similar to the test takers with high ability, 70 % of the test takers with average ability used reading strategies at global level (RS1, RS3).

Sample answers from the interview

Sample answers from the interview of the test takers on their reading

strategies while responding to the prompt passage are as follows:

How did you read the prompt passage?

Student HS8: "First, I looked at the title, 'Recycling can reduce pollution'. Then I read quickly to get the main ideas of the passage. The first paragraph was about 'waste and pollution'. The second paragraph was about 'reducing, reusing, and recycling'. So after I read the whole passage rapidly, I could get the main ideas of it."

Student AI1: "I read the title. I read only the subjects and the main verb in each sentence. There were some unknown words such as 'disposal', 'incineration', but I did not care them much. I did not read every word of the prompt passage."

Student LS4: "I read the title, ' Recycling can reduce pollution'. I knew the word 'recycle', but I didn't know the words 'reduce' and 'pollution'. I read the passage carefully and tried to comprehend all the words as much as I could. However, there were many unknown words like, 'dissolves', 'incineration', 'restrict', 'scratch', and these words made me worried about their meanings. Therefore, I could not understand the whole passage."

Note: In analyzing test takers' reading and test-taking strategies, the following notation is used to refer to the test taker.

HI1 = Student number 1 from the high ability group who was assessed by the IT

AS1 = Student number 1 from the average ability group who was assessed by the ST

In conclusion, the verbal reports from the test takers confirmed how the test takers read the prompt passage. Most of the test takers from the high ability group and average ability group paid more attention to the global comprehension while they were reading the prompt passage; however, most of the test takers from the low ability group paid too much attention to comprehend the lexis or local comprehension in the prompt passage.

4.2.2 Reports on the use of reading and test-taking strategies while responding to the IT

The 15 test takers from high, average and low language ability groups reported their use of reading and test-taking strategies variously while they were responding to the IT. The data of the reading and test-taking strategies were presented in numbers and percentages as shown in Table 4.7 and Table 4.8.

Table 4.7 illustrates the reading strategies that were used by the 15 test takers from high, average and low ability groups when they were responding to the prompt passage and the options in the IT.

Table 4.7: Test takers' reading strategies while responding to the IT

Reading Strategies	high ability	average ability	low ability
R1. Did you skim the passage and the options?			
1.1 Yes	4	3	1
	(80%)	(60%)	(20%)
1.2 No	1	2	4
	(20%)	(40%)	(80%)
R2. Did you read every word of the passage and of the options?			
2.1 Yes	1	2	4
	(20%)	(40%)	(80%)
2.2 No	4	3	1
	(80%)	(60%)	(20%)
R3. Could you distinguish the main ideas from the supporting details?			
3.1 Yes	4	4	2
	(80%)	(80%)	(40%)
3.2 No	1	1	1
	(20%)	(20%)	(20%)
3.3 Not sure	0	0	2
	(0%)	(0%)	(40%)
R4. Did you scan the passage and the options by reading selectively for specific words or phrases?			
4.1 Yes	4	4	2
	(80%)	(80%)	(40%)
4.2 No	1	1	3
	(20%)	(20%)	(60%)
R5. Did you read the passage and the options carefully then discard the options which are irrelevant information or minor details?			
5.1 Yes	1	0	0
	(20%)	(0%)	(0%)
5.2 No	4	5	5
	(80%)	(100%)	(100%)

The data of the reading strategies as shown in Table 4.7 can be explained as follows:

R1. Skimming

80% of the test takers with high ability reported they skimmed the passage and the options whereas 60% of the test takers with average ability, and only 20 % of the test takers with low ability reported they skimmed them.

R2. Reading every word of the passage and the options establishing main ideas

In contrast to skimming, 80% of the test takers with low ability reported they read every word of the passage and of the options whereas 40% of the test takers with average ability and only 20 % of the test takers with high ability reported they did this.

R3. Distinguishing the main ideas from the supporting details

When asked whether they could distinguish the main ideas from the supporting details, 80% of the test takers from both groups of high and average ability reported they could distinguish them. Nevertheless, only 40% of the test takers with low ability reported they could distinguish them, and another 40 % said they were not sure they could.

R4. Scanning the passage and the options by reading selectively for specific words or phrases

80% of test takers from both groups of high and average ability reported that they scanned the passage and the options by reading selectively for specific words and phrases while they were completing the graphic organizer. Meanwhile, 40 % of the test takers with low ability reported they did this.

R5. Reading the passage and the options carefully then discarding the options which are irrelevant information or minor details

Only 20 % of the test takers from high ability group reported they responded to the IT by reading the passage and the options carefully then discarding the options which are irrelevant information or minor details. Most of them (80%) and all the test takers from the average and low ability groups reported that they did not use this reading strategy.

Table 4.8 illustrates the test-taking strategies that were used by the 15 test takers from high, average and low ability groups when they were responding to the prompt passage and the options in the IT.

Table 4.8: Test takers' test-taking strategies while responding to the IT

Test-taking Strategies	high ability	average ability	low ability
T1. Did you consider the graphic organizer so as to conceptualize major ideas from across the passage?			
1.1 Yes	4 (80%)	3 (60%)	1 (20%)
1.2 No	1 (20%)	2 (40%)	4 (80%)
T2. Did you consider the introductory sentence of the prose summary so as to understand the overview of the passage?			
1.1 Yes	-	-	-
1.2 No	-	-	-
T3. Did you group the options that are relevant to each portion of the passage?			
2.1 Yes	5 (100%)	4 (80%)	0 (0%)
2.2 No	0 (0%)	1 (20%)	5 (100%)
T4. Did you divide the passage into portions, get the gist of each portion and look for specific words in the options?			
3.1 Yes	5 (100%)	3 (60%)	1 (20%)
3.2 No	0 (0%)	2 (40%)	4 (80%)
T5. Did you select and discard options through vocabulary, sentence, paragraph overall meaning?			
4.1 Yes	4 (80%)	4 (80%)	3 (60%)
4.2 No	1 (20%)	1 (20%)	2 (40%)

Note: There were no data of T2 because it is the test-taking strategy dealing with the prose summary in the ST.

The data of the test-taking strategies as shown in Table 4.8 can be explained as follows:

T1. Considering the graphic organizer so as to conceptualize major ideas from across the passage.

80% of the test takers with high ability said they had a look at the graphic organizer and this helped them conceptualize main ideas from across the passage. 60 % of the test takers with average ability said they considered the graphic organizer before reading the options. In contrast, only 20% of the test takers with low ability reported they considered the graphic organizer.

T2. Considering the introductory sentence of the prose summary so as to understand the overview of the passage

There were no data of T2 because it is the test-taking strategy dealing with the prose summary in the ST.

T3. Grouping the options that are relevant to each portion of the passage

All of the test takers from the high ability group mentioned they grouped the options according to the portions of the passage. On the contrary, all of the test takers from the low ability group did not mention they used this test-taking strategy. 80% of the test takers from the average ability group mentioned they did use this test-taking strategy.

T4. Dividing the passage into portions, getting the gist of each portion and looking for specific words in the options

All of the test takers from the high ability group reported they divided the passage into portions, read for the gist of each portion and looked for specific words in the options. 60% of the test takers from the average ability group and only 20% of

the test takers from the low ability group mentioned they used this test-taking strategy.

T5. Selecting and discarding options through vocabulary, sentence, paragraph overall meaning

80% of the test takers from the high ability group and the average ability group reported they selected and discarded options through vocabulary, sentence, paragraph overall meaning. 60% of the test takers from the low ability group mentioned they used this test-taking strategy.

Sample answers from the interview

Sample answers from the interviews on the reading and test-taking strategies while the test takers were responding to the IT are as follows:

Reading strategies

R1. Did you skim the passage and the options?

Student HI2 : " I read the passage thoroughly and quickly for only the main ideas. Then, I skimmed all the options."

Student AI1 : " I skimmed the whole passage and all the options for the important ideas."

Student LI4 : " No, I didn't. I didn't know how to skim."

R2. Did you read every word of the passage and of the options?

Student HI2 : " No, I didn't read every word. I read only the main subjects and verbs."

Student AI1 : "No, I did not. I skipped difficult or long words."

Student LI4 : " I tried to read every word of the passage and of the options in order to get the meanings of the words as much as I could."

R3. Could you distinguish the main ideas from the supporting details?

Student HI1 : " Yes, I could distinguish the main ideas of the passage from the minor details."

Student AI4 : " I read only the subjects and the main verbs of the sentences. I didn't care for unknown words. I distinguished major ideas from minor ones."

Student LI5 : " I'm not sure. There were a lot of difficult words."

R4. Did you scan the passage and the options by reading selectively for specific words or phrases?

Student HI5 : " Yes, after I quickly read the whole passage, I looked for words in the first paragraph about the problem, 'Pollution caused by waste is a complex problem'. Then I saw the option (D), 'Waste can cause pollution'. They were the same words, so I wrote (D) in the blank (1)."

Student AI2 : " I drew lines under 'Pollution caused by waste is a complex problem', 'landfills', 'pollute water', 'incineration plants', 'pollutes the air'. Then I looked at the first part of the graphic organizer, scanned for these words in the options, and I saw these words in the options (D), (L), (M). So I selected them."

Student LI2 : "I'm not sure what to do after reading and trying to translate the words I knew in the passage. There were so many options. I tried to match words in the options with words in the passage, but I felt confused and didn't know which

option I had to select to fill in the blanks of the graphic organizer."

R5. Did you read the passage and the options carefully then discard the options which contain irrelevant information or minor details?

Student HI4 : " No, I read them quickly, then I chose the options in the order of the passage. I didn't discard the options before that."

Student AI3: " No, I didn't discard the options. I filled in the blanks of the graphic organizer by selecting the appropriate choices. "

Student LI1: " No, I didn't know which options contained irrelevant information."

Test-taking strategies

T1. Did you consider the graphic organizer so as to conceptualize major ideas from across the passage?

Student HI 3: "Yes, I looked at the graphic organizer. There were two main parts: Problem and Solutions. The graphic organizer helped me conceptualize important ideas of the passage."

Student AI5: "Yes, I considered the graphic organizer. I tried to fill in the blanks of the graphic organizer with the appropriate options. The graphic organizer helped me understand the main ideas of the passage."

Student LI 3: "Yes, I tried to have a look at the graphic organizer and it helped me understand some ideas of the passage."

T3. Did you group the options that are relevant to each portion of the passage?

Students HI2: "Yes, I grouped the options that are relevant to each portion of the passage. For example, the options (A) and (B) started with the word 'By', so I grouped them as the options for 'Solutions'. I also noticed the option (C) 'By recycling'."

Student AI 4 : "Yes, I looked through the options. For example, the words ' People should…' in the options (F), (G), (H), (I), (J),(K) so I grouped them together. I thought they might be choices for the items (6), (7), (9), (10). I noticed the sample answer '(E) People should limit the amount of new goods'.

Student LI1: No, I didn't divide the options into groups. They all looked similar.

T4. Did you divide the passage into portions, get the gist of each portion and look for specific words in the options ?

Student HI3: "Yes, I divided the passage into three portions: Problem ; Solution1 ; Solution2. Then I looked for specific words in the options that were matching with the words in the specific portion. For example, the main idea of the first portion of the passage was about ' waste' and ' pollution', and I saw these words in the options (D), (L) and (M)."

Student AI1: “ I read the first part of the second paragraph. I saw the sentences, ‘They can do this by reducing, reusing, and recycling. To reduce, …another way to reduce.’ I saw the relevant information, ‘ …limit new goods, use both sides of paper and cloth bags, buy recycled products…’. I saw these words in the options (E), (G) and (H), so I selected them as the answers for the items (6) and (7).

Student LI2: “I’m not sure how to divide the passage into portions, so I read all the passage.”

T5. Did you select and discard options through vocabulary, sentence, paragraph overall meaning?

Student HI5: “Yes, I read through the options. I decided to select and discard them through the sentence overall meaning.”

Student AI2: “Yes, I selected and discarded the options through ‘vocabulary’. For example, I discarded the options (F) because I saw the words ‘more disciplined’. This was not true according to the passage.”

Student LI3: “Yes, I tried to select and discard the options through vocabulary and sentence overall meaning. For example, I selected the option (D) ‘waste can cause pollution’ as the answer to the item (1) because of the overall meaning of the first sentence in the first paragraph.”

To conclude, the test takers' reading and test-taking strategies can be summarized as shown in Table 4.9.

Table 4.9: Summarization of the test takers' reading and test-taking strategies while responding to the IT

Reading and Test-taking Strategies	high ability	average ability	low ability
R1 (skim)	80%	60%	20%
R2 (read every word)	20%	40%	80%
R3 (distinguish)	80%	80%	40%
R4 (scan)	80%	80%	40%
R5 (discard irrelevant inf.)	20%	0%	0%
T1 (consider graphic org.)	80%	60%	20%
T2 (consider introductory sent.)	---	---	---
T3 (group options)	100%	80%	0%
T4 (look for specific words)	100%	60%	20%
T5 (select and discard options)	80%	80%	60%

Table 4.9 summarizes the reading and test-taking strategies used by the three groups of 15 test takers while they were responding to the IT. Obviously, the high ability test takers used these reading and test-taking strategies at the high percentages (80%-100%): R1 (skimming); R3 (distinguishing main ideas from supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); T3 (grouping options that are relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist then looking for specific words in the options); and T5 (selecting options through vocabulary, sentence,

paragraph overall meaning). They used these reading strategies in the lower percentages (20%): R2 (reading every word of the passage and of the options establishing main ideas); and R5 (reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details).

The average ability test takers reported they used R1 (skimming); R3 (distinguishing main ideas from supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); T3 (grouping options that are relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist then looking for specific words in the options); and T5 (selecting options through vocabulary, sentence, paragraph overall meaning) at lower percentages (60%-80%). They used R2 (reading every word of the passage and of the options establishing main ideas) at 40% but did not use R5 (reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details).

The low ability test takers reported they used R1 (skimming); R3 (distinguishing main ideas from supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); and T4 (dividing the passage into portions, getting the gist then looking for specific words in the options) at the lowest percentages (20%-40%), but they reported they used T5 (selecting options through vocabulary, sentence, paragraph overall meaning) at 60%. They used R2 (reading every word of the passage and of the options establishing main ideas) at 80% but did not use R5 (reading the passage and the options carefully then

discarding the options which contain irrelevant information or minor details) and T3 (grouping options that are relevant to each portion of the passage).

4.2.3 Reports on the use of reading and test-taking strategies while responding to the ST

The 15 test takers from high, average and low language ability groups reported that their use of reading and test-taking strategies differed while they were responding to the ST. The data of the reading and test-taking strategies were presented in numbers and percentages as shown in Table 4.10 and Table 4.11.

Table 4.10 shows the reading strategies that were used by the 15 test takers from high, average and low ability groups when they were responding to the prompt passage and the options in the ST.

Table 4.10: Test takers' reading strategies while responding to the ST

Reading Strategies	high ability	average ability	low ability
R1. Did you skim the passage and the options?			
1.1 Yes	1	1	1
	(20%)	(20%)	(20%)
1.2 No	4	4	4
	(80%)	(80%)	(80%)
R2. Did you read every word of the passage and of the options?			
2.1 Yes	4	4	4
	(80%)	(80%)	(80%)
2.2 No	1	1	1
	(20%)	(20%)	(20%)
R3. Could you distinguish the main ideas from the supporting details?			
3.1 Yes	4	4	3
	(80%)	(80%)	(60%)
3.2 No	1	1	1
	(20%)	(20%)	(20%)
3.3 Not sure	0	0	1
	(0%)	(0%)	(20%)
R4. Did you scan the passage and the options by reading selectively for specific words or phrases?			
4.1 Yes	2	2	2
	(40%)	(40%)	(40%)
4.2 No	3	3	3
	(60%)	(60%)	(60%)
R5. Did you read the passage and the options carefully then discard the options which are irrelevant information or minor details?			
5.1 Yes	5	4	2
	(100%)	(80%)	(40%)
5.2 No	0	1	3
	(0%)	(20%)	(60%)

The data of the reading strategies as shown in Table 4.10 can be explained as follows:

R1. Skimming

The test takers from the three ability groups reported they skimmed the passage and the options at the same percentages (20%).

R2. Reading every word of the passage and of the options establishing main ideas

In contrast to skimming, 80% of the test takers from the three ability groups reported they used this reading strategy.

R3. Distinguishing the main ideas from the supporting details

When asked whether they could distinguish the main ideas from the supporting details, 80% of the test takers from both groups of high and average ability reported they could distinguish them. 60% of the test takers with low ability reported they could distinguish them, 20 % said they could not and another 20% were not sure they could.

R4. Scanning the passage and the options by reading selectively for specific words or phrases

While responding to the ST, all three groups of test takers reported that they scanned the passage and the options by reading selectively for specific words and phrases at the same percentages (40%). They did not scan the passage and the options by reading selectively for specific words and phrases at the same percentages (60%).

R5. Reading the passage and the options carefully then discarding the options which are irrelevant information or minor details

While responding to the ST, 100 % of the test takers from high ability group reported they read the passage and the options carefully then discarded the options which are irrelevant information or minor details. 80% of the test takers with average ability also reported they used this reading strategy. And 40% of the test takers with low ability used this reading strategy.

Table 4.11 illustrates the test-taking strategies that were used by the 15 test takers from high, average and low ability groups when they were responding to the prompt passage and the options in the ST.

Table 4.11: Test takers' test-taking strategies while responding to the ST

Test-taking Strategies	high ability	average ability	low ability
T1. Did you consider the graphic organizer so as to conceptualize major ideas from across the passage?			
1.1 Yes	-	-	-
1.2 No	-	-	-
T2. Did you consider the introductory sentence of the prose summary so as to understand the overview of the passage?			
1.1 Yes	4 (80%)	4 (80%)	3 (60%)
1.2 No	1 (20%)	1 (20%)	2 (40%)
T3. Did you group the options that are relevant to each portion of the passage?			
2.1 Yes	5 (100%)	4 (80%)	1 (20%)
2.2 No	0 (0%)	1 (20%)	4 (80%)
T4. Did you divide the passage into portions, get the gist of each portion and look for specific words in the options ?			
3.1 Yes	3 (60%)	2 (40%)	1 (20%)
3.2 No	2 (40%)	3 (60%)	4 (80%)
T5. Did you select and discard options through vocabulary, sentence, paragraph overall meaning?			
4.1 Yes	5 (100%)	4 (80%)	3 (60%)
4.2 No	0 (0%)	1 (20%)	2 (40%)

Note: There were no data of T1 because it is the test-taking strategy dealing with the graphic organizer in the IT.

The data of the test-taking strategies as shown in Table 4.11 can be explained as follows:

T1. Considering the graphic organizer so as to conceptualize major ideas from across the passage

There were no data of T1 because it is the test-taking strategy dealing with the graphic organizer in the IT.

T2. Considering the introductory sentence of the prose summary so as to understand the overview of the passage

80% of the test takers with high ability and those with average ability said they considered the introductory sentence of the prose summary so as to understand the overview of the passage. And 60% of the test takers with low ability reported they used this test-taking strategy.

T3. Grouping the options that are relevant to each portion of the passage

100% of the test takers from the high ability group mentioned they grouped the options according to the portions of the passage. 80% of the test takers from the average ability group mentioned they used this test-taking strategy. 20% of the test takers with low ability reported using this test-taking strategy.

T4. Dividing the passage into portions, getting the gist of each portion and looking for specific words in the options

60% of the test takers from the high ability group reported they divided the passage into portions, read for the gist of each portion and looked for specific words in the options. 40% of the test takers from the average ability group and only 20% of the test takers from the low ability group mentioned they used this test-taking strategy.

T5. Selecting and discarding options through vocabulary, sentence, paragraph overall meaning

100% of the test takers from the high ability group reported they selected and discarded options through vocabulary, sentence, paragraph overall meaning. The test takers from the average and low ability groups reported they used this strategy at the percentages of 80 and 60 respectively.

Sample answers from the interview

Sample answers from the interview on the reading and test-taking strategies while the test takers were responding to the ST are as follows:

Reading strategies

R1. Did you skim the passage and the options?

Student HS3: "At the first time I read the passage, I skimmed it. But for this time to respond to the task in the ST, I didn't read it quickly."

Student AS2: "No, I didn't only skim the passage. I read it more carefully this time."

Student LS1: "No, I didn't. I read the whole passage."

R2. Did you read every word of the passage and of the options establishing main ideas?

Student HS3: "Yes. I read the passage and the options more carefully. The words in the options were very similar. They looked the same such as those in the choices (B) and (E). I tried to look for their differences and then I saw the phrases 'To cut down,…more disciplined' in (E), this was not the

'problem' mentioned in the passage, so I decided to select (B) as the answer for item (1). "

Student AS2: "Yes, I did. After I read the passage more carefully, I considered the options by reading all of them."

Student LS1: "Yes, I read every word of the passage and of the options."

R3. Could you distinguish the main ideas from the supporting details?

Student HS2: "Yes, I think I could. For example, I could recognize that the main idea in the first paragraph was 'Waste causes pollution'. The supporting details were 'Waste in landfills can cause water pollution' and 'Waste at incineration plants can cause air pollution'."

Student AS4: " Yes, from the second paragraph, the main idea was in the two first sentences, ' To cut down…produce. They …recycling'. The supporting details were the sentences starting with 'To reduce …', 'To reuse…', and 'To recycle…'."

Student LS4: "I think I could, but I am not sure. For example, I think the first sentence of the first paragraph, 'Pollution caused by waste is a complex problem' was a main idea. And another main idea was in the sentence, 'To cut down,…they produce'. Am I right?"

R4. Did you scan the passage and the options by reading selectively for specific words or phrases?

Student HS5: "Yes. I scanned the passage and found the words 'waste',

and ‘pollution’ in the first paragraph. Next, I looked for these words in the options and I saw them in the choices (B) and (E).”

Student AS1: “No, I didn’t scan the passage and the options by reading for specific words or phrases because the sentences in the options were long. It was difficult to read and scan only specific words.”

Student LS3 : “Yes, I tried to read selectively for the words in the passage and the words in the options such as ‘landfills’ but I found them in the choices (B), (D) and (E) and I did not know which was the answer to item 1.”

R5. Did you read the passage and the options carefully then discard the options which contain irrelevant information or minor details?

Student HS1: “Yes, I had to read the passage and the options carefully. So, I could discard the options with irrelevant information. For example, the options (B) and (E), they were very similar. Also, the options (A) and (F), they were not much different.”

Student AS5: “Yes, I read the passage and the options carefully. If not, I would not have found the differences among the options. They were almost the same. I read each option carefully and discarded the one with irrelevant information such as the choice (D). I discarded it because of the word ‘Singapore’. I didn’t see any information about

'Singapore' in the passage. "

Student LS2: "Yes, I read every word of them. However, I found it difficult to select and discard any options. They were very similar."

Test-taking strategies

T2. Did you consider the introductory sentence of the prose summary so as to understand the overview of the passage?

Student HS4: "Yes, I read the introductory sentence of the prose summary in order to understand the overview of the passage. The first sentence of it told me what the passage was about."

Student AS3: "Yes, I had a look at the introductory sentence of the prose summary; then I read all the options so I could understand which options I should select for which item."

Student LS5: "Yes, I looked at the introductory sentence of the prose summary first and it helped me understand the topic of the passage."

T3. Did you group the options that are relevant to each portion of the passage?

Students HS2: "Yes, I grouped the options that are relevant to each portion of the passage. For example, I saw the words 'People should' in the choices (C), (F) and 'People have to' in (A), so I grouped these options together. Then I chose two of them as the answers for items (2) and (3). They were the solutions mentioned in the passage."

Student AS 4: "Yes, I grouped the choices (B), (E) and (D) together because there were words like 'waste', 'pollution', and 'landfills' in these choices. And I thought one of them should be the answer for the item (1), the problem mentioned in the passage. Then, I grouped the choices (A), (C) and (F) together because they started with the word "People should/have to" which referred to the answers for the item (2), (3) for the solutions mentioned in the passage. I read all of the options again more carefully before selecting the answers."

Student LS4: "No, I didn't group the options that are relevant to each portion of the passage. I read all the options in their orders from (A) to (F)."

T4. Did you divide the passage into portions, get the gist of each portion and look for specific words in the options?

Student HS1: "Yes, I divided the passage into three parts: Problem in the first paragraph, Solution 1 in the front part of the second paragraph, and Solution 2 in the following part of the second paragraph. However, it was rather difficult. I looked at specific words such as 'recycled', 'reduce', but they didn't help. I had to read all the options carefully."

Student AS5: "No, I didn't divide the passage into portions. I read the whole passage and all the options. I didn't look for specific words. I thought I needed to read and

comprehend all the options."

Student LS2: "No, I didn't. I read the passage and then read the options. I chose the options without looking for any specific words or phrases."

T5. Did you select and discard options through vocabulary, sentence, paragraph overall meaning?

Student HS5: "Yes, I read all the options. I decided to select and discard them through the sentence overall meaning."

Student AS1: "Yes, I chose the options through vocabulary overall meaning. For example I discarded the options (A) because I saw the words 'only recycled things'. This was not mentioned in the passage."

Student LS3: "No. I couldn't translate many words in the options, so I sometimes selected the options by matching the words in the options with the words in the passage."

To conclude, the test takers' reading and test-taking strategies while responding to the ST can be summarized as shown in Table 4.12.

Table 4.12: Summarization of the test takers' reading and test-taking strategies while responding to the ST

Reading and Test-taking Strategies	high ability	average ability	low ability
R1 (skim)	20%	20%	20%
R2 (read every word)	80%	80%	80%
R3 (distinguish)	80%	80%	60%
R4 (scan)	40%	40%	40%
R5 (discard irrelevant inf.)	100%	80%	40%
T1 (consider graphic org.)	---	---	---
T2 (consider introductory sent.)	80%	80%	60%
T3 (group options)	100%	80%	20%
T4 (look for specific words)	60%	40%	20%
T5 (select and discard options)	100%	80%	60%

Table 4.12 summarizes the reading and test-taking strategies used by the three groups of 15 test takers while they were responding to the ST.

The high ability test takers used these reading and test-taking strategies at the high percentages (80%-100%): R2 (reading every word of the passage and of the options establishing main ideas); R3 (distinguishing main ideas from supporting details; R5 (reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T3 (grouping options that are relevant to each portion of the passage); and

T5 (selecting options through vocabulary, sentence, paragraph overall meaning). They used these reading strategies at the lower percentages (20%-40%): R1 (skimming) and R4 (scanning the passage and the options by reading selectively for specific words or phrases). They used T4 (dividing the passage into portions, getting the gist then looking for specific words in the options) at the percentage of 60.

The average ability test takers reported they used R2 (reading every word of the passage and of the options establishing main ideas); R3 (distinguishing main ideas from supporting details); R5 (reading the passage and the options carefully then discarding the options which contain irrelevant information or minor details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T3 (grouping options that are relevant to each portion of the passage); and T5 (selecting options through vocabulary, sentence, paragraph overall meaning) at the percentage of 80. They used R4 (scanning the passage and the options by reading selectively for specific words or phrases) and T4 (dividing the passage into portions, getting the gist then looking for specific words in the options) at the percentage of 40. They used R1 (skimming) at 20%.

The low ability test takers reported they used R2 (reading every word of the passage and of the options establishing main ideas) at 80%. They reported they used R3 (distinguishing main ideas from supporting details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); and T5 (selecting options through vocabulary, sentence, paragraph overall meaning) at 60%. They used R4 (scanning the passage and the options by reading selectively for specific words or phrases); and R5 (reading the passage and the options carefully then discarding the options which contain irrelevant information or minor

details) at 40% and R1 (skimming); T3 (grouping options that are relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist then looking for specific words in the options) at 20%.

4.2.4 Reports on the attitudes of the test takers towards the IT

The 15 test takers who were assessed by the IT presented their attitudes as shown in Table 4.13. Their attitudes were categorized into three main parts: the attitudes towards the reading passages, the advantages and the disadvantages of the IT. Most of the test takers from the high ability group (80%) felt they were familiar with the topics of the reading passages. The test takers with average ability and the test takers with low ability thought the topics were familiar at the percentages of 60 and 40 respectively. As for the difficulty of the passages, 80 % of the test takers with low ability, 60% of the test takers with average ability and 40% of the test takers with high ability felt the passages were difficult. Regarding the attitudes towards the advantages of the IT, most of the test takers with high ability and most of those with average ability (80%) felt the IT was able to assess their reading ability and facilitated their global comprehension of the passages. Also, 60% of the test takers with low ability felt the IT was able to assess their reading ability and it facilitated their global comprehension of the passages. In addition, 100% of the test takers with high ability and 80% of the test takers with average ability felt the IT was innovative and game-like. However, only 40 % of the test takers with low ability agreed with this. Regarding the attitudes towards the disadvantages of the IT, 60% of the test takers with low ability felt the task was confusing and difficult as well as there were too many numbers of items and options in each passage. However, only 20% of the test takers with high and low ability agreed with them.

Table 4.13: Test takers' attitudes towards the IT

Attitudes	high ability	average ability	low ability
1. The reading passages			
1.1 topic familiarity	4	3	2
	(80%)	(60%)	(40%)
1.2 content difficulty	2	3	4
	(40%)	(60%)	(80%)
2. The advantages			
2.1 able to assess one's reading ability	4	4	3
	(80%)	(80%)	(60%)
2.2 facilitate the global comprehension	4	4	3
	(80%)	(80%)	(60%)
2.3 **innovative and game-like**	5	4	2
	(100%)	(80%)	(40%)
3. The disadvantages			
3.1 confusing and difficult	1	1	3
	(20%)	(20%)	(60%)
3.2 **too many numbers of items and options**	1	1	3
	(20%)	(20%)	(60%)

4.2.5 Reports on the attitudes of the test takers towards the ST

The 15 test takers who were assessed by the ST presented their attitudes as illustrated in Table 4.14. Their attitudes were categorized into three main parts: the attitudes towards the reading passages, the advantages and the disadvantages of the ST. Most of the test takers from the high ability group (80%) felt they were familiar with the topics of the reading passages. The test takers with average ability and the test takers with low ability thought the topics were familiar at the percentages of 60 and 40 respectively. As for the difficulty of the passages, 80 % of the test takers with low ability, 60% of the test takers with average ability and 40% of the test takers with

high ability felt the passages were difficult. Regarding the attitudes towards the advantages of the ST, most of the test takers with high ability and most of those with average ability (80%) felt the ST was able to assess their reading ability and it facilitated their global comprehension of the passages. Also, 60% of the test takers with low ability agreed with this. Nevertheless, 40% of the test takers with high ability, 20% of those with average ability and 20 % of those with low ability felt the ST was innovative and game-like. Regarding the attitudes towards the disadvantages of the ST, 60% of the test takers with low ability felt the task was confusing and difficult, as well as, the options were similar. However, only 20% of the test takers with high and low ability agreed with them.

Table 4.14: Test takers' attitudes towards the ST

Attitudes	high ability	average ability	low ability
1. The reading passages			
1.1 topic familiarity	4	3	2
	(80%)	(60%)	(40%)
1.2 content difficulty	2	3	4
	(40%)	(60%)	(80%)
2. The advantages			
2.1 able to assess one's reading ability	4	4	3
	(80%)	(80%)	(60%)
2.2 facilitate the global comprehension	4	4	3
	(80%)	(80%)	(60%)
2.3 innovative and game-like	2	1	1
	(40%)	(20%)	(20%)
3. The disadvantages			
3.1 confusing and difficult	1	1	3
	(20%)	(20%)	(60%)
3.2 **the options were similar**	1	1	3
	(20%)	(20%)	(60%)

To conclude, the attitudes of the test takers who were assessed by either the IT or the ST were very similar. There were only a few differences at the views towards the advantages of the tasks.

The similarities can be identified by the following example, 80% of the test takers with high ability, 60% of the test takers with average ability, and 40% of the test takers with low ability reported they were familiar with the topics of the reading passages. 60%-80% of the test takers from the three ability groups reported their positive attitudes towards the advantages of the tasks. They thought the tasks could assess their reading ability and facilitated their global comprehension.

The differences were that more test takers from the high ability (100%) viewed the IT as an innovative and game-like task. But lower percentage of the test takers with high ability (40%) viewed the ST as an innovative and game-like task. In addition, the test takers with low ability who were assessed by the IT felt there were too many numbers of items and options in each passage. However, the test takers with low ability who were assessed by the ST did not bother about the number of the options but they bothered about the similarity of them.

4.3 Conclusions of the data

4.3.1Conclusions of the data from the IT and the ST administration

The data from the administration of the IT and the ST can be concluded as follows:

1. The mean scores obtained by the two reading assessment techniques, the IT and the ST, were different. The mean score of the test takers assessed by the IT was lower than that of the test takers assessed by the ST.

2. The mean scores obtained from the three groups of test takers with high, average and low language ability were significantly different. The mean score obtained from the test takers with high ability was more than that of the average ability and more than that of the low ability.

3. The ST had more of an effect on the test takers with low ability than it did on the test takers with average or high ability. The test takers with low ability had much more mean score when they were assessed by the ST than by the IT.

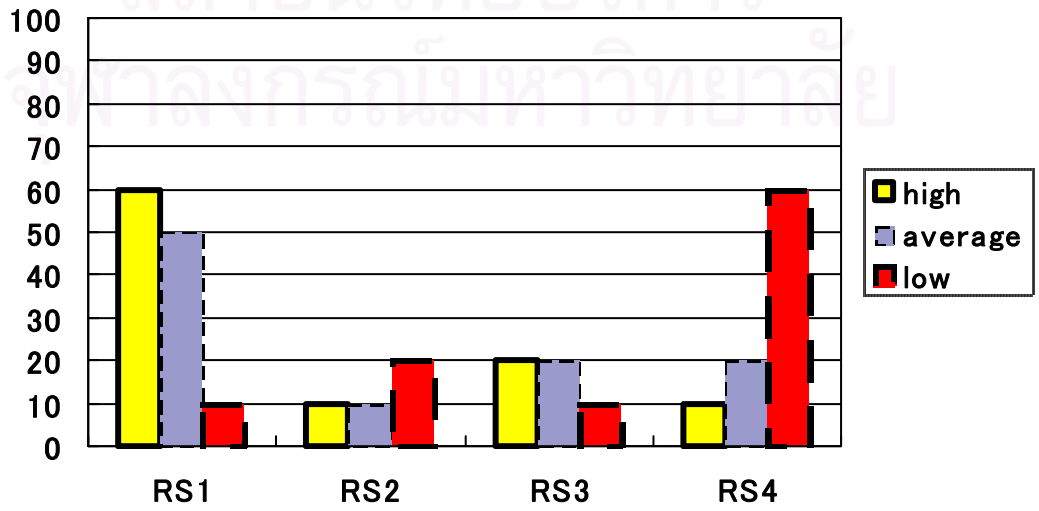
4.3.2 Conclusions of the data from the semi-structure interview

The data from the semi-structure interview can be concluded by graphs in Figure 4.2 - 4.4 and by Table 4.15 - 4.16.

4.3.2.1 Conclusions of the data of test takers' reading strategies while responding to the prompt passage

The information of test takers' reading strategies while responding to the prompt passage can be concluded and presented by the following graph (Figure 4.2):

Figure 4.2: Test takers' reading strategies while responding to the prompt passage



From Figure 4.2, it can be seen that 80% of the test takers with high ability reported they used reading strategies at global level: RS1 (skimming for main ideas) and RS3 (reading carefully establishing main ideas). However, 80% of the test takers with low ability used reading strategies at local level: RS2 (scanning for specific words) and RS4 (reading carefully identifying lexis and syntax). Almost similar to the test takers with high ability, 70 % of the test takers with average ability used reading strategies at global level: RS1 (skimming for main ideas) and RS3 (reading carefully establishing main ideas).

In sum, most of the test takers from the high ability group and average ability group paid more attention to the global comprehension while they were reading the prompt passage; however, most of the test takers from the low ability group paid too much attention to local comprehension identifying lexis in the prompt passage.

4.3.2.2 Conclusions of the data of test takers' reading and test-taking strategies while responding to the IT and to the ST

The information of test takers' reading and test-taking strategies while responding to the IT (see Table 4.9) and the ST (see Table 4.12) can be compared by Figure 4.3 and Figure 4.4.

From Figure 4.3, it can be seen that the reading and test-taking strategies measured by the IT and reported by the high ability test takers at the high percentages (80%-100%) were R1 (skimming); R3 (distinguishing the main ideas from the supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); T3 (grouping the options that are

relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist of each portion and looking for specific words in the options); T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning).

The average ability test takers reported they used these reading and test-taking strategies at lower percentages (60%-80%): R1 (skimming); R3 (distinguishing main ideas from supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); T3 (grouping options that are relevant to each portion of the passage); T4 (dividing the passage into portions, getting the gist then looking for specific words in the options); and T5 (selecting options through vocabulary, sentence, paragraph overall meaning).

The low ability test takers reported they used R1 (skimming); R3 (distinguishing main ideas from supporting details); R4 (scanning the passage and the options by reading selectively for specific words or phrases); T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage); and T4 (dividing the passage into portions, getting the gist then looking for specific words in the options) at the lowest percentages (20%-40%), but they reported they used T5 (selecting options through vocabulary, sentence, paragraph overall meaning) at 60%. They did not use T3 (grouping options that are relevant to each portion of the passage).

Briefly, most of the average ability test takers and particularly most of the low ability test takers did not use the reading and test-taking strategies measured by the IT at the same percentages as the high ability test takers did. Distinctly, the test takers with low ability still reported they used R2 (reading every word of the passage

and the options) at high percentage (80%). This confirmed they always paid attention to local comprehension identifying lexis. Also, they did not use T3 (grouping options that are relevant to each portion of the passage) at all.

Figure 4.3: Test takers' reading and test-taking strategies while responding to the IT

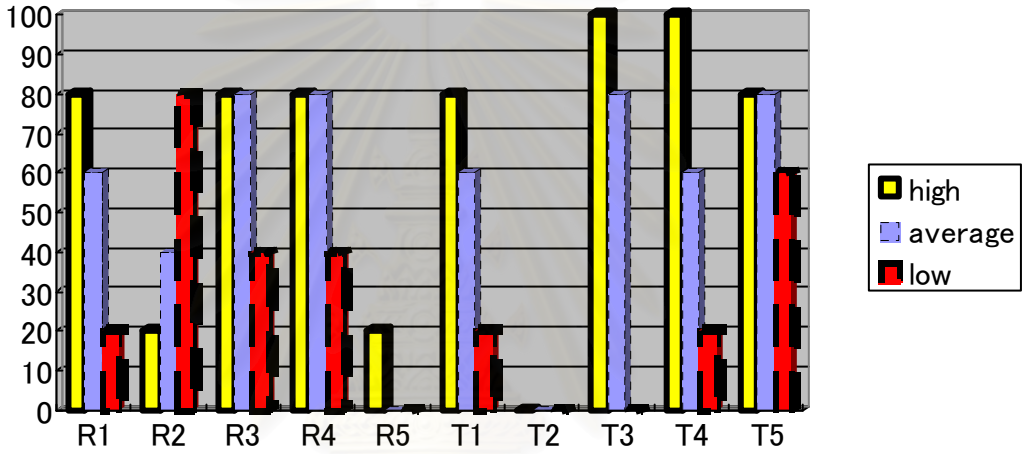
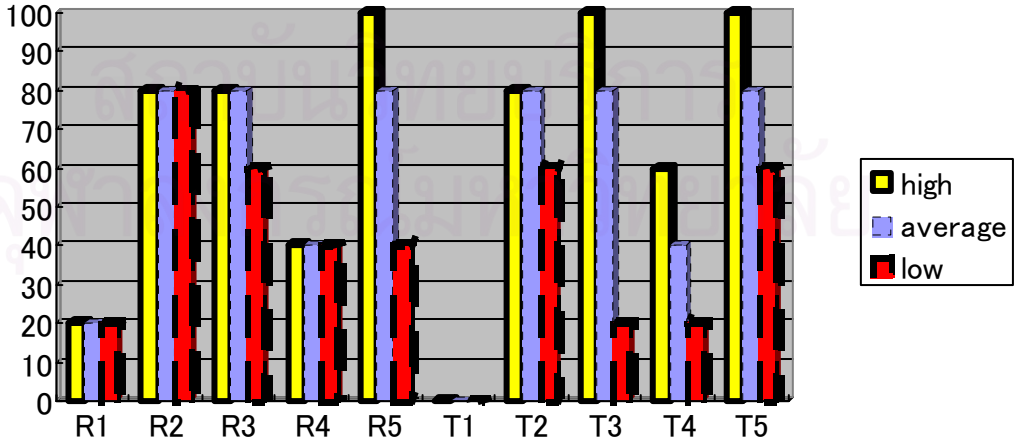


Figure 4.4: Test takers' reading and test-taking strategies while responding to the ST



From Figure 4.4, it is shown that the reading and test-taking strategies measured by the ST and reported by the high ability test takers at the high percentages (80%-100%) were R2 (reading every word of the passage and of the options); R3 (distinguishing the main ideas from the supporting details); R5 (reading the passage and the options carefully then discarding the options which are irrelevant information or minor details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T3 (grouping the options that are relevant to each portion of the passage); T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning).

The average ability test takers reported they used R2 (reading every word of the passage and of the options); R3 (distinguishing the main ideas from the supporting details); R5 (reading the passage and the options carefully then discarding the options which are irrelevant information or minor details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T3 (grouping the options that are relevant to each portion of the passage); T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning) at the percentage of 80.

Again, the test takers with low ability still reported they used R2 (reading every word of the passage and of the options) at 80%. They reported they used R3 (distinguishing the main ideas from the supporting details); T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage); T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning) at 60%; R5 (reading the passage and the options carefully then discarding the options which are irrelevant information or minor details) at 40%

and T3 (grouping the options that are relevant to each portion of the passage) at only 20%.

In short, most of the average ability test takers used the reading and test-taking strategies measured by the ST at almost the same percentages as the high ability test takers did. However, the low ability test takers used them at the lowest percentages (20%-60%). Particularly, they reported they used R2 (reading every word of the passage and of the options) at 80%. This shows their constant style of reading for local comprehension identifying lexis. As for T3 (grouping the options that are relevant to each portion of the passage), they used it at only 20%.

Comparison of the two assessment techniques

To compare the differences of reading and test-taking strategies that were used in the IT and those that were used in the ST, the higher percentages of the reading and test-taking strategies used by the high ability test takers can provide this information as shown in Table 4.15.

Table 4.15: Comparison of reading and test-taking strategies assessed by the two assessment techniques reported by the high ability test takers

Reading and Test-taking Strategies	The IT	The ST
R1 (skim)	**80%**	20%
R2 (read every word)	20%	**80%**
R3 (distinguish)	**80%**	**80%**
R4 (scan)	**80%**	40%
R5 (discard irrelevant inf.)	20%	**100%**
T1 (consider graphic org.)	**80%**	---
T2 (consider introductory sent.)	---	**80%**
T3 (group options)	**100%**	**100%**
T4 (look for specific words)	**100%**	60%
T5 (select and discard options)	80%	**100%**

From Table 4.15, R1 (skimming); R4 (scanning the passage and the options by reading selectively for specific words or phrases); and T4 (dividing the passage into portions, getting the gist of each portion and looking for specific words in the options) were used in the IT at higher percentages than they were used in the ST.

However, R2 (reading every word of the passage and of the options); R5 (reading the passage and the options carefully then discarding the options which are irrelevant information or minor details); and T5 (selecting and discarding options through vocabulary, sentence, paragraph overall meaning) were used in the ST at higher percentages than they were used in the IT.

Furthermore, R3 (distinguishing the main ideas from the supporting details) and T3 (grouping the options that are relevant to each portion of the passage) were

used at the same percentages in the IT and the ST. Also, T1 (considering the graphic organizer so as to conceptualize major ideas from across the passage) was used in the IT, but T2 (considering the introductory sentence of the prose summary so as to understand the overview of the passage) was used in the ST.

In sum, the information from the semi-structure interview of the reading and test-taking strategies measured by the IT and the ST, which was reported by the high ability test takers at higher percentages, can be presented as shown in Table 4.16 below. This information also represents the constructs of the two assessment techniques.

Table 4.16: Conclusions of the data of reading and test-taking strategies measured by the IT and the ST

	IT	**ST**
Reading Strategies	skimming (R1)	reading every word of the passage and of the options (R2)
	distinguishing the main ideas from the supporting details (R3)	
	scanning the passage and the options by reading selectively for specific words or phrases (R4)	reading the passage and the options carefully then discarding the options which are irrelevant information or minor details (R5)
Test-taking Strategies	considering the graphic organizer so as to conceptualize major ideas from across the passage (T1)	considering the introductory sentence of the prose summary so as to understand the overview of the passage (T2)
	grouping the options that are relevant to each portion of the passage (T3)	
	dividing the passage into portions, getting the gist of each portion and looking for specific words in the options (T4)	selecting and discarding options through vocabulary, sentence, paragraph overall meaning (T5)

Table 4.16 presents the conclusions of the data based on the information obtained from the high ability test takers. This data provide the information which represents the reading and test-taking skills tested by the IT and the ST.

As for the brief conclusion of the data of the attitudes, most of the test takers from the three ability groups had positive attitudes towards the IT and the ST. Particularly, the IT was viewed as an innovative and game-like task.

In conclusion this chapter presents the findings of the data from the test administration and the findings of the data from the semi-structure interview. The next chapter will present the discussions of the result.

CHAPTER V

DISCUSSIONS AND CONCLUSIONS

This chapter presents the summary of the study, discussions of the findings, conclusions, implications and recommendations for further studies.

5.1 Summary of the study

The study has investigated the effects of the two reading assessment techniques: the Information-transfer Technique (IT) and the Summary Technique (ST) and the test takers' English language ability on their reading comprehension scores. It has also investigated the test takers' reading and test-taking strategies while responding to the IT and the ST. The participants were 180 Thai 9th grade high school students. There were 60 of them in each of the three language ability groups: High, Average and Low. 30 subjects from each language ability group were randomly assigned to take each reading assessment technique either the IT or the ST. The data were obtained through two sources: the IT and ST administration and the semi-structure interview. The data from the IT and the ST administration were analyzed by Two-Way ANOVA and the interview was analyzed by content analysis and presented in numbers and percentages.

The findings of the study were as follows. First, the mean scores obtained by the two reading assessment techniques, the IT and the ST, were different. The mean score of the test takers assessed by the IT was lower than that of the test takers assessed by the ST. Second, the mean scores obtained from the three groups of test takers with high, average and low language ability were significantly different. The

mean score obtained from the test takers with high ability was more than that of the average ability and more than that of the low ability. Third, the ST had more of an effect on the test takers with low ability than it did on the test takers with average or high ability. In other words, the test takers with high ability had more mean score when they were assessed by the ST than by the IT. Similarly, the test takers with average ability had also more mean score when they were assessed by the ST than by the IT. However, the test takers with low ability had much more mean score when they were assessed by the ST than by the IT. Finally, the test takers' reading and test-taking strategies, particularly those of the test takers with high ability confirmed the constructs of the IT and the ST. The IT assessed the ability to skim (R1); distinguish the main ideas from the supporting details (R3); scan the passage and the options by reading selectively for specific words or phrases (R4); consider the graphic organizer so as to conceptualize major ideas from across the passage (T1); group the options that are relevant to each portion of the passage (T3); divide the passage into portions, get the gist of each portion and look for specific words in the options (T4). The ST assessed the ability to read carefully/ read every word of the passage and of the options (R2); distinguish the main ideas from the supporting details (R3); read the passage and the options carefully then discard the options which are irrelevant information or minor details (R5); consider the introductory sentence of the prose summary so as to understand the overview of the passage (T2); group the options that are relevant to each portion of the passage (T3); select and discard options through vocabulary, sentence, paragraph overall meaning (T5). In addition, most of the test takers from the three ability groups had positive attitudes towards the IT and the ST. Particularly, the IT was viewed as an innovative and game-like task.

5.2 Discussions

The discussions of the findings are presented according to the research questions of the study.

5.2.1 RQ1: "Do different reading assessment techniques (the IT and the ST) have a significant effect on test takers' reading comprehension scores?"

With regard to RQ1, the findings revealed that there was a significant main effect of the reading assessment techniques on reading comprehension scores at the .05 level with a small effect size (.085). This suggests that the IT and the ST had an effect on reading comprehension scores. However, there was not a lot of variance among reading comprehension scores assessed by IT and the ST due to the small effect size. From the descriptive statistics, the mean score of the test takers assessed by the IT (7.00) was lower than that of the test takers assessed by the ST (8.16).

The findings can be discussed in detail based on the evidence provided by previous reading research studies, the constructs of the IT and the ST and the influence of the task characteristics in the IT and the ST.

The result of the effect of the two assessment techniques on reading comprehension scores is consistent with the result of previous research studies such as Shohamy (1984), Lee (1987), Carrell (1991), Wolf (1993), Riley and Lee (1996), Huhta and Randell (1995), Kobayashi (2002), Sawaki (2005). All of them compared different assessment tasks as measures of SL/FL on reading comprehension and provided the evidence that different test methods had effects on reading comprehension scores. In addition, Bachman and Palmer (1996) also insisted that there were research studies in language testing demonstrating the effects of test

methods on test performance. The studies support that different test methods affect test scores.

Regarding the constructs of the IT and the ST, they are similar in some parts and different in other parts. Both intend to measure the test takers' ability to identify major ideas and important information in a text. In other words, the IT and the ST have been developed to test the test takers' reading strategies for global comprehension, the understanding of macropropositions in the macro structure including main ideas and important details (see Weir *et al*., 2000: 23). Specifically, the IT has been developed to measure the extent to which test takers can complete a 'graphic organizer' by selecting answers of main ideas and important details from 'multiple-selection' multiple choices. The ST has been developed to measure the extent to which test takers can complete a 'prose summary' by selecting answers of main ideas and important details from 'multiple-selection' multiple choices. Corresponding to the reports of the high ability test takers, the reading skills tested by the IT are skimming (R1), distinguishing main ideas from supporting details (R3) and scanning (the passage and the options) by reading selectively for specific words or phrases (R4). The reading skills tested by the ST are reading carefully/ reading every word of the passage and the options (R2), distinguishing main ideas from supporting details (R3) and rejecting irrelevant information or minor details (R5). Obviously, the same skill measured by the IT and the ST is R3 (distinguishing main ideas from supporting details), but the different skills are R1 (skimming), R2 (reading carefully/ reading every word of the passage and the options), R4 (scanning (the passage and the options) by reading selectively for specific words or phrases) and R5 (rejecting irrelevant information or minor details). To restate, both IT and ST assess the ability

to distinguish main ideas from supporting details. At the same time, the IT assesses the ability to skim, and to scan by reading selectively for specific words or phrases but the ST assesses the ability to read carefully and to reject irrelevant information or minor details. In short, the constructs of the IT and the ST were similar in some parts and different in other parts; therefore, the mean scores of the two tests were not much different.

In addition, concerning the mean scores of the test takers assessed by the IT and by the ST in detail, the former (7.00) was slightly lower than the latter (8.16). This suggests that the IT is a bit more difficult than the ST. It can be explained by the influence of the task characteristics in the IT and the ST. The IT required the test takers to correctly complete the graphic organizer of the text by choosing ten answers from twelve options including two distracters. However, the ST called on the test takers to merely select summary statements of the text by choosing only three answers from six options including three distracters. This implies that the nature of the tasks of the IT and the ST as well as the number of choices affected the mean scores. Apparently, the information-transfer task in the IT required the test takers to complete the graphic organizer by selecting choices of answers from the list of options. To complete the graphic organizer, the test takers had to have a mental framework as a whole of the main ideas and important details of the passage. However, to complete the summary task, the test takers merely needed to read the options and discard the ones with irrelevant information or minor details of the passage. The process of selecting and discarding the options in doing the ST seemed to offer the test takers a slightly simpler task in finding the correct choices than that in doing the IT. This can be supported by Cohen and Upton's (2007) explanation of a requirement to complete

the ‘Schematic Table’ in the TOEFL reading task. Like a graphic organizer, a correctly completed table should reflect an able reader’s mental framework of the text. Also, Cohen and Upton illustrated the ease a test taker had in responding to the ‘Prose Summary’ in TOEFL task. Many of the subjects in their study showed the lack of need to return to the text to look for clues about choices or to confirm their selections. They merely examined the options one by one, and then selected or discarded it.

The number of choices of the ST (six choices for three answers) was smaller than that of the IT (twelve choices for ten answers). The test takers assessed by the ST did not have to wrestle with the options so many times as those did in the IT. The smaller number of options was easier for the test takers to choose the right answers regardless of the strategy used. This finding is supported by Huhta and Randell’s study (1995). They studied the effect of 3-choice and 5-choice multiple-choice summary test formats on reading ability scores. They found out that the 3-choice format was easier for the test takers to choose or merely guess the right option.

5.2.2 RQ2: “Do test takers’ English language ability have a significant effect on reading comprehension scores?”

As for RQ2, the findings showed that there was a significant main effect of the test takers’ levels of English language ability on reading comprehension scores at the .05 level with a large effect size (.632). This suggests that the test takers’ levels of language ability had an effect on reading comprehension scores. In other words, the reading comprehension scores among the three groups of the test takers: high, average and low were significantly different. More specifically, the mean score obtained from the test takers with high ability (10.30) was more than that of average

ability (8.15), and more than that of low ability (4.28).

The findings confirm that 'language ability' is a variable which has a great effect on the test takers' reading comprehension scores (Devine 1993). It is also evidenced in the studies such as Shohamy's (1984), Johns and Mayes' (1990), Wolf 's (1993), Riley and Lee's (1996), Kobayashi's (2002). In Wolf's study (1993), for example, it was found that the advanced-level subjects received higher scores than the beginning-level ones. Likewise, Devine (1993) and Alderson (2002) advocated the influence of this 'language ability' variable on reading ability. Alderson (2002:60) stated that "For L2 readers, an important component in developing reading ability must be increasing language proficiency".

The data from the semi-structure interview showed that most of the high ability test takers' reading strategies corresponded to the reading skills aimed at by the test developer (the researcher) or their reading abilities were tabbed by the IT and the ST. On the contrary, most of the low ability test takers were not skilled readers, so they did not possess the reading skills which were effective for their reading comprehension. This was also found in Wijgh's study (1995) which traced the participants' reading strategies in a Dutch reading comprehension test. Wijgh concluded that unskilled readers needed reading strategies training.

5.2.3 RQ3: "Is there a significant interaction effect between reading assessment techniques and test takers' English language ability on their reading comprehension scores?"

The answer to RQ3 was that there was a significant interaction effect between reading assessment techniques and test takers' language ability on their reading

comprehension scores. That is, the ST had more of an effect on the test takers with low ability than it did on the test takers with average or high ability. More specifically, the difference of the mean scores between the low ability group assessed by the ST and the IT (5.40-3.17 = 2.23) was much more than that of the average ability group (8.50-7.80 = 0.70) and that of the high ability group (10.57-10.03 = 0.44). Simply stated, the test takers with low ability had much more mean score when they were assessed by the ST than those who were assessed by the IT.

This result can be discussed due to the interaction effects of the two independent variables: the ability levels of the test takers and the characteristics of the tasks in the IT and the ST.

First, the high ability test takers had almost equal mean scores regardless of the assessment techniques. Similarly, the average ability test takers did not have as distinctly different mean scores as the low ability test takers did. This can be explained by Shohamy's (1984 cited in Wolf 1993: 48) assertion that "As subjects become more proficient in the target language, they are less likely to be affected by assessment task type".

Second, the low ability test takers had higher scores on the ST than on the IT because they could have guessed some responses correctly without having understood the reading passages. Evidenced by Birch (2002), many low ability test takers seemed to lack linguistic knowledge which referred to the ability to decode phonological, orthographic, lexical, syntactic and discourse features of a text, therefore, regardless of the type of assessment techniques, they would get low scores. However; as mentioned earlier under RQ1, the demanding of the ST, due to the smaller number of options, was not as much as that of the IT. This enabled the low

ability test takers assessed by the ST to have more chances of guessing and getting correct answers. This is also supported by Nevo's study (1989) and Huhta and Randell's (1995) who found out in their studies that fewer number of options could give the test takers more chances of getting correct answer regardless of right or wrong reasons.

5.2.4 RQ4: "What are the test takers' reading and test-taking strategies when assessed by the two reading assessment techniques?"

The finding of RQ4 was that the test takers' reading and test-taking strategies, particularly those of the test takers with high ability confirmed the constructs of the IT and the ST. Furthermore, most of the test takers from the three ability groups had positive attitudes towards the IT and the ST. The IT was viewed as an innovative and game-like task.

The high ability test takers' reading and test-taking strategies while responding to the reading tasks illustrated the constructs that the IT and the ST intended to measure. Concerning the reading strategies when responding to the reading passage, most of the high ability test takers (80%) and those with average ability (70%) used reading strategies at global level. They read the passage for main ideas, not for details. The following verbal reports are sample reports of two high ability test takers. Thy revealed their reading strategies which corresponded to the strategies assessed by the IT and the ST.

Student HS8: "First, I looked at the title, 'Recycling can reduce pollution'. Then I read quickly to get the main ideas of the passage. The first paragraph was about "waste and

pollution". The second paragraph was about 'reducing, reusing, and recycling'. So after I read the whole passage rapidly, I could get the main ideas of it."

StudentHI7: "I skimmed the passage for the important ideas. I did not read every word. I skipped the unknown words. I read quickly to get the main ideas of the passage."

Most of the high ability test takers used the following reading and test-taking strategies while responding to the IT: skimming; distinguishing the main ideas from the supporting details; scanning the passage and the options by reading selectively for specific words or phrases; considering the graphic organizer so as to conceptualize major ideas from across the passage; grouping the options that are relevant to each portion of the passage; dividing the passage into portions, getting the gist of each portion and looking for specific words in the options; and selecting and discarding options through vocabulary, sentence, paragraph overall meaning. Some of these test-taking strategies are the same as those found in Cohen and Upton's study (2006: 98-99). For example, the most frequently used reading and test-taking strategy found in their study was 'selecting option through vocabulary, sentence, paragraph, or passage overall meaning'. Another high frequently used reading and test-taking strategy was 'reading a portion of the passage rapidly looking for specific information'. This can be seen from the following verbal protocols.

Student HI5: "Yes, after I quickly read the whole passage, I looked for words in the first paragraph about the problem, 'Pollution caused by waste is a complex problem'. Then I saw the option (D), 'Waste can cause pollution'. They were the

same words, so I wrote (D) in the blank (1)."

Student HI3: "Yes, I looked at the graphic organizer. There were two main parts: Problem and Solutions. The graphic organizer helped me conceptualize important ideas of the passage."

Regarding the reading and test-taking strategies while responding to the ST, most of the high ability test takers used these strategies: reading carefully; distinguishing the main ideas from the supporting details; reading the passage and the options carefully then discarding the options which are irrelevant information or minor details; considering the introductory sentence of the prose summary so as to understand the overview of the passage; grouping the options that are relevant to each portion of the passage; dividing the passage into portions; and selecting and discarding options through vocabulary, sentence, paragraph overall meaning. Also, the most frequently used reading and test-taking strategy found in Cohen and Upton's study (2006: 92-93) when test takers were responding to the Reading to Learn-prose summary was 'selecting option through vocabulary, sentence, paragraph, or passage overall meaning'. Samples of these strategies were shown in the following verbal protocols.

Student HS1: "Yes, I had to read the passage and the options carefully. So, I could discard the options with irrelevant information. For example, the options (B) and (E), they were very similar. Also, the options (A) and (F), they were not much different."

Student HS5: "Yes, I read all the options. I decided to select and discard them through the sentence overall meaning."

With regard to the attitudes towards the IT and the ST, most of the test takers from the three ability groups had positive attitudes towards the IT and the ST. Many of high ability test takers mentioned that the IT was innovative and game-like. This may be because the high ability test takers thought it was more challenging to complete the graphic organizer than to do the general conventional multiple-choice comprehension test. This result is supported by Chang *et al.*'s (2002:5) assertion that, "Graphic strategies provide readers with new approaches to reading that are different from traditional, linear text presentation. Instead, the structure of the whole text and the interrelations between concepts are illustrated with a visual method that gives the readers a clearer, more substantial understanding of what is being read." Also, it is advocated by the studies that proved graphic organizers can enhance reading comprehension such as Griffin *et al.*'s study (1995).

However, concerning the graphic organizer, the result in this study (under the discussion of RQ1) revealed that the mean score of the IT was lower than the ST. This is not supported by Chang *et al.*'s study (2002) in terms of the advantage of graphic organizers. It can be explained that the result may be affected by the level of language experience of the subjects as well as the lack of reading strategies training. The subjects in this study are 9th grade high school students. They have little experience in reading in the target language which is EFL. They have only had a few courses of reading strategies training and a few of them have had an experience in responding to the task like a graphic organizer. Normally, the reading assessment technique they are familiar with is the traditional multiple-choice basic comprehension item type.

5.3 Conclusions

This study investigated the effects of reading assessment techniques: the IT and the ST, and the test takers' English language ability on their reading comprehension scores. The findings supported the previous research studies that different test techniques affected reading comprehension scores. It was evidenced in this study that reading comprehension scores obtained by the two tests were different. Also, it was revealed that test takers with different levels of language ability had different reading performances. This confirms that language proficiency affects reading ability. Furthermore, it was found that there was an interaction effect between reading assessment techniques and the language ability on reading comprehension scores. This confirms two facts. First, the test takers with high ability are less likely to be affected by assessment techniques. Their capable reading performance can reflect their high proficiency regardless of the type of test items if the tests are reliable and valid. Second, the task characteristics influence reading scores. In the study, the number of choices of the ST was smaller than that of the IT. Thus, the test takers assessed by the ST did not have to wrestle with the options so many times as those did in the IT. That is, the process of selecting and discarding the options in doing the ST seemed to offer the test takers a slightly simpler task in finding the correct choices than that in doing the IT. Apparently, the test takers, particularly those with low ability, assessed by the ST got more chances of getting correct answers regardless of right or wrong reasons than those assessed by the IT. This might also be explained by Alderson's (2002: 248) assertion about the IT that "sometimes the candidates spend so much time understanding what is required and what should go where in the table…the IT adds an element of difficulty that is not in

the text". Therefore, it may be concluded that the ST is more user-friendly than the IT, particular for the low ability test takers.

Finally, the qualitative data of the semi-structure interview provided the evidence of the constructs of the two tests. Both tests seemed to be able to measure the reading ability for global comprehension--the ability to understand any macropropositions in the macrostructure, including main ideas and important details. The verbal protocols from the semi-structure interview reflected the constructs of the two tests. The IT measured the test takers' ability to skim (R1), to distinguish main ideas from supporting details (R3) and to scan by reading selectively for specific words or phrases (R4). The ST measured the test takers' ability to read carefully (for important ideas and important details) (R2), to distinguish main ideas from supporting details (R3) and to reject irrelevant information or minor details (R5). In addition, the qualitative data revealed that the weaker students did not possess the reading and test-taking skills tested by the IT and the ST. Apart from the mentioned reading skills, as for the information-transfer task, the weaker students did not possess these test-taking skills: considering the graphic organizer so as to conceptualize major ideas from across the passage (T1); grouping the options that are relevant to each portion of the passage (T3); dividing the passage into portions, getting the gist of each portion and looking for specific words in the options (T4). As for the summary task, they did not possess these test-taking skills: considering the introductory sentence of the prose summary so as to understand the overview of the passage (T2); grouping the options that are relevant to each portion of the passage (T3); selecting and discarding options through vocabulary, sentence, paragraph overall meaning (T5).

5.4 Implications of the study

The findings of the study can offer theoretical and practical implications. In terms of theoretical implications, the study could provide more insights on the reading theory that reading is made up of separable components. The process of reading involves the use of different skills and strategies. In designing a reading test, the skills measured by the test should be identified clearly. Thus, the reading scores can reflect the ability of the test takers. In this study, it can be concluded that the IT measured the ability to skim, to distinguish main ideas from supporting details and to scan by reading selectively for specific words or phrases whereas the ST measured the ability to read carefully (for important ideas and important details), to distinguish main ideas from supporting details and to reject irrelevant information or minor details. In addition, the study throws lights on the reading test development process starting from the selection of the texts, the design of the tasks and the viability of the experts' judgment. Finally, the study illustrates the test validation process using the combination of quantitative and qualitative analysis in interpreting the test scores.

In terms of practical contribution, the findings of different ability test takers' reading and test-taking strategies have implications for reading instruction. The weaker students should be trained in how to read for global comprehension and use the effective reading and test-taking strategies. As for the information-transfer task, they should be trained in how to skim (R1); to distinguish main ideas from supporting details (R3); to scan by reading selectively for specific words or phrases (R4); to consider the graphic organizer so as to conceptualize major ideas from across the passage (T1); to group the options that are relevant to each portion of the passage (T3); to divide the passage into portions, to get the gist of each portion and to look for

specific words in the options (T4). As for the summary task, they should be trained in how to read carefully (for important ideas and important details)(R2); to distinguish main ideas from supporting details (R3); to reject irrelevant information or minor details (R5); to consider the introductory sentence of the prose summary so as to understand the overview of the passage (T2); to group the options that are relevant to each portion of the passage (T3); to select and discard options through vocabulary, sentence, paragraph overall meaning (T5). Furthermore, reading courses embedded with reading materials should be designed using the graphic organizers in the information-transfer task and the prose summaries in the summary task to enhance the students' reading ability.

5.5 Recommendations

The study can offer some recommendations for ESL/ EFL reading teachers, test developers, researchers in the testing field. For reading teachers, in order to provide the positive washback effect in EFL reading instruction, it is recommended to design reading courses for global comprehension. Graphic organizers in the IT and prose summaries in the ST should be used to enhance students' reading performance. The exercises in reading materials should be designed to promote the reading and test-taking strategies for global comprehension. In addition, regarding reading assessment, the reading teachers should incorporate different types of reading assessment techniques in reading tests. As mentioned by Alderson (2002), good reading tests are likely to employ a number of techniques. Therefore, in the real setting of educational contexts, reading tests should have a mixture of the item types that can assess global reading comprehension, like the IT and the ST in this study, and

basic comprehension item types as well as inferencing item types.

Regarding test development process, test developers should clearly identify the constructs their reading tests aim to measure. These constructs would reflect the underlying abilities the tests designed to measure. Therefore, the reading comprehension scores can be interpreted and used as an indicator of the test takers' reading proficiency. Moreover, it is recommended for test developers to utilize both quantitative and qualitative approaches to strengthen the interpretations of the test results. This can provide evidence-based validity of the reading tests. In addition, it is recommended for test developers to consult the experts' judgment on test developing issues, i.e. topic familiarity of reading texts, skills measured by the tests, and text selection procedures.

For researchers in the testing field, in terms of the research instruments, a think-aloud protocol is recommended to explore more reading and test-taking strategies in case the subjects of the study are more advanced than those in the present study. In addition, it is recommended for further research on the different types of expected responses. Instead of the multiple-choice multiple selection format, for example, the writing summary or the gap-filling graphic organizers should be explored to illuminate more lights of test method effects on reading comprehension performance and writing performance. Furthermore, different types of test items including the IT and the ST and other assessment techniques which focus on more microlinguistic items: lexis, cohesion markers and structural elements should be incorporated in the research instruments to assess the students' reading ability. Finally, the replication of this study with different groups of subjects at the same or higher levels, i.e. upper secondary school students or university students would

provide more insights into the effects of test methods on other test takers' reading comprehension.

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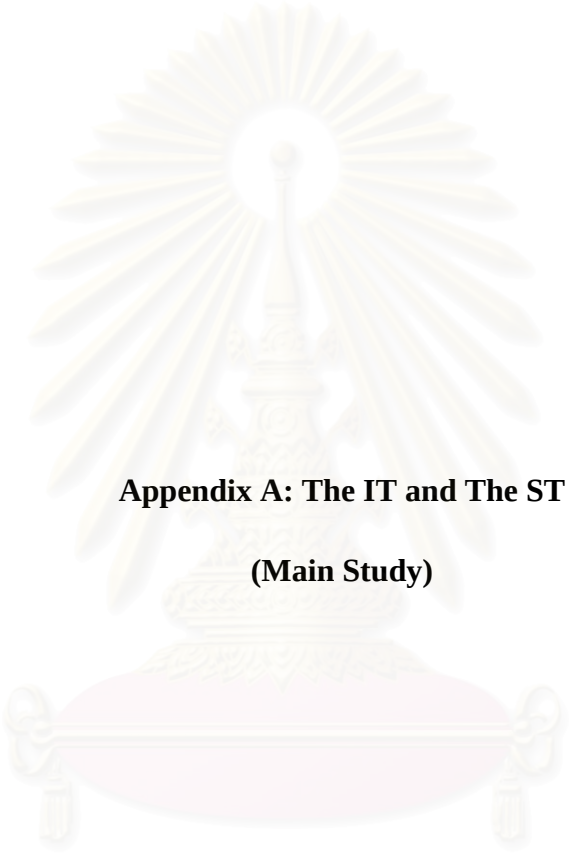
APPENDICES



Appendix A: The IT and The ST

(Main Study)

(Form A: Information-transfer)

The IT Booklet

……

Directions: **คำสั่ง :**

(1) This test is composed of four passages : Passage 1-4. Each passage contains 10 test items. The total score for each passage is 3 points. The total score for the whole paper is 12 points. You have 40 minutes to do the whole paper.
ข้อสอบชุดนี้มีบทอ่าน 4 บท ในแต่ละบทอ่าน มีข้อย่อย 10 ข้อคิดเป็นคะแนนเต็มบทอ่านละ 3 คะแนนคะแนนรวมทั้งฉบับ 12 คะแนน เวลา 40 นาที

(2) Read each passage. Then complete the graphic organizer according to the chronology of the passage by selecting the appropriate sentence which fits each gap in the graphic organizer. There are two extra sentences which you do not need to use. Sample answers (i), (ii), or (iii) have been given to you.
ให้นักเรียนอ่านบทอ่าน จากนั้น เลือกข้อความจากตัวเลือกที่ให้มา เติมแผนภาพบทอ่านให้สมบูรณ์ โดยคำตอบตัวอย่างคือคำตอบข้อ (i), (ii) หรือ(iii) และตัวเลือกที่ให้มามีเกินจำนวนคำตอบสองตัวเลือก

ตัวอย่าง:

Example: "Safety in Cyberspace"

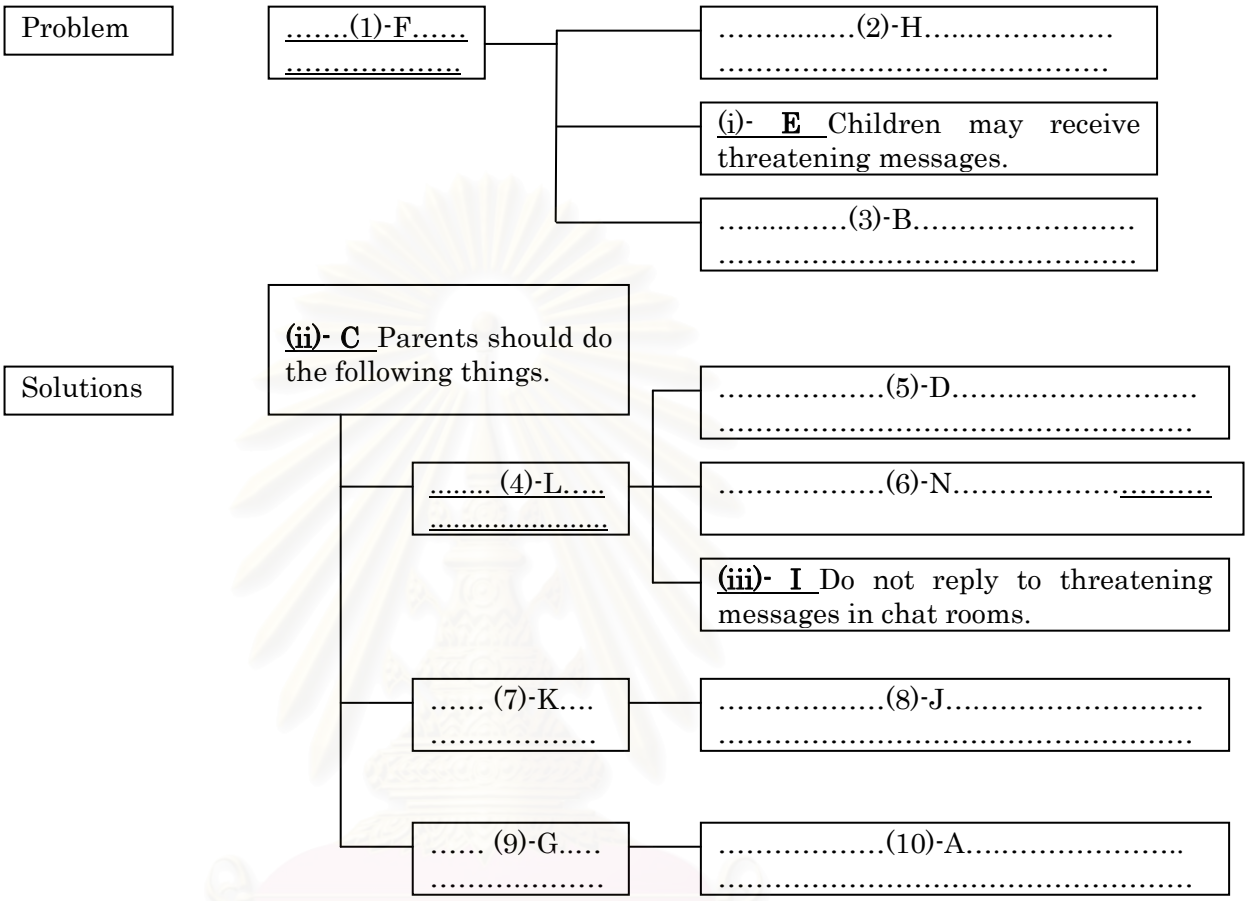
Safety in Cyberspace

A serious problem is that children using the internet can be exposed to sexually explicit pictures called pornography, and unpleasant and cruel messages called hate mail. Besides, the biggest danger is that kids will communicate unknowingly with child predators who lure or trick them into dangerous situations.

A solution to this problem is for parents to provide their children with the knowledge of how to protect themselves from harm by online safety rules. For example, do not give out personal information that would reveal their actual identity such as full name, and address. Do not meet in person someone they met on-line unless their parents agree that it's okay. Do not respond to threatening or illegal messages in chat rooms. In addition, parents should set limits on the amount of time the kids may spend online. This can be controlled by placing the computer in the family room rather than in the children room. Moreover, they should set limits on what areas on the Internet are appropriate for them to enter by using filtering software to screen out inappropriate websites.

เฉลยตัวอย่าง:

Graphic Organizer of " Safety in Cyberspace"



A. Filtering software should be set up.
B. Children may be tricked by strangers.
C. Parents should do the following things.
D. Do not pass round personal information.
E. Children may receive threatening messages.
F. Children using the internet can be in danger.
G. Parents should screen out unsuitable websites.
H. Children may see photos showing sexual activities.
I. Do not reply to threatening messages in chat rooms.
J. Kids' computer should be placed in the family room.
K. Parents should control the amount of kids' on-line time.
L. Parents should provide their children with online safety tips.
M. Parents should prevent children from using the internet all the time.
N. Avoid seeing strangers they met on-line face to face without permission.
O. Children using the internet are usually fond of playing on-line games because they are fun and exciting.

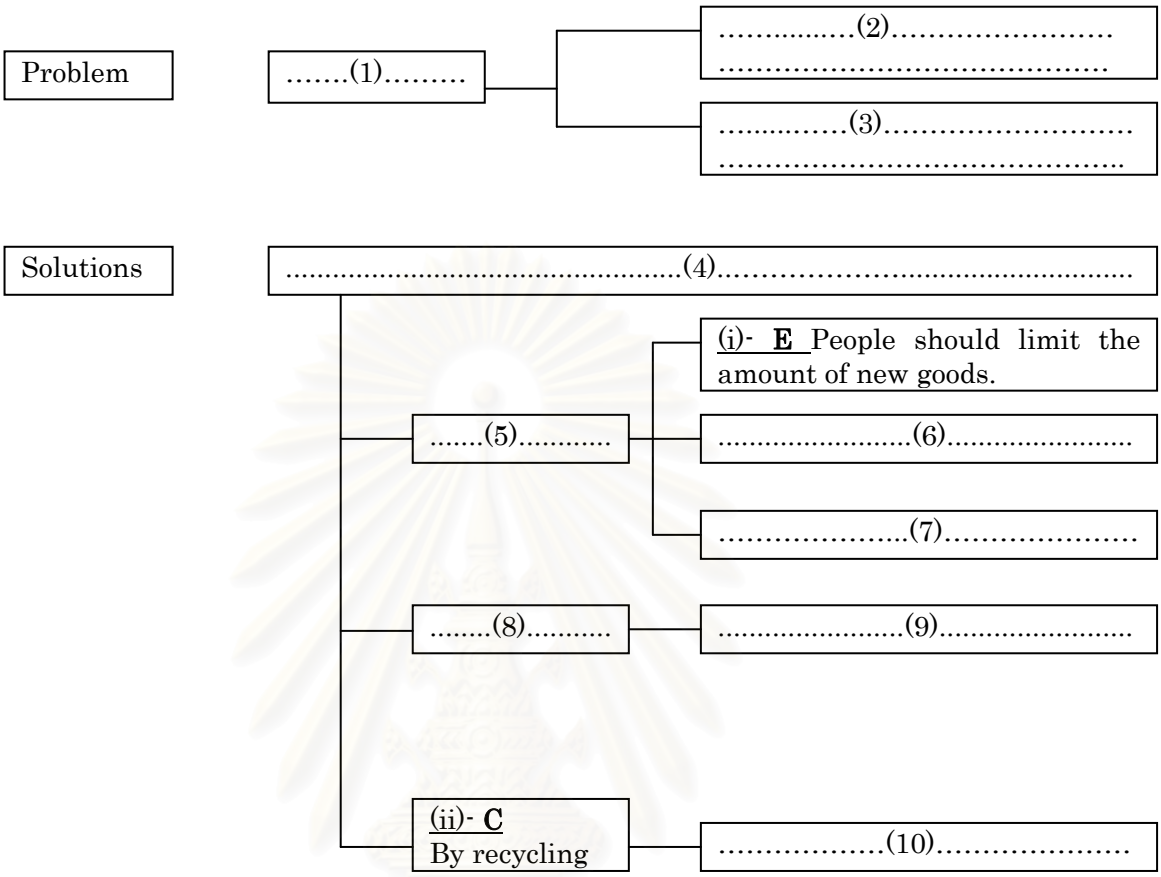
Passage 1: "Recycling Can Reduce Pollution"

Recycling Can Reduce Pollution

Pollution caused by waste is a complex problem. Waste disposal companies bury most garbage in landfills. Over time, trash slowly dissolves into chemicals. Some of these chemicals are poisonous and can pollute water. Another way to dispose of trash is to burn it. At incineration plants, trash is burned to produce energy. Although this is a beneficial use of trash, some of the gas produced in the process pollutes the air.

To cut down on pollution caused by waste, people can restrict the amount of trash they produce. They can do this by "reducing, reusing, and recycling". To reduce, people limit the amount of new goods they use. Ways to reduce include using both sides of a sheet of scratch paper and using cloth bags for shopping. Buying products made from recycled paper, plastic, or glass is another way to reduce. To reuse, people can save bags, containers, clothing, books, and toys so that they can be used more than once. Plastic bags and containers can be washed and reused. Clothing, books, and toys can be passed on to others for their use instead of being thrown away. To recycle, people can separate from their trash the materials that can be used again to make new products. Paper, cans, glass, and plastic can be recycled. By recycling, reducing, and reusing the products we consume, we can cut down on trash and pollution.

Graphic Organizer of "Recycling Can Reduce Pollution"



A. By reusing
B. By reducing
C. By recycling
D. Waste can cause pollution.
E. People should limit the amount of new goods
F. People have to be more disciplined in waste disposal.
G. People should use both sides of paper and cloth shopping bags.
H. People should purchase products made from recycled materials.
I. People should use things such as containers, clothing and toys more than once.
J. People should treat waste materials by separating recyclable things from trash.
K. People should decrease the amount of garbage they produce to reduce pollution.
L. Waste disposed in landfills produces chemicals that can cause water pollution.
M. Waste disposed at incineration plants produces gas that can cause air pollution.
N. People must restrict themselves to only recycled things such as paper, cans, glass, and plastic.

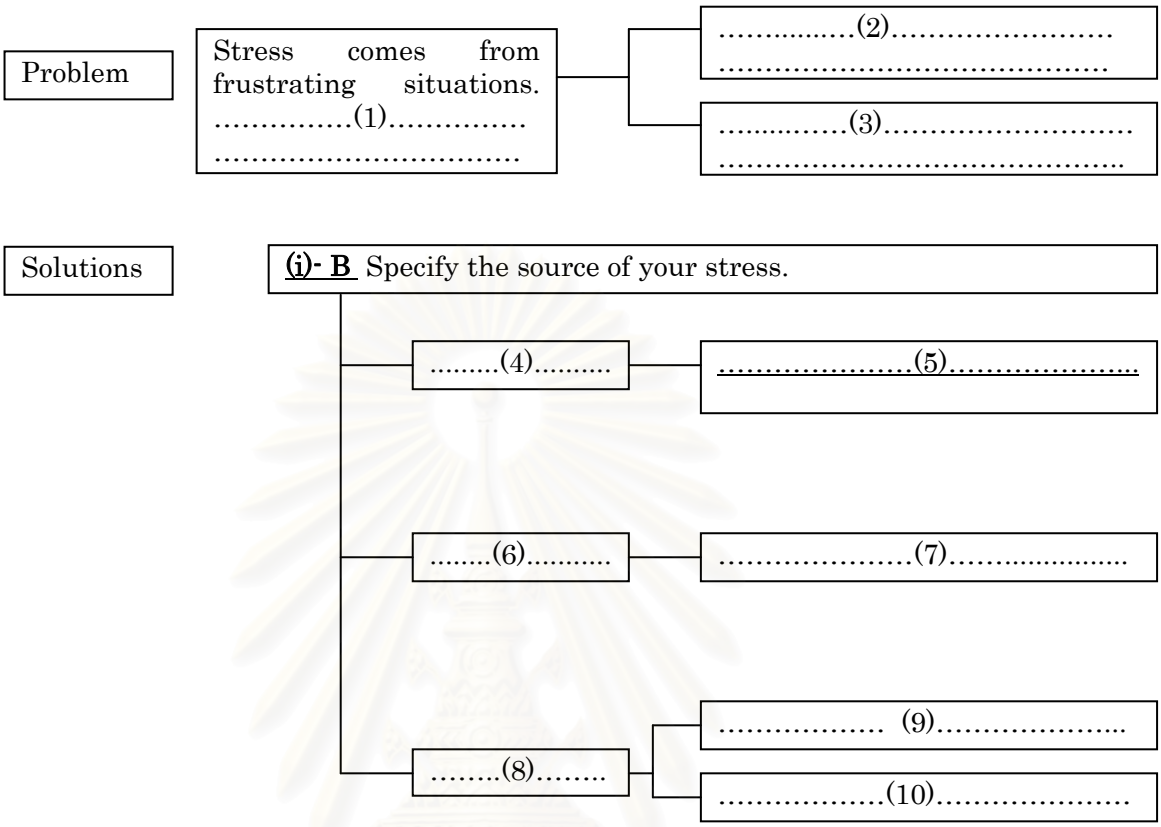
Passage 2: "Stress"

Stress

Stress can come from any situation or thought that makes you feel frustrated, angry, or anxious. What is stressful to one person is not necessarily stressful to another. Stress is a normal part of life. In small quantities, stress is good—it can motivate you and help you be more productive. However, too much stress is harmful. It can set you up for physical or psychological illnesses like heart disease, or depression. Stress is often accompanied by symptoms including headaches, loss of temper, and sleeping difficulty called insomnia.

The most effective solution is to find and address the source of your stress. Unfortunately, this is not always possible. A first step is to make a list of what you think might be making you stress out. Either 'what do you worry about most?' or 'what in particular makes you sad or depressed?'. Then, find someone you trust who will listen to you. Often, just talking to a friend or loved one is all that is needed to relieve stress. Most communities also have support groups or hotlines that can help. Also find healthy ways to cope with stress. For example, eat a well-balanced, healthy diet, get enough sleep, exercise regularly, learn relaxation techniques like yoga, or meditation, and make sure to balance fun activities with responsibilities.

Graphic Organizer of "Stress"



A. Make a list of stress causes.
B. Specify the source of your stress.
C. Deal with stress by healthy ways.
D. Talk to a close friend or others on hotlines.
E. What makes you worried, sad or depressed?
F. To relieve stress, people should not work hard.
G. Let someone listen to you to relieve your stress.
H. Stress in large quantities is dangerous for health.
I. Get good food, enough sleep, and regular exercise.
J. Stress signs are headaches, bad moods, and sleeplessness.
K. Practice relaxing activities as well as balance work and leisure.
L. Stress can cause a physical illness like heart disease, and a psychological illness like depression.
M .People who work harder are more stressful because they do not get good food, enough rest, and rarely do relaxing exercise.

Passage 3: " Protection from the Sun"

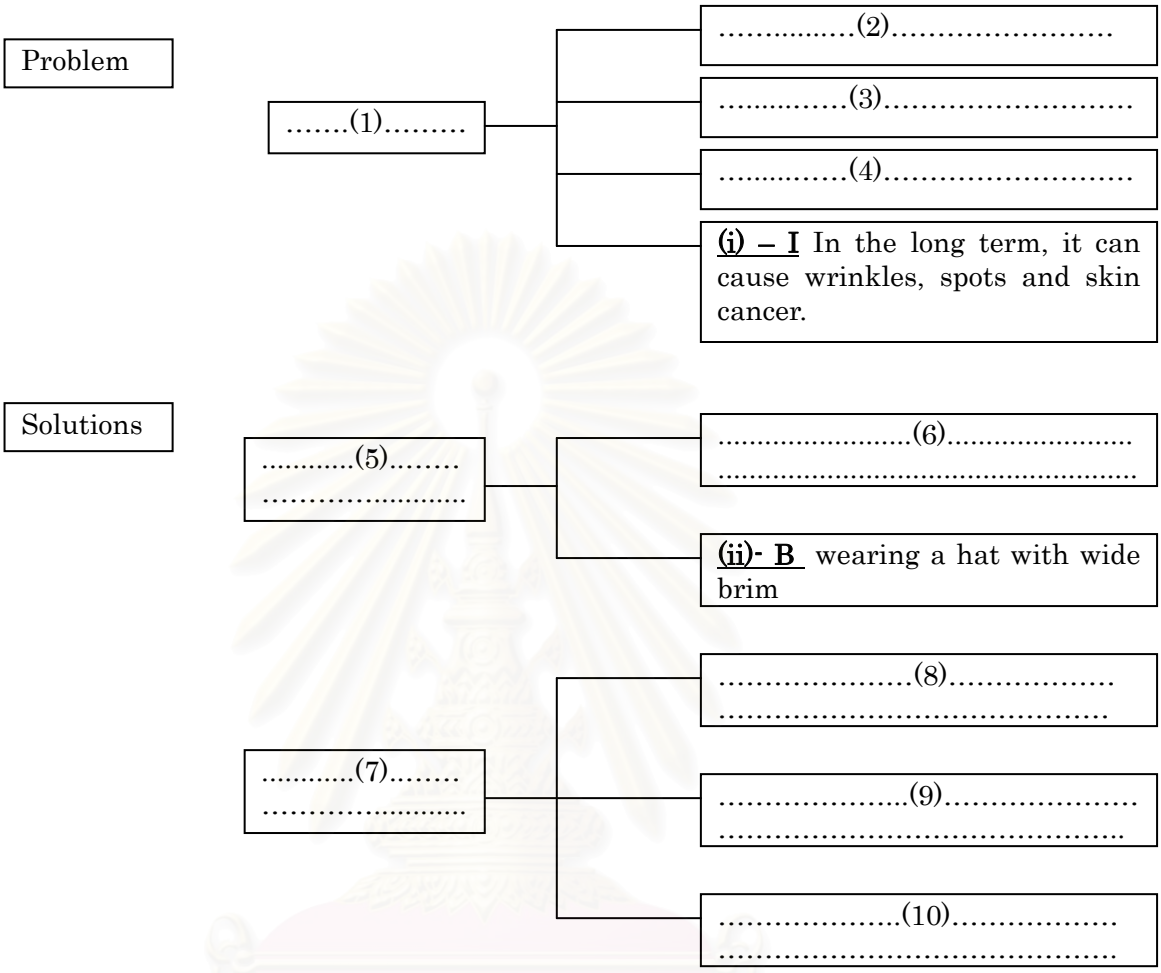
Protection from the Sun

Ultraviolet rays, or UV rays, from the sun can harm the eyes and skin. In the short term, bright sunlight can cause eyestrain as the eyes struggle to focus through the glare of bright light. Too much sun in one day also can cause painful sunburn. In the long term, the sun's harmful ultraviolet rays can damage the sensitive retina at the back of the eye or cause cataracts. Long-term damaging effects to the skin include wrinkles, spots, and skin cancer.

To protect the eyes from the sun's harmful UV rays, a person should wear sunglasses that carry a label certifying that they block UV rays. Materials in the lenses of these sunglasses absorb UV rays so that they do not enter and harm the eyes. Wearing a wide-brimmed hat will shade the eyes and protect skin on the head as well.

To protect skin on other parts of the body from UV rays, a person should wear long, loose clothing. The fabric should not be so loosely woven that it allows some sunlight to filter through. If the fabric is sheer and does not block sunlight, or if areas of skin are not covered, it is a good idea to wear sunscreen. Sunscreen alone is not enough, however, to prevent sun damage to the skin. A person must avoid spending long periods of time in the sun if at all possible.

Graphic Organizer of " Protection from the Sun"



A. Rubbing skin with sunscreen.
B. Wearing a hat with wide brim.
C. In the short term, it can cause red sore skin.
D. In the long term, it can cause retina damage.
E. Avoiding spending too many hours in the sun.
F. In the short term, it can cause a pain in your eye.
G. The sun's harmful UV rays can cause health problems.
H. Wearing special sunglasses with UV rays-blocking lens.
I. In the long term, it can cause wrinkles, spots, and skin cancer.
J. Wearing appropriate clothing with enough thick fabric to block sunlight.
K. The skin can be protected from the sun's harmful UV rays by doing proper things.
L. The eyes can be protected from the sun's harmful UV rays by doing proper things.
M. Sunscreen can help prevent sun damage to skin if a person stays out of the sun all the time.
N. The sun's harmful UV rays are rather dangerous because they can increase short-term and long-term pain in your brain, eyes, and skin.

Passage 4: "Understanding and Overcoming Motion Sickness"

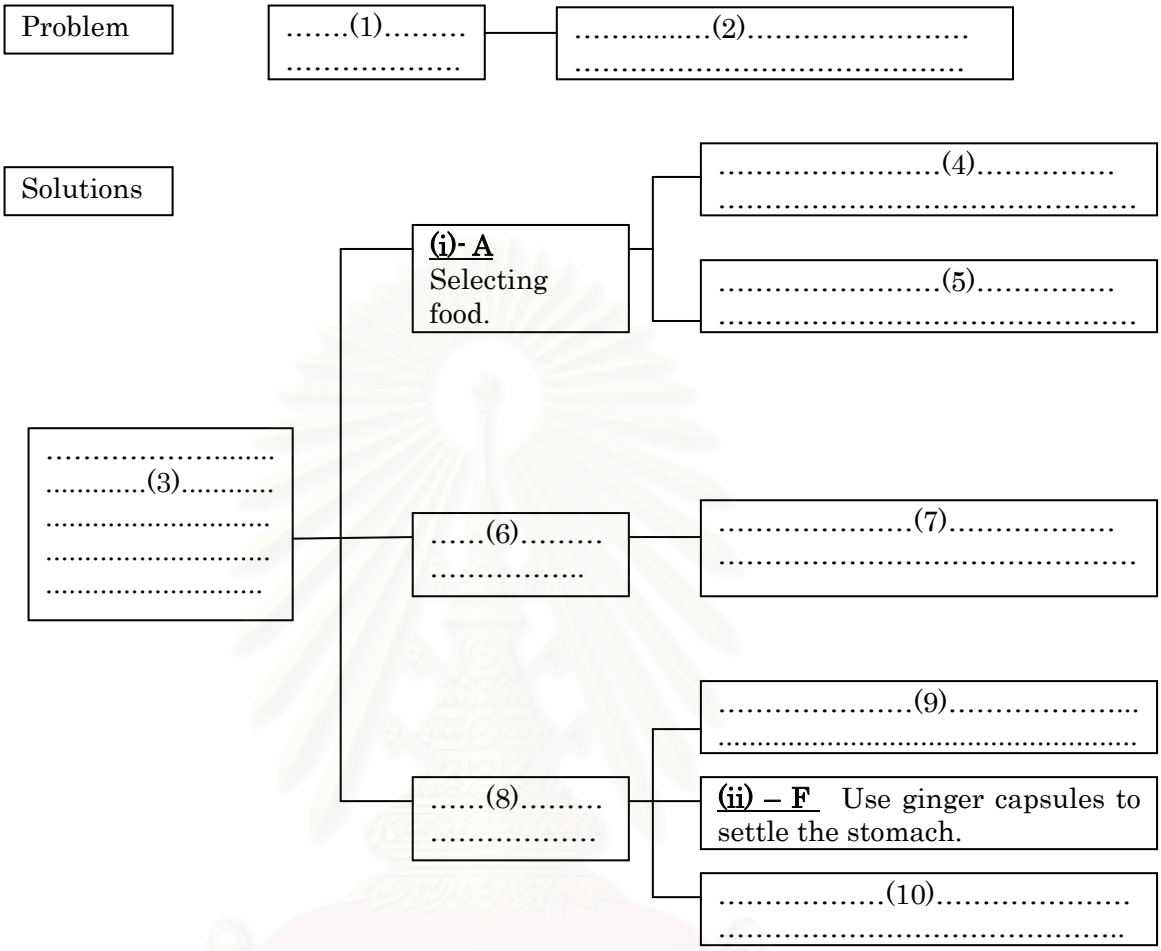
Understanding and Overcoming Motion Sickness

Motion sickness comes in many forms. Some people get motion sickness on cruises, airplanes, motorcycles, amusement park rides, and even on camels. Motion sickness occurs when the brain is trying to make sense of a situation and there are too many conflicting messages. While the eyes are sending one message, the ears are trying to send a message about balance. The skin and bone joints, sensitive to air pressure, send another message.

People who have violent motion sickness should employ some well-known strategies to avoid getting sick. The most useful strategy concerns food: eat a light meal before traveling and bring along a packet of crackers to snack on regularly. Avoid alcoholic and carbonated beverages, high-fat foods, and spices. Care in choosing the location of your seat is another important strategy. In a car, sit in the front seat. On a plane, sit near the wings. On a boat, sit at the front and keep your eyes fixed on the horizon.

People who still get sick after trying these strategies can try medical help. Some rely on over-the-counter medications, although some of them can make you sleepy. Others use simple ginger capsules to settle their stomach. A large number of travelers use pressure bands on their wrists.

Graphic Organizer of " Understanding and Overcoming Motion Sickness"



A. Selecting food.
B. Choosing seats.
C. Have light meals.
D. Getting medical help.
E. Wear pressure wristbands.
F. Use ginger capsules to settle the stomach.
G. Avoid alcoholic and carbonated drinks during traveling.
H. Take medicine that can be bought without prescription.
I. People should not eat any thing at all while they are sitting in vehicles.
J. Some people have motion sickness while they are in traveling vehicles.
K. To help people overcome motion sickness, there are some useful strategies.
L. Sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon.
M. This happens when there are too many conflicting messages sent to the brain from the eyes, the ears, the skin, and the bone joints.
N. Some people are sick on cruises, airplanes, motorcycles, amusement park rides, and camels because they feel afraid while they are traveling in the vehicles.

(Form B: Summary: ย่อความ)

The ST Booklet

……

Directions: **คำสั่ง** :

(1) This test is composed of four passages : Passage 1-4. Each passage contains 3 test items. The total score for each passage is 3 points. The total score for the whole paper is 12 points. You have 40 minutes to do the whole paper.

ข้อสอบชุดนี้มีบทอ่าน 4 บทอ่าน ในแต่ละบทอ่านมีข้อย่อย 3 ข้อ คิดเป็นคะแนนเต็มบทอ่านละ 3 คะแนน คะแนนรวมทั้งฉบับ 12 คะแนน เวลา 40 นาที

(2) Read each passage. Then complete the summary according to the chronology of the passage by selecting the THREE answer choices that express main ideas and important supporting details. Do not choose minor details or ideas that are not presented in the passage.

ให้นักเรียนอ่านบทอ่าน จากนั้นย่อความบทอ่าน โดยเลือกข้อความที่เป็นใจความหลักและใจความสำคัญ(main ideas and important supporting details) จากตัวเลือกที่ให้มาจำนวน 3 ตัวเลือก นักเรียนควรเลือกตัวเลือกที่เป็นใจความสำคัญตามลำดับเนื้อเรื่องในบทอ่าน นักเรียนไม่ควรเลือกตัวเลือกที่เป็นใจความย่อย (minor details)หรือข้อความที่ไม่ได้ระบุในบทอ่าน

ตัวอย่าง

Example: "Safety in Cyberspace"

Safety in Cyberspace

A serious problem is that children using the internet can be exposed to sexually explicit pictures called pornography, and unpleasant and cruel messages called hate mail. Besides, the biggest danger is that kids will communicate unknowingly with child predators who lure or trick them into dangerous situations.

A solution to this problem is for parents to provide their children with the knowledge of how to protect themselves from harm by online safety rules. For example, do not give out personal information that would reveal their actual identity such as full name, and address. Do not meet in person someone they met on-line unless their parents agree that it's okay. Do not respond to threatening or illegal messages in chat rooms. In addition, parents should set limits on the amount of time the kids may spend online. This can be controlled by placing the computer in the family room rather than in the children room. Moreover, they should set limits on what areas on the Internet are appropriate for them to enter by using filtering software to screen out inappropriate websites.

เฉลยตัวอย่าง

Summary of “Safety in Cyberspace”

The passage discusses a problem and solutions about children’s use of the internet.
The problem is that.....(1)-C..... .
The solutions are that .....(2)-F..... .
In addition,..... (3)-D..... .

A. children using the internet are usually fond of playing on-line games because they
are fun and exciting
B. parents should advise children not to use the internet because there are cruel messages, inappropriate websites, and unpleasant photos on line
C. children using the internet can be in danger. They may see photos showing sexual activities, receive threatening messages, and be tricked by strangers
D. parents should control the amount of kids’ on-line time by placing their computer in the family room and screen out unsuitable websites by setting up filtering software
E. parents should prevent children from using the internet all the time and tell them not to give their actual identity to strangers, or not to meet people they chatted with on-line
F. parents should provide their children with online safety tips: do not pass round personal information, avoid seeing strangers they met on-line face to face without permission, and do not reply to threatening messages in chat rooms

Passage 1: "Recycling can Reduce Pollution"

Recycling Can Reduce Pollution

Pollution caused by waste is a complex problem. Waste disposal companies bury most garbage in landfills. Over time, trash slowly dissolves into chemicals. Some of these chemicals are poisonous and can pollute water. Another way to dispose of trash is to burn it. At incineration plants, trash is burned to produce energy. Although this is a beneficial use of trash, some of the gas produced in the process pollutes the air.

To cut down on pollution caused by waste, people can restrict the amount of trash they produce. They can do this by "reducing, reusing, and recycling". To reduce, people limit the amount of new goods they use. Ways to reduce include using both sides of a sheet of scratch paper and using cloth bags for shopping. Buying products made from recycled paper, plastic, or glass is another way to reduce. To reuse, people can save bags, containers, clothing, books, and toys so that they can be used more than once. Plastic bags and containers can be washed and reused. Clothing, books, and toys can be passed on to others for their use instead of being thrown away. To recycle, people can separate from their trash the materials that can be used again to make new products. Paper, cans, glass, and plastic can be recycled. By recycling, reducing, and reusing the products we consume, we can cut down on trash and pollution.

Summary of "Recycling Can Reduce Pollution"

The passage discusses a problem and solutions about the ways to reduce pollution.
The problem is that.....(1)..... .
The solutions are that .....(2)..... .
In addition,.....(3)..... .

A. people have to reduce the pollution caused by waste by restricting the amount of trash they produce. They must also restrict themselves to only recycled things such as paper, cans, glass, and plastic
B. waste can cause pollution. Waste disposed in landfills produces chemicals that can cause water pollution, while, waste disposed at incineration plants produces gas that can cause air pollution
C. people should reuse things—use things such as containers, clothing and toys more than once, and they should recycle things—treat waste materials by separating recyclable things from trash
D. trash can be useful when it is buried in landfills in some countries such as Singapore, moreover, it can be burned at incineration plants to produce energy. However, these disposal procedures are not popular in other countries
E. waste can cause water pollution when trash disposed in landfills overtime turns into chemicals, and it can cause air pollution when trash burned at incineration plants turns into gas. To cut down on the pollution, people have to be more disciplined
F. people should decrease the amount of garbage they produce to reduce pollution. They should limit the amount of new goods, use both sides of paper, and cloth shopping bags, and purchase products made from recycled materials

Passage 2: "Stress"

Stress

Stress can come from any situation or thought that makes you feel frustrated, angry, or anxious. What is stressful to one person is not necessarily stressful to another. Stress is a normal part of life. In small quantities, stress is good—it can motivate you and help you be more productive. However, too much stress is harmful. It can set you up for physical or psychological illnesses like heart disease, or depression. Stress is often accompanied by symptoms including headaches, loss of temper, and sleeping difficulty called insomnia.

The most effective solution is to find and address the source of your stress. Unfortunately, this is not always possible. A first step is to make a list of what you think might be making you stress out. Either 'what do you worry about most?' or 'what in particular makes you sad or depressed?'. Then, find someone you trust who will listen to you. Often, just talking to a friend or loved one is all that is needed to relieve stress. Most communities also have support groups or hotlines that can help. Also find healthy ways to cope with stress. For example, eat a well-balanced, healthy diet, get enough sleep, exercise regularly, learn relaxation techniques like yoga, or meditation, and make sure to balance fun activities with responsibilities.

Summary of "Stress"

The passage discusses stress comes from frustrating situations. .....(1)..... .
The solutions of how to relieve it are that .....(2).....
In addition, ...(3).....

A. you should not pay attention to the source of your stress because it may harm your health and cause physical and psychological illnesses
B. you should deal with stress by healthy ways—get good food, enough sleep, regular exercise, and practice relaxing activities as well as balance your work and leisure
C. you should ask yourself by making a list of your depression, and happiness. Then, try to solve all the problems. After that, see the doctor for both physical and psychological illnesses
D. you should specify the source of the stress. First, make a list of stress causes that make you worried, sad, or depressed. Then, let someone listen to you such as your close friend, or others on hotlines
E. stress in large quantities is dangerous for health. It can cause a physical illness like heart disease, and a psychological illness like depression. Stress signs are headaches, bad moods, and sleeplessness
F. the amount of stress is not the same for every one. People who work harder are more stressful because they do not get good food, enough rest, and rarely do relaxation exercises. To relieve stress, people should not work too hard

Passage 3: " Protection from the Sun"

Protection from the Sun

Ultraviolet rays, or UV rays, from the sun can harm the eyes and skin. In the short term, bright sunlight can cause eyestrain as the eyes struggle to focus through the glare of bright light. Too much sun in one day can also cause painful sunburn. In the long term, the sun's harmful ultraviolet rays can damage the sensitive retina at the back of the eye or cause cataracts. Long-term damaging effects to the skin include wrinkles, spots, and skin cancer.

To protect the eyes from the sun's harmful UV rays, a person should wear sunglasses that carry a label certifying that they block UV rays. Materials in the lenses of these sunglasses absorb UV rays so that they do not enter and harm the eyes. Wearing a wide-brimmed hat will shade the eyes and protect skin on the head as well.

To protect skin on other parts of the body from UV rays, a person should wear long, loose clothing. The fabric should not be so loosely woven that it allows some sunlight to filter through. If the fabric is sheer and does not block sunlight, or if areas of skin are not covered, it is a good idea to wear sunscreen. Sunscreen alone is not enough, however, to prevent sun damage to the skin. A person must avoid spending long periods of time in the sun if at all possible.

Summary of " Protection from the Sun"

The passage discusses the harm of the sun's UV rays.
.....(1)..... .
.....(2)..... .
Also,.....(3)..... .

A. The eyes can be protected from the UV rays when we wear special sunglasses with UV rays-blocking lens and a wide-brimmed hat
B. The sun's harmful UV rays are rather dangerous because they can increase short-term and long-term pain in your brain, eyes, and skin
C. The skin can be protected when we wear appropriate clothing with enough thick fabric, rub skin with sunscreen, and avoid spending too many hours in the sun
D. Special sunglasses, appropriate clothes with right fabric, and sunscreen can help prevent sun damage to the skin if a person stays out of the sun all the time
E. The sun's harmful UV rays can cause health problems. In the short term, it can cause a pain in your eye, and red sore skin. In the long term, it can cause retina damage, as well as wrinkles, spots, and skin cancer
F. Some people can stay in the sun for a longer period of time if they rub enough cream onto their skin to stop it from being burned by the sun. However, if they spend too much time in the sun, the sunscreen cannot help prevent sun damage to their skin

Passage 4: "Understanding and Overcoming Motion Sickness"

Understanding and Overcoming Motion Sickness

Motion sickness comes in many forms. Some people get motion sickness on cruises, airplanes, motorcycles, amusement park rides, and even on camels. Motion sickness occurs when the brain is trying to make sense of a situation and there are too many conflicting messages. While the eyes are sending one message, the ears are trying to send a message about balance. The skin and bone joints, sensitive to air pressure, send another message.

People who have violent motion sickness should employ some well-known strategies to avoid getting sick. The most useful strategy concerns food: eat a light meal before traveling and bring along a packet of crackers to snack on regularly. Avoid alcoholic and carbonated beverages, high-fat foods, and spices. Care in choosing the location of your seat is another important strategy. In a car, sit in the front seat. On a plane, sit near the wings. On a boat, sit at the front and keep your eyes fixed on the horizon.

People who still get sick after trying these strategies can try medical help. Some rely on over-the-counter medications, although some of them can make you sleepy. Others use simple ginger capsules to settle their stomach. A large number of travelers use pressure bands on their wrists.

Summary of "Understanding and Overcoming Motion Sickness"

The passage discusses forms of motion sickness and how to overcome it.
The problem is that .....(1)..... .
To help people overcome motion sickness,.....(2)..... .
In addition, ...(3)..... .

A. people should not eat any thing at all while they are sitting in vehicles. Moreover, they should sit at the front of the vehicles as well as take some pills

B. people should get medical help. They should take medicine that can be bought without prescription, use ginger capsules to settle the stomach, or use pressure wristbands

C. some people have motion sickness while they are in traveling vehicles. This happens when there are too many conflicting messages sent to the brain from the eyes, the ears, the skin, and the bone joints

D. people who have violent motion sickness try not to travel because they do not know what motion sickness is. Also they do not know strategies concerning choosing food, seats, and medicine

E. some people are sick on cruises, airplanes, motorcycles, amusement park rides, and camels because they feel afraid while they are traveling in the vehicles. They should not travel unless they know strategies involving food, seats, and medicine

F. there are strategies concerning food, seats, and medicine. People should eat light meals and avoid alcoholic and carbonated drinks during traveling. Also they should sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon

Appendix B: The IT and The ST

(Pilot Study)

(Form A: Information-transfer: ถ่ายโยงข้อมูล)

The IT Booklet

…….

Directions: **คำสั่ง :**

(1) This test is composed of five passages : Passage 1-5. Each passage contains 10 test items. The total score for the whole paper is 15 points.

ข้อสอบชุดนี้มีบทอ่าน 5 บทอ่าน ในแต่ละบทอ่าน มีข้อย่อย 10 ข้อ คะแนนรวมทั้งฉบับ 15 คะแนน

(2) Read each passage. Then complete the graphic organizer according to the chronology of the passage by selecting the appropriate sentence which fits each gap in the graphic organizer. There are two extra sentences which you do not need to use. Sample answers (i), (ii), or (iii) have been given to you. You will get 1 point for each correct answer. The total score for each passage is 3 points.

ให้นักเรียนอ่านบทอ่าน จากนั้นเลือกข้อความจากตัวเลือกที่ให้มา เติมแผนภาพบทอ่าน (graphic organizer) ให้สมบูรณ์ตามลำดับเนื้อเรื่องในบทอ่าน โดยคำตอบตัวอย่างคือคำตอบข้อ (i), (ii) หรือ(iii) และตัวเลือกที่ให้มามีเกินจำนวนคำตอบสองตัวเลือก คำตอบที่ถูกมีค่า 1 คะแนน คะแนนเต็มบทอ่านละ 3 คะแนน

ตัวอย่าง:

Example: “Household Hazardous Wastes”

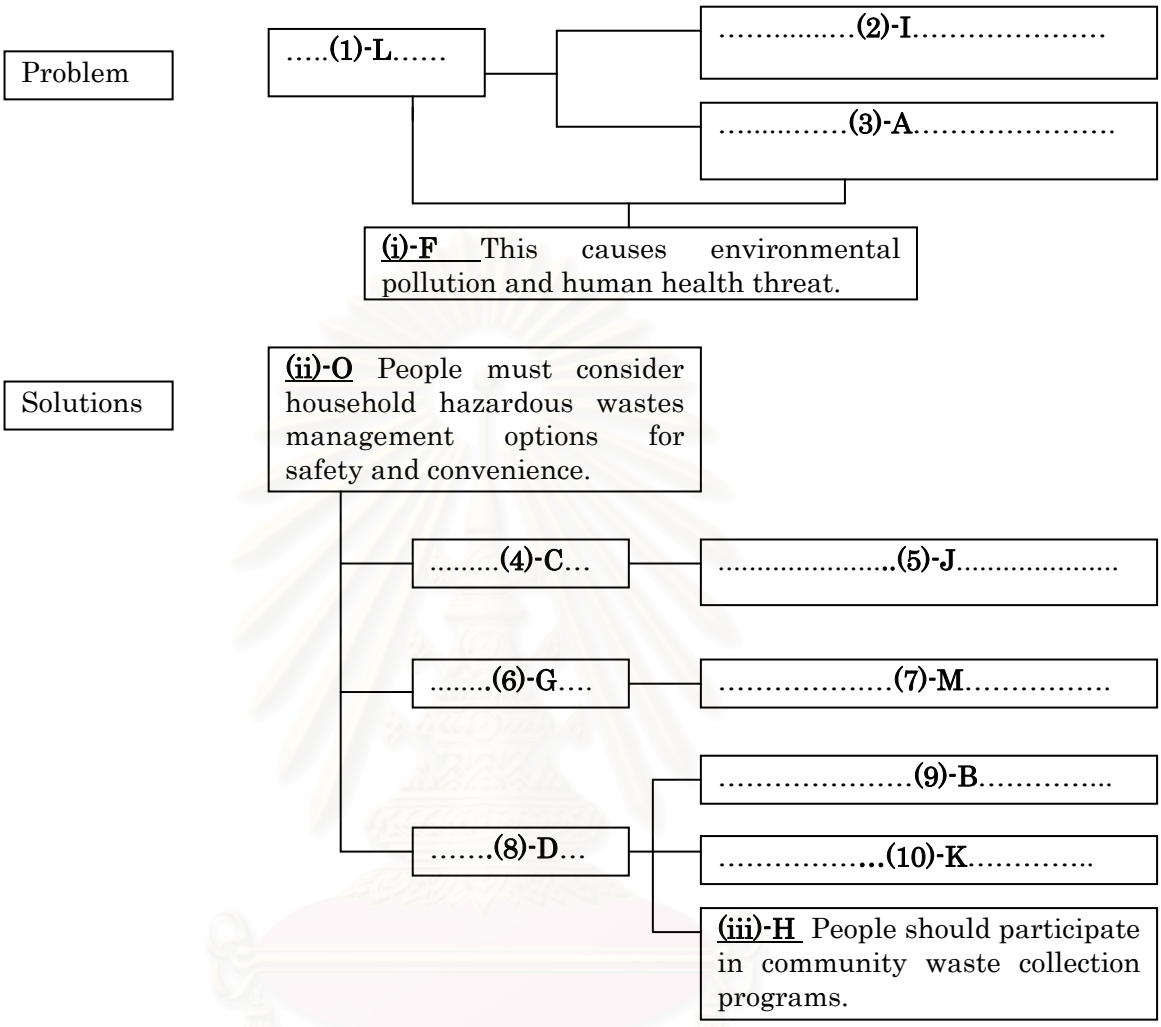
Household Hazardous Wastes

A serious problem is that people dispose household hazardous wastes improperly. These wastes refer to leftover household products that contain toxic, ignitable, or reactive ingredients such as paints, cleaners, oils, batteries, and pesticides. Improper disposal can include pouring them down the drain, on the ground, into the sewers, or in some cases putting them out with the trash. This can pollute the environment and pose a threat to human health.

A solution to this problem is that people have to consider the reduction, reuse, recycling, and disposal options for conveniently and safely managing household hazardous wastes. For reduction, people should, for example, reduce their purchase of products that contain hazardous ingredients by using alternative products such as mild leaves soap instead of plant spray. They should visit their community exchange areas which facilitate leftover materials to be reused and recycled. For proper disposal, they should remember to follow any instructions for use and disposal provided on product labels in order to reduce the risk of products exploding, igniting, leaking, mixing with other chemicals. They should drop off certain products at local collection sites and participate the household hazardous waste collection programs rather than discard them in the trash.

เฉลยตัวอย่าง:

Graphic Organizer of "Household Hazardous Wastes"



A. They dispose of them with the trash.
B. People should follow instructions on product labels before disposal.
C. People should reduce buying household hazardous products.
D. People should dispose household hazardous wastes properly.
E. Household hazardous products should not be bought by children.
F. This causes environmental pollution and threats to human health.
G. People should reuse and recycle household hazardous products.
H. People should participate in community waste collection programs.
I. They pour them down the drain, on the ground, or into the sewers.
J. People should use alternative products without hazardous ingredients.
K. People should discard household hazardous wastes at local collection sites.
L. People throw away leftover household products containing toxicity improperly.
M. People should take advantages of the facilities at their community exchange areas.
N. Household hazardous wastes are dangerous to human health, but not to environment.
O. People must consider household hazardous wastes management options for safety and convenience.

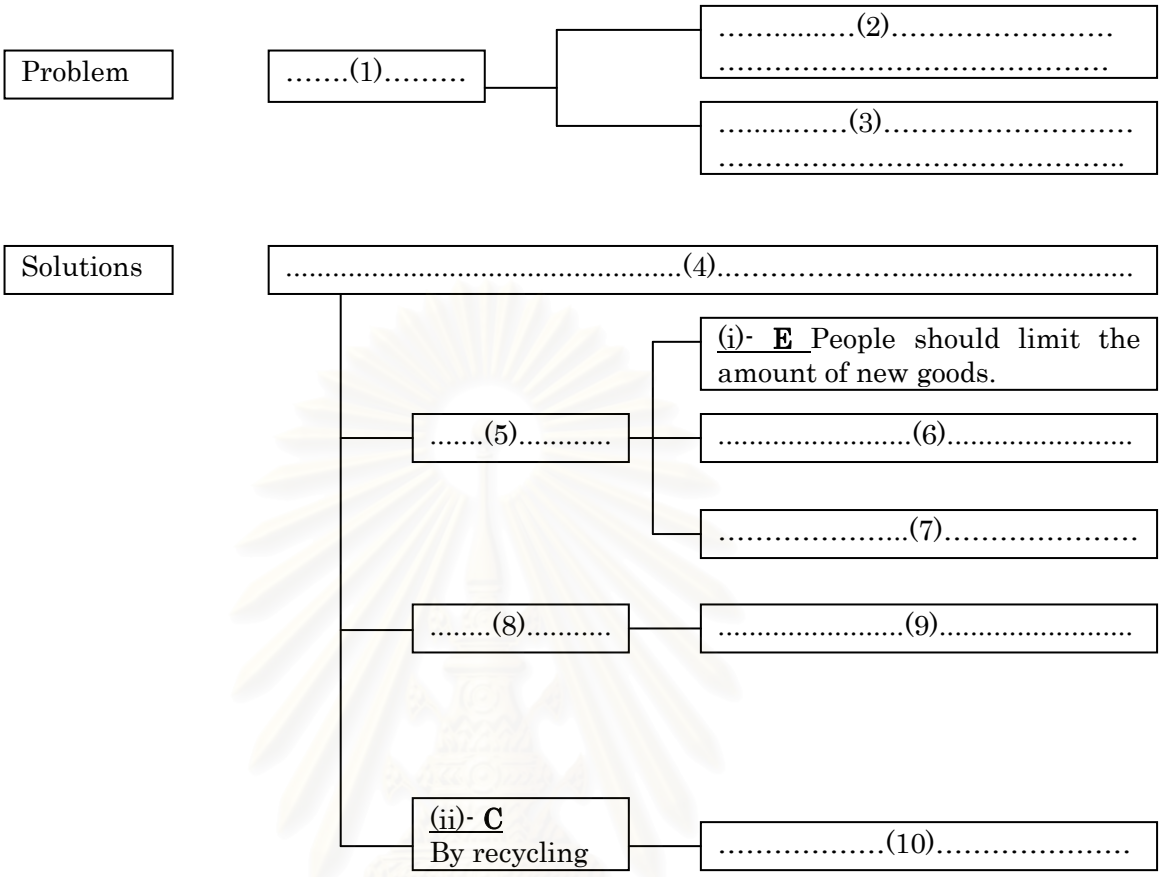
Passage 1: "Recycling Can Reduce Pollution"

Recycling Can Reduce Pollution

Pollution caused by waste is a complex problem. Waste disposal companies bury most garbage in landfills. Over time, trash slowly dissolves into chemicals. Some of these chemicals are poisonous and can pollute water. Another way to dispose of trash is to burn it. At incineration plants, trash is burned to produce energy. Although this is a beneficial use of trash, some of the gas produced in the process pollutes the air.

To cut down on pollution caused by waste, people can restrict the amount of trash they produce. They can do this by "reducing, reusing, and recycling". To reduce, people limit the amount of new goods they use. Ways to reduce include using both sides of a sheet of scratch paper and using cloth bags for shopping. Buying products made from recycled paper, plastic, or glass is another way to reduce. To reuse, people can save bags, containers, clothing, books, and toys so that they can be used more than once. Plastic bags and containers can be washed and reused. Clothing, books, and toys can be passed on to others for their use instead of being thrown away. To recycle, people can separate from their trash the materials that can be used again to make new products. Paper, cans, glass, and plastic can be recycled. By recycling, reducing, and reusing the products we consume, we can cut down on trash and pollution.

Graphic Organizer of "Recycling Can Reduce Pollution"



A. By reusing
B. By reducing
C. By recycling
D. Waste can cause pollution.
E. People should limit the amount of new goods
F. People have to be more disciplined in waste disposal.
G. People should use both sides of paper and cloth shopping bags.
H. People should purchase products made from recycled materials.
I. People should use things such as containers, clothing and toys more than once.
J. People should treat waste materials by separating recyclable things from trash.
K. People should decrease the amount of garbage they produce to reduce pollution.
L. Waste disposed in landfills produces chemicals that can cause water pollution.
M. Waste disposed at incineration plants produces gas that can cause air pollution.
N. People must restrict themselves to only recycled things such as paper, cans, glass, and plastic.

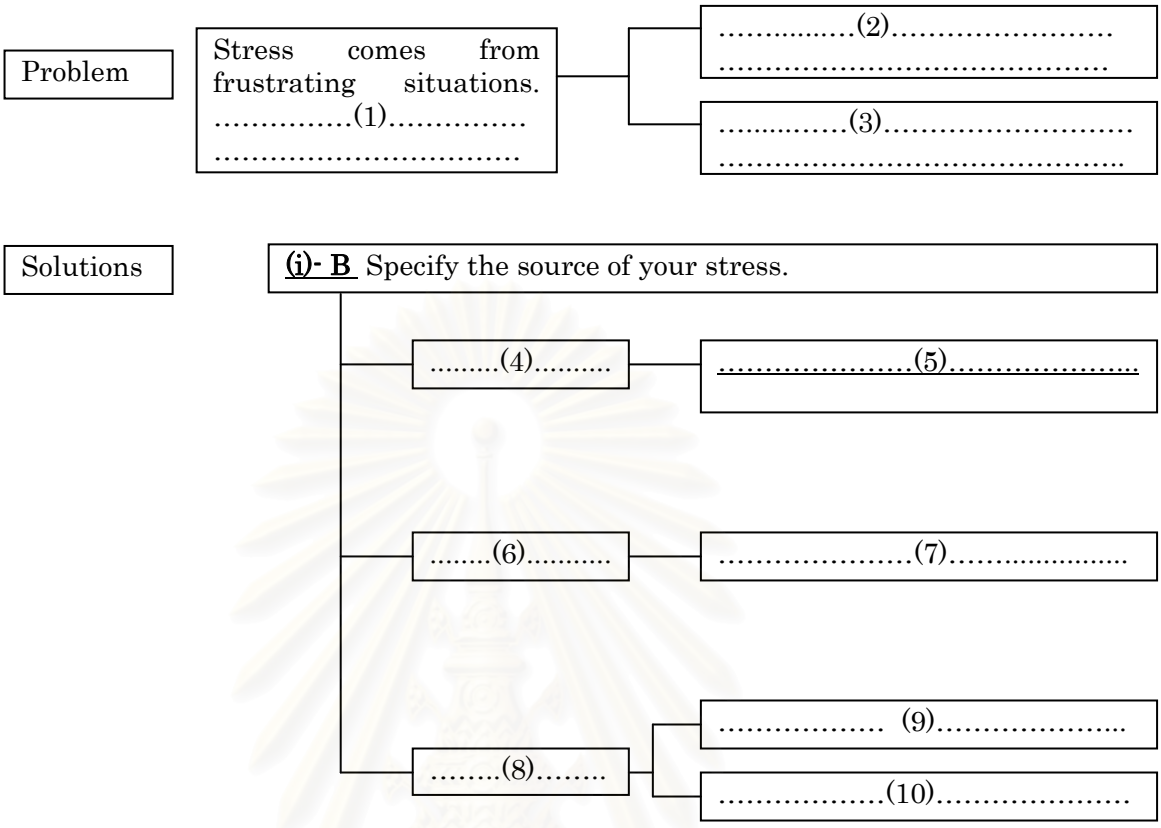
Passage 2: "Stress"

Stress

Stress can come from any situation or thought that makes you feel frustrated, angry, or anxious. What is stressful to one person is not necessarily stressful to another. Stress is a normal part of life. In small quantities, stress is good—it can motivate you and help you be more productive. However, too much stress is harmful. It can set you up for physical or psychological illnesses like heart disease, or depression. Stress is often accompanied by symptoms including headaches, loss of temper, and sleeping difficulty called insomnia.

The most effective solution is to find and address the source of your stress. Unfortunately, this is not always possible. A first step is to make a list of what you think might be making you stress out. Either 'what do you worry about most?' or 'what in particular makes you sad or depressed?'. Then, find someone you trust who will listen to you. Often, just talking to a friend or loved one is all that is needed to relieve stress. Most communities also have support groups or hotlines that can help. Also find healthy ways to cope with stress. For example, eat a well-balanced, healthy diet, get enough sleep, exercise regularly, learn relaxation techniques like yoga, or meditation, and make sure to balance fun activities with responsibilities.

Graphic Organizer of "Stress"



A. Make a list of stress causes.
B. Specify the source of your stress.
C. Talk to a close friend or others on hotlines.
D. Deal with stress by healthy ways.
E. What makes you worried, sad or depressed?
F. To relieve stress, people should not work hard.
G. Let someone listen to you to relieve your stress.
H. Stress in large quantities is dangerous for health.
I. Get good food, enough sleep, and regular exercise.
J. Stress signs are headaches, bad moods, and sleeplessness.
K. Practice relaxing activities as well as balance work and leisure.
L. Stress can cause a physical illness like heart disease, and a psychological illness like depression.
M.People who work harder are more stressful because they do not get good food, enough rest, and rarely do relaxing exercise.

Passage 3: " Protection from the Sun"

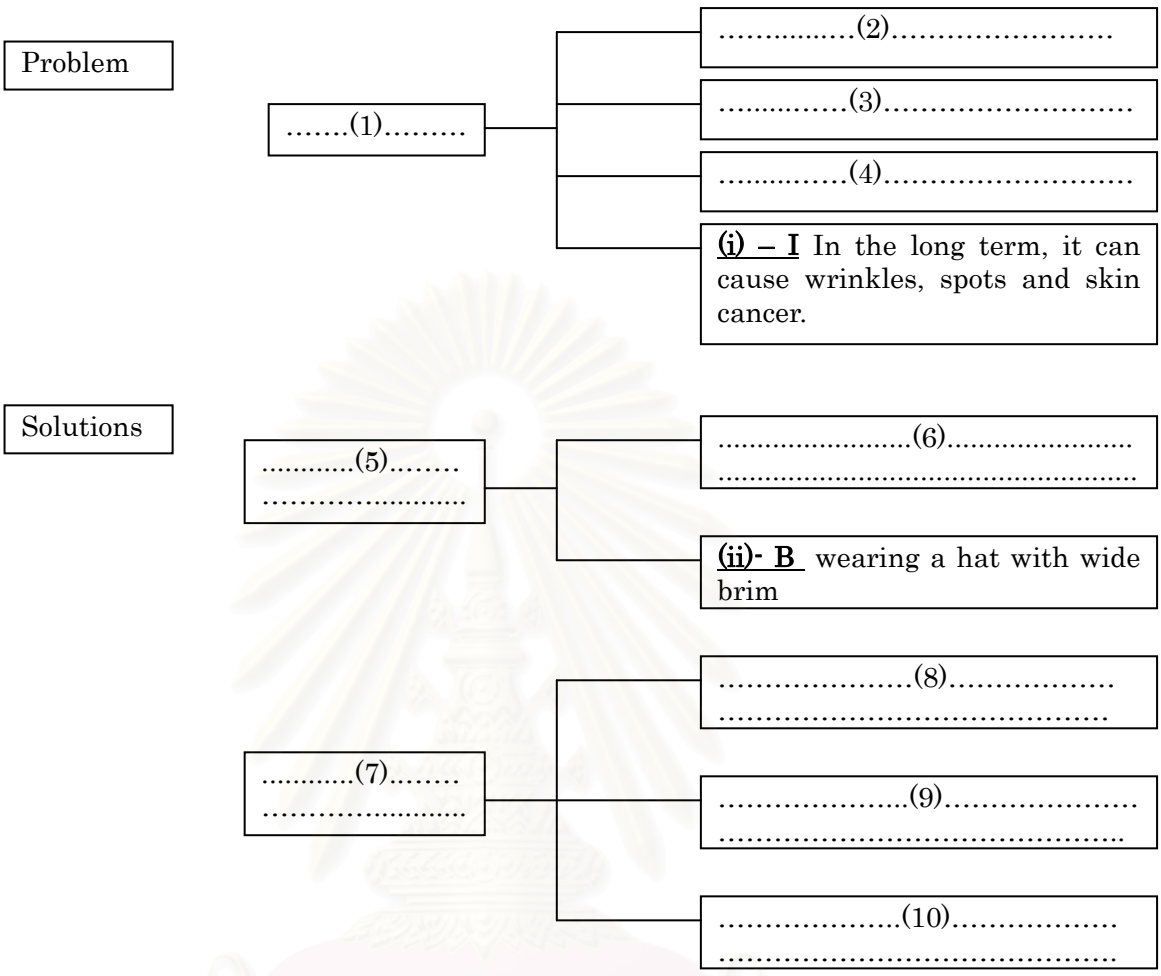
Protection from the Sun

Ultraviolet rays, or UV rays, from the sun can harm the eyes and skin. In the short term, bright sunlight can cause eyestrain as the eyes struggle to focus through the glare of bright light. Too much sun in one day also can cause painful sunburn. In the long term, the sun's harmful ultraviolet rays can damage the sensitive retina at the back of the eye or cause cataracts. Long-term damaging effects to the skin include wrinkles, spots, and skin cancer.

To protect the eyes from the sun's harmful UV rays, a person should wear sunglasses that carry a label certifying that they block UV rays. Materials in the lenses of these sunglasses absorb UV rays so that they do not enter and harm the eyes. Wearing a wide-brimmed hat will shade the eyes and protect skin on the head as well.

To protect skin on other parts of the body from UV rays, a person should wear long, loose clothing. The fabric should not be so loosely woven that it allows some sunlight to filter through. If the fabric is sheer and does not block sunlight, or if areas of skin are not covered, it is a good idea to wear sunscreen. Sunscreen alone is not enough, however, to prevent sun damage to the skin. A person must avoid spending long periods of time in the sun if at all possible.

Graphic Organizer of " Protection from the Sun"



A. Rubbing skin with sunblock.
B. Wearing a hat with wide brim.
C. In the short term, it can cause red sore skin.
D. In the long term, it can cause retina damage.
E. Avoiding spending too many hours in the sun.
F. In the short term, it can cause a pain in your eye.
G. The sun's harmful UV rays can cause health problems.
H. Wearing special sunglasses with UV rays-blocking lens.
I. In the long term, it can cause wrinkles, spots, and skin cancer.
J. Wearing appropriate clothing with enough thick fabric to block sunlight.
K. The skin can be protected from the sun's harmful UV rays by doing proper things.
L. The eyes can be protected from the sun's harmful UV rays by doing proper things.
M. Sunscreen can help prevent sun damage to skin if a person stays out of the sun all the time.
N. The sun's harmful UV rays are rather dangerous because they can increase short-term and long-term pain in your brain, eyes, and skin.

Passage 4: "Understanding and Overcoming Motion Sickness"

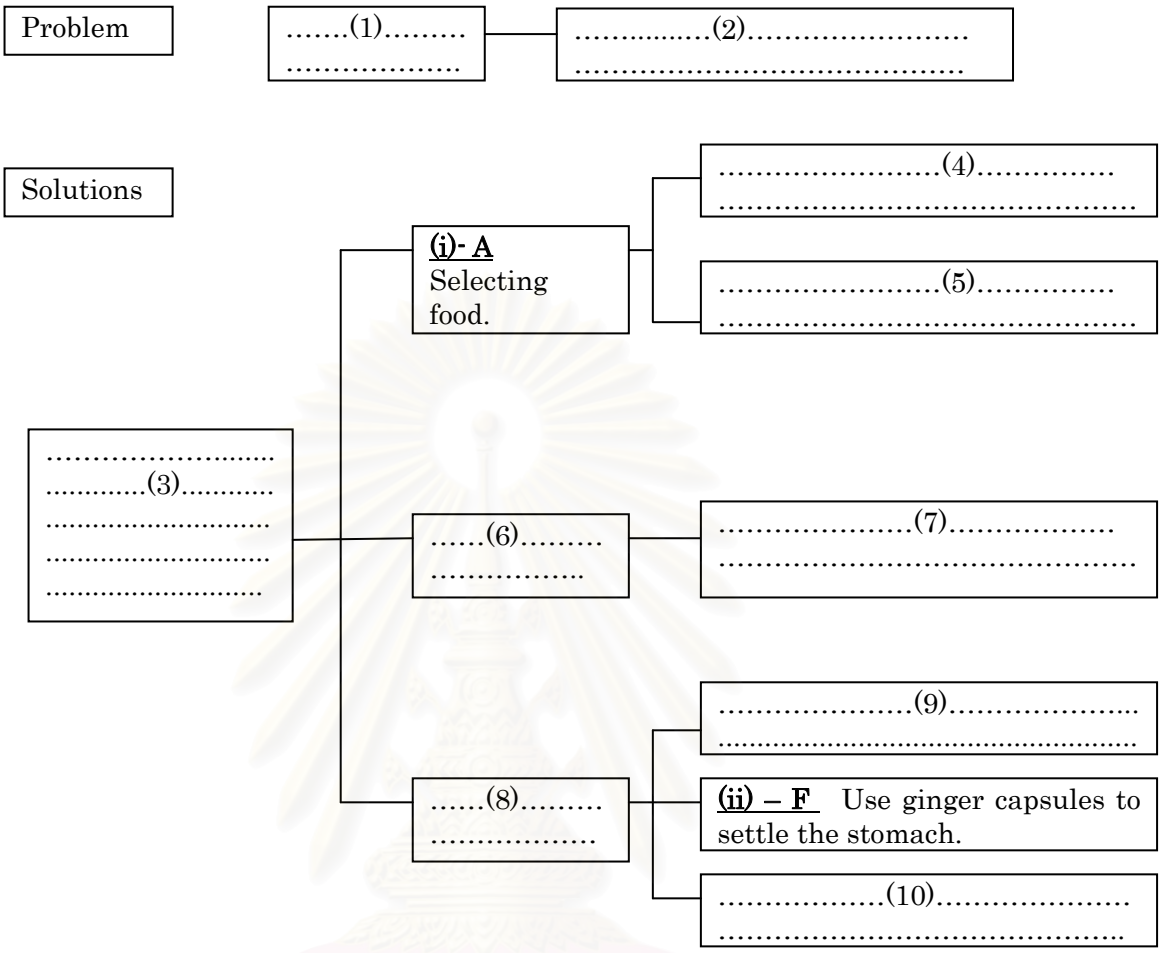
Understanding and Overcoming Motion Sickness

Motion sickness comes in many forms. Some people get motion sickness on cruises, airplanes, motorcycles, amusement park rides, and even on camels. Scientists have learned that motion sickness occurs when the brain is trying to make sense of a situation and there are too many conflicting messages. While the eyes are sending one message, the ears are trying to send a message about balance. The skin and bone joints, sensitive to air pressure, send another message.

People who have violent motion sickness should employ some well-known strategies to avoid getting sick. The most useful strategy concerns food: eat a light meal before traveling and bring along a packet of crackers to snack on regularly. Avoid alcoholic and carbonated beverages, high-fat foods, and spices. Care in choosing the location of your seat is another important strategy. In a car, sit in the front seat. On a plane, sit near the wings. On a boat, sit at the front and keep your eyes fixed on the horizon.

People who still get sick after trying these strategies can try medical help. Some rely on over-the-counter medications, although some of them can make you sleepy. Others use simple ginger capsules to settle their stomach. A large number of travelers use pressure bands on their wrists.

Graphic Organizer of " Understanding and Overcoming Motion Sickness"



A. Selecting food.
B. Choosing seats.
C. Have light meals.
D. Getting medical help.
E. Wear pressure wristbands.
F. Use ginger capsules to settle the stomach.
G. Avoid alcoholic and carbonated drinks during traveling.
H. Take medicine that can be bought without prescription.
I. People should not eat any thing at all while they are sitting in vehicles.
J. Some people have motion sickness while they are in traveling vehicles.
K. To help people overcome motion sickness, there are some useful strategies.
L. Sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon.
M. This happens when there are too many messages sent to the brain from the eyes, the ears, the skin, and the bone joints.
N. Some people are sick on cruises, airplanes, motorcycles, amusement park rides, and camels because they feel afraid while they are traveling in the vehicles.

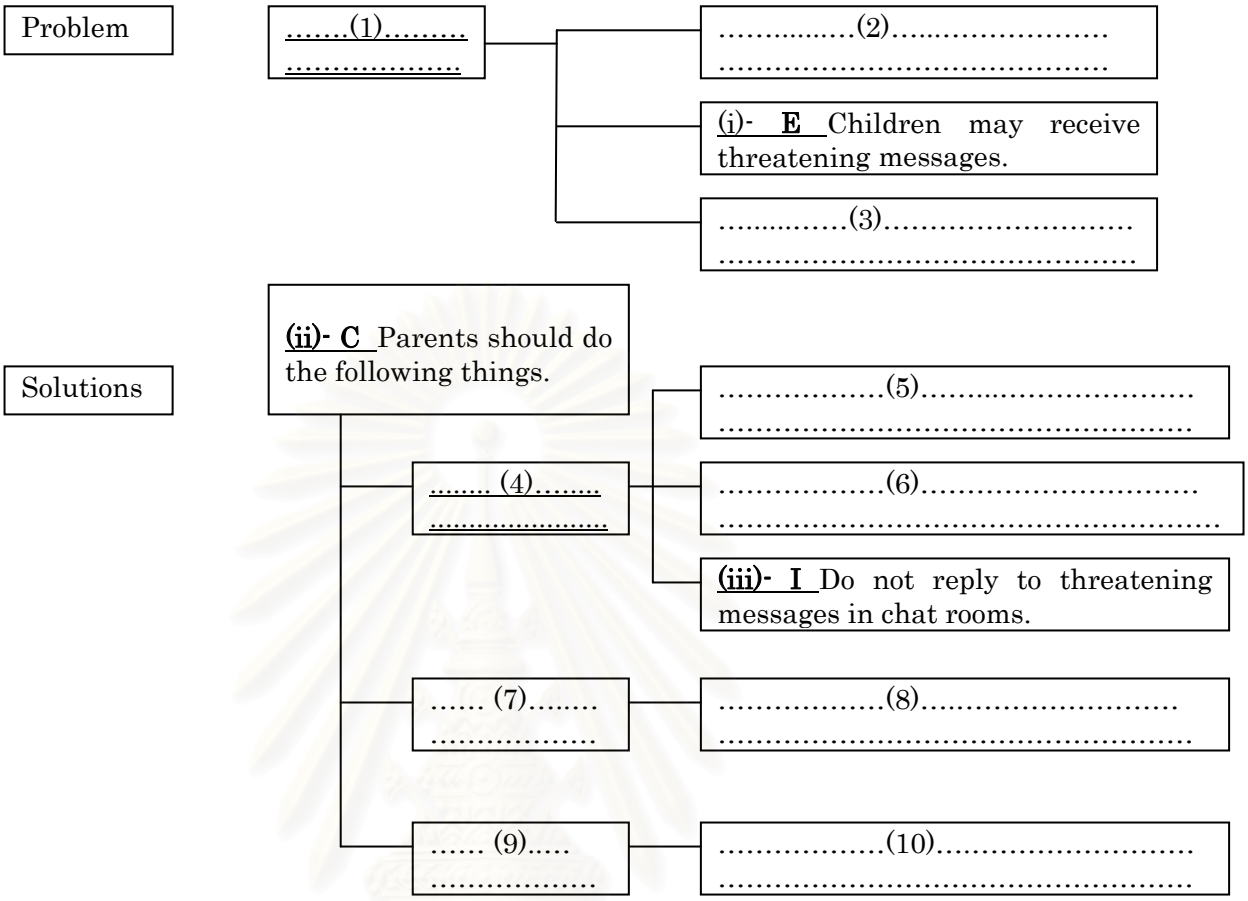
Passage 5: "Safety in Cyberspace"

Safety in Cyberspace

A serious problem is that children using the internet can be exposed to sexually explicit pictures called pornography, and unpleasant and cruel messages called hate mail. Besides, the biggest danger is that kids will communicate unknowingly with child predators who lure or trick them into dangerous situations.

A solution to this problem is for parents to provide their children with the knowledge of how to protect themselves from harm by online safety rules. For example, do not give out personal information that would reveal their actual identity such as full name, and address. Do not meet in person someone they met on-line unless their parents agree that it's okay. Do not respond to threatening or illegal messages in chat rooms. In addition, parents should set limits on the amount of time the kids may spend online. This can be controlled by placing the computer in the family room rather than in the children room. Moreover, they should set limits on what areas on the Internet are appropriate for them to enter by using filtering software to screen out inappropriate websites.

Graphic Organizer of " Safety in Cyberspace"



A. Filtering software should be set up.
B. Children may be tricked by strangers.
C. Parents should do the following things.
D. Do not pass round personal information.
E. Children may receive threatening messages.
F. Children using the internet can be in danger.
G. Parents should screen out unsuitable websites.
H. Children may see photos showing sexual activities.
I. Do not reply to threatening messages in chat rooms.
J. Kids' computer should be placed in the family room.
K. Parents should control the amount of kids' on-line time.
L. Parents should provide their children with online safety tips.
M. Parents should prevent children from using the internet all the time.
N. Avoid seeing strangers they met on-line face to face without permission.
O. Children using the internet are usually fond of playing on-line games because they are fun and exciting.

(Form B: Summary: ย่อความ)

The ST Booklet

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Directions: **คำสั่ง** :

(1) This test is composed of five passages: Passage 1-5. Each passage contains 3 test items. The total score for the whole paper is 15 points.

ข้อสอบชุดนี้มีบทอ่าน 5 บทอ่าน ในแต่ละบทอ่าน มีข้อย่อย 3 ข้อ คะแนนรวมทั้งฉบับ 15 คะแนน

(2) Read each passage. Then complete the summary according to the chronology of the passage by selecting the THREE answer choices that express main ideas and important supporting details. Do not choose minor details or ideas that are not presented in the passage. You will get 1 point for each correct answer. The total score is 3 points.

ให้นักเรียนอ่านบทอ่าน จากนั้นย่อความบทอ่าน โดยเลือกข้อความที่เป็นใจความหลักและใจความสำคัญ(main ideas and important supporting details) จากตัวเลือกที่ให้มาจำนวน 3 ตัวเลือก นักเรียนควรเลือกตัวเลือกที่เป็นใจความสำคัญตามลำดับเนื้อเรื่องในบทอ่าน นักเรียนไม่ควรเลือกตัวเลือกที่เป็นใจความย่อย (minor details)หรือข้อความที่ไม่ได้ระบุในบทอ่าน คำตอบที่ถูกมีค่า 1 คะแนน คะแนนเต็มบทอ่านละ 3 คะแนน

ตัวอย่าง

Example: "Household Hazardous Wastes"

Household Hazardous Wastes

A serious problem is that people dispose of household hazardous wastes improperly. These wastes refer to leftover household products that contain toxic, ignitable, or reactive ingredients such as paints, cleaners, oils, batteries, and pesticides. Improper disposal can include pouring them down the drain, on the ground, into the sewers, or in some cases putting them out with the trash. This can pollute the environment and pose a threat to human health.

Some solutions to this problem are that people need to consider the reduction, reuse, recycling, and disposal options for conveniently and safely managing household hazardous wastes. For reduction, people should, for example, reduce their purchase of products that contain hazardous ingredients by using alternative products such as mild leaves soap instead of plant spray. They should visit their community exchange areas which facilitate leftover materials to be reused and recycled. For proper disposal, they should remember to follow any instructions for use and disposal provided on product labels in order to reduce the risk of products exploding, igniting, leaking or mixing with other chemicals. They should drop off certain products at local collection sites and participate in the household hazardous waste collection programs rather than discard them in the trash.

เฉลยตัวอย่าง:

Summary of "Household Hazardous Wastes"

The passage discusses a problem and solutions about household hazardous wastes.
The problem is that .....(1)-(C)..... .
The solutions to this problem are that .....(2)-(F)..... .
In addition, ...(3)- (D)..... .

A. Household hazardous wastes are dangerous to human health, but not to the environment
B. People should read the instructions on household hazardous products labels before they decide to buy them. Moreover, some of these products are dangerous, so they should not be bought by children
C. People dispose of leftover household hazardous products improperly by pouring them down the drain, on the ground, into the sewers, and discarding them with trash. This can cause environmental pollution and threats to human health
D. People should dispose of household hazardous wastes properly. They should follow instructions on product labels before disposal; discard household hazardous wastes at local collection sites; and participate in community waste collection programs
E. People should decrease the risk of household hazardous products exploding, igniting, leaking or mixing with other chemicals. They should not reuse and recycle them. In addition, if possible, they should not discard them after use.
F. People should reduce buying household hazardous products such as using alternative products without hazardous ingredients. They should reuse, and recycle household hazardous products by taking advantages of the community exchange areas facilities.

Passage 1: "Recycling can Reduce Pollution"

Recycling Can Reduce Pollution

Pollution caused by waste is a complex problem. Waste disposal companies bury most garbage in landfills. Over time, trash slowly dissolves into chemicals. Some of these chemicals are poisonous and can pollute water. Another way to dispose of trash is to burn it. At incineration plants, trash is burned to produce energy. Although this is a beneficial use of trash, some of the gas produced in the process pollutes the air.

To cut down on pollution caused by waste, people can restrict the amount of trash they produce. They can do this by "reducing, reusing, and recycling". To reduce, people limit the amount of new goods they use. Ways to reduce include using both sides of a sheet of scratch paper and using cloth bags for shopping. Buying products made from recycled paper, plastic, or glass is another way to reduce. To reuse, people can save bags, containers, clothing, books, and toys so that they can be used more than once. Plastic bags and containers can be washed and reused. Clothing, books, and toys can be passed on to others for their use instead of being thrown away. To recycle, people can separate from their trash the materials that can be used again to make new products. Paper, cans, glass, and plastic can be recycled. By recycling, reducing, and reusing the products we consume, we can cut down on trash and pollution.

Summary of "Recycling Can Reduce Pollution"

The passage discusses a problem and solutions about the ways to reduce pollution. The problem is that.....(1)..... . The solutions are that .....(2)..... . In addition,.....(3)..... .

A. people have to reduce the pollution caused by waste by restricting the amount of trash they produce. They must also restrict themselves to only recycled things such as paper, cans, glass, and plastic
B. waste can cause pollution. Waste disposed in landfills produces chemicals that can cause water pollution, while, waste disposed at incineration plants produces gas that can cause air pollution
C. people should reuse things—use things such as containers, clothing and toys more than once, and they should recycle things—treat waste materials by separating recyclable things from trash
D. trash can be useful when it is buried in landfills in some countries such as Singapore, moreover, it can be burned at incineration plants to produce energy. However, these disposal procedures are not popular in other countries
E. waste can cause water pollution when trash disposed in landfills overtime turns into chemicals, and it can cause air pollution when trash burned at incineration plants turns into gas. To cut down on the pollution, people have to be more disciplined
F. people should decrease the amount of garbage they produce to reduce pollution. They should limit the amount of new goods, use both sides of paper, and cloth shopping bags, and purchase products made from recycled materials

Passage 2: "Stress"

Stress

Stress can come from any situation or thought that makes you feel frustrated, angry, or anxious. What is stressful to one person is not necessarily stressful to another. Stress is a normal part of life. In small quantities, stress is good—it can motivate you and help you be more productive. However, too much stress is harmful. It can set you up for physical or psychological illnesses like heart disease, or depression. Stress is often accompanied by symptoms including headaches, loss of temper, and sleeping difficulty called insomnia.

The most effective solution is to find and address the source of your stress. Unfortunately, this is not always possible. A first step is to make a list of what you think might be making you stress out. Either 'what do you worry about most?' or 'what in particular makes you sad or depressed?'. Then, find someone you trust who will listen to you. Often, just talking to a friend or loved one is all that is needed to relieve stress. Most communities also have support groups or hotlines that can help. Also find healthy ways to cope with stress. For example, eat a well-balanced, healthy diet, get enough sleep, exercise regularly, learn relaxation techniques like yoga, or meditation, and make sure to balance fun activities with responsibilities.

Summary of "Stress"

The passage discusses stress comes from frustrating situations. .....(1)..... .
The solutions of how to relieve it are that.....(2)..... .
In addition, ...(3)..... .

A. you should not pay attention to the source of your stress because it may harm your health and cause physical and psychological illnesses
B. you should deal with stress by healthy ways—get good food, enough sleep, regular exercise, and practice relaxing activities as well as balance your work and leisure
C. you should ask yourself by making a list of your depression, and happiness. Then, try to solve all the problems. After that, see the doctor for both physical and psychological illnesses
D. you should specify the source of the stress. First, make a list of stress causes that make you worried, sad, or depressed. Then, let someone listen to you such as your close friend, or others on hotlines
E. stress in large quantities is dangerous for health. It can cause a physical illness like heart disease, and a psychological illness like depression. Stress signs are headaches, bad moods, and sleeplessness
F. the amount of stress is not the same for every one. People who work harder are more stressful because they do not get good food, enough rest, and rarely do relaxation exercises. To relieve stress, people should not work too hard

Passage 3: “ Protection from the Sun”

Safety in Cyberspace

Protection from the Sun

Ultraviolet rays, or UV rays, from the sun can harm the eyes and skin. In the short term, bright sunlight can cause eyestrain as the eyes struggle to focus through the glare of bright light. Too much sun in one day can also cause painful sunburn. In the long term, the sun’s harmful ultraviolet rays can damage the sensitive retina at the back of the eye or cause cataracts. Long-term damaging effects to the skin include wrinkles, spots, and skin cancer.

To protect the eyes from the sun’s harmful UV rays, a person should wear sunglasses that carry a label certifying that they block UV rays. Materials in the lenses of these sunglasses absorb UV rays so that they do not enter and harm the eyes. Wearing a wide-brimmed hat will shade the eyes and protect skin on the head as well.

To protect skin on other parts of the body from UV rays, a person should wear long, loose clothing. The fabric should not be so loosely woven that it allows some sunlight to filter through. If the fabric is sheer and does not block sunlight, or if areas of skin are not covered, it is a good idea to wear sunscreen. Sunscreen alone is not enough, however, to prevent sun damage to the skin. A person must avoid spending long periods of time in the sun if at all possible.

Summary of " Protection from the Sun"

The passage discusses the harm of the sun's UV rays.
.....(1)..... .
.....(2)..... .
Also,.....(3)..... .

A. The eyes can be protected from the UV rays when we wear special sunglasses with UV rays-blocking lens and a wide-brimmed hat
B. The sun's harmful UV rays are rather dangerous because they can increase short-term and long-term pain in your brain, eyes, and skin
C. The skin can be protected when we wear appropriate clothing with enough thick fabric, rub skin with sunblock, and avoid spending too many hours in the sun
D. Special sunglasses, appropriate clothes with right fabric, and suntan lotion can prevent sun damage to the skin if a person stays out of the sun all the time
E. The sun's harmful UV rays can cause health problems. In the short term, it can cause a pain in your eye, and red sore skin. In the long term, it can cause retina damage, as well as wrinkles, spots, and skin cancer
F. Some people can stay in the sun for a longer period of time if they rub enough cream onto their skin to stop it from being burned by the sun. However, if they spend too much time in the sun, the sunscreen cannot help prevent sun damage to their skin

Passage 4: "Understanding and Overcoming Motion Sickness"

Understanding and Overcoming Motion Sickness

Motion sickness comes in many forms. Some people get motion sickness on cruises, airplanes, motorcycles, amusement park rides, and even on camels. Scientists have learned that motion sickness occurs when the brain is trying to make sense of a situation and there are too many conflicting messages. While the eyes are sending one message, the ears are trying to send a message about balance. The skin and bone joints, sensitive to air pressure, send another message.

People who have violent motion sickness should employ some well-known strategies to avoid getting sick. The most useful strategy concerns food: eat a light meal before traveling and bring along a packet of crackers to snack on regularly. Avoid alcoholic and carbonated beverages, high-fat foods, and spices. Care in choosing the location of your seat is another important strategy. In a car, sit in the front seat. On a plane, sit near the wings. On a boat, sit at the front and keep your eyes fixed on the horizon.

People who still get sick after trying these strategies can try medical help. Some rely on over-the-counter medications, although some of them can make you sleepy. Others use simple ginger capsules to settle their stomach. A large number of travelers use pressure bands on their wrists.

Summary of "Understanding and Overcoming Motion Sickness"

The passage discusses forms of motion sickness and how to overcome it.
The problem is that .....(1)..... .
To help people overcome motion sickness,.....(2)..... .
In addition, ...(3)..... .

A. people should not eat any thing at all while they are sitting in vehicles. Moreover, they should sit at the front of the vehicles as well as take some pills
B. people should get medical help. They should take medicine that can be bought without prescription, use ginger capsules to settle the stomach, or use wrist pressure bands
C. some people have motion sickness while they are in traveling vehicles. This happens when there are too many conflicting messages sent to the brain from the eyes, the ears, the skin, and the bone joints
D. people who have violent motion sickness try not to travel because they do not know what motion sickness is. Also they do not know strategies concerning choosing food, seats, and medicine
E. some people are sick on cruises, airplanes, motorcycles, amusement park rides, and camels because they feel afraid while they are traveling in the vehicles. They should not travel unless they know strategies involving food, seats, and medicine
F. there are strategies concerning food, seats, and medicine. People should eat light meals and avoid alcoholic and carbonated drinks during traveling. Also they should sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon

Passage 5: "Safety in Cyberspace"

Safety in Cyberspace

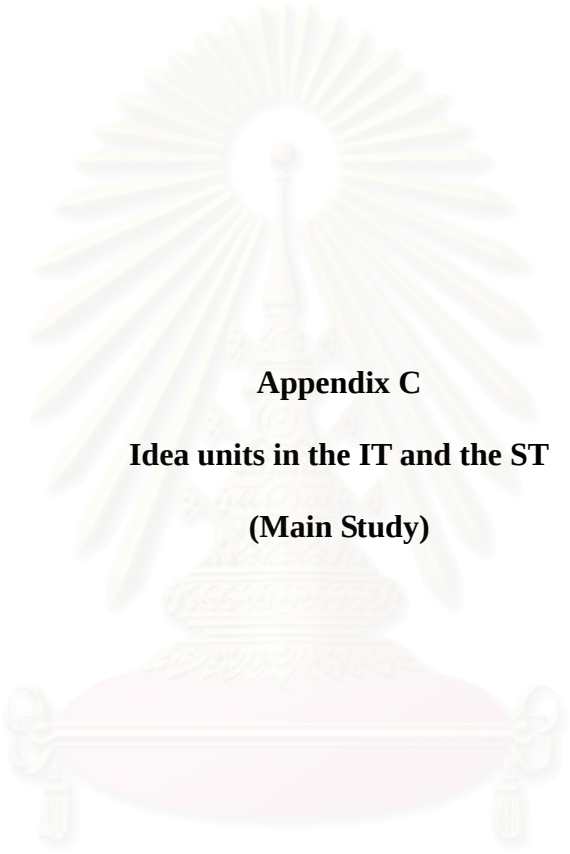
A serious problem is that children using the internet can be exposed to sexually explicit pictures called pornography, and unpleasant and cruel messages called hate mail. Besides, the biggest danger is that kids will communicate unknowingly with child predators who lure or trick them into dangerous situations.

A solution to this problem is for parents to provide their children with the knowledge of how to protect themselves from harm by online safety rules. For example, do not give out personal information that would reveal their actual identity such as full name, and address. Do not meet in person someone they met on-line unless their parents agree that it's okay. Do not respond to threatening or illegal messages in chat rooms. In addition, parents should set limits on the amount of time the kids may spend online. This can be controlled by placing the computer in the family room rather than in the children room. Moreover, they should set limits on what areas on the Internet are appropriate for them to enter by using filtering software to screen out inappropriate websites.

Summary of "Safety in Cyberspace"

The passage discusses a problem and solutions about children's use of the internet. The problem is that.....(1)..... . The solutions are that .....(2)..... . In addition,..... (3)..... .

A. children using the internet are usually fond of playing on-line games because they
   are fun and exciting
B. parents should advise children not to use the internet because there are cruel messages, inappropriate websites, and unpleasant photos on line
C. children using the internet can be in danger. They may see photos showing sexual activities, receive threatening messages, and be tricked by strangers
D. parents should control the amount of kids' on-line time by placing their computer in the family room and screen out unsuitable websites by setting up filtering software
E. parents should prevent children from using the internet all the time and tell them not to give their actual identity to strangers, or not to meet people they chatted with on-line
F. parents should provide their children with online safety tips: do not pass round personal information, avoid seeing strangers they met on-line face to face without permission, and do not reply to threatening messages in chat rooms



Appendix C

Idea units in the IT and the ST

(Main Study)

Idea units in the IT and the ST

The idea units of the passages are the same in the IT and the ST. They have been validated by the three experts in the field. The idea units in the test items of passage 1 – 4 for the main study can be presented below.

Idea units in the test items of passage 1

Idea Units in the test items	
Passage 1: Recycling can reduce pollution	
IT	ST
1)Waste can cause pollution. 2)Waste disposed in landfills produces chemicals that can cause water pollution. 3)Waste disposed at incineration plants produces gas that can cause air pollution.	1)waste can cause pollution. Waste disposed in landfills produces chemicals that can cause water pollution, while, waste disposed at incineration plants produces gas that can cause air pollution
4)People should decrease the amount of garbage they produce to reduce pollution. 5) By reducing i)People should limit the amount of new goods 6)People should use both sides of paper and cloth shopping bags. 7)People should purchase products made from recycled materials.	2)people should decrease the amount of garbage they produce to reduce pollution. They should limit the amount of new goods, use both sides of paper, and cloth shopping bags, and purchase products made from recycled materials
8)By reusing 9)People should use things such as containers, clothing and toys more than once. ii) By recycling 10)People should treat waste materials by separating recyclable things from trash.	3)people should reuse things—use things such as containers, clothing and toys more than once, and they should recycle things—treat waste materials by separating recyclable things from trash

* i) and ii) were the items of the sample answers given in the test.

Idea units in the test items of passage 2

Idea Units in the test items	
Passage 2: Stress	
IT	ST
1) Stress in large quantities is dangerous for health. 2) Stress can cause a physical illness like heart disease, and a psychological illness like depression. 3) Stress signs are headaches, bad moods, and sleeplessness.	1) Stress in large quantities is dangerous for health. It can cause a physical illness like heart disease, and a psychological illness like depression. Stress signs are headaches, bad moods, and sleeplessness.
i) Specify the source of the stress. 4) Make a list of stress causes 5) What makes you worried, sad, or depressed? 6) Let someone listen to you to relieve your stress 7) Talk to a close friend, or others on hotlines.	2) You should specify the source of the stress. First, make a list of stress causes that make you worried, sad, or depressed. Then, let someone listen to you such as your close friend, or others on hotlines.
8) Deal with stress by healthy ways 9) Get good food, enough sleep, and regular exercise 10) Practice relaxing activities as well as balance your work and leisure	3) You should deal with stress by healthy ways –get good food, enough sleep, regular exercise, and practice relaxing activities as well as balance your work and leisure.

* i) was the items of the sample answers given in the test.

Idea units in the test items of passage 3

Idea Units in the test items	
Passage 3: Protection from the Sun	
IT	ST
1) The sun's harmful UV rays can cause health problems 2) In the short term, it can cause a pain in your eye 3) In the short term, it can cause red sore skin 4) In the long term, it can cause retina damage. i) In the long term, it can cause wrinkles, spots, and skin cancer	1) The sun's harmful UV rays can cause health problems. In the short term, it can cause a pain in your eye, and red sore skin. In the long term, it can cause retina damage, as well as wrinkles, spots, and skin cancer.
5) The eyes can be protected from the UV rays by doing proper things 6) Wearing special sunglasses with UV rays-blocking lens ii) Wearing a hat with wide brim	2) The eyes can be protected from the UV rays when we wear special sunglasses with UV rays-blocking lens and a wide-brimmed hat.
7) The skin can be protected from the UV rays by doing proper things 8) Wearing appropriate clothing with enough thick fabric to block sunlight 9) Rubbing skin with sunscreen 10) Avoiding spending too many hours in the sun	3) The skin can be protected when we wear appropriate clothing with enough thick fabric, rub skin with sunscreen, and avoid spending too many hours in the sun.

* i) and ii) were the items of the sample answers given in the test.

Idea units in the test items of passage 4

Idea Units in the test items	
Passage 4: Understanding and Overcoming Motion Sickness	
IT	ST
1) Some people have motion sickness while they are in traveling vehicles 2) This happens when there are too many conflicting messages sent to the brain from the eyes, the ears, the skin, and the bone joints	1) Some people have motion sickness while they are in traveling vehicles. This happens when there are too many conflicting messages sent to the brain from the eyes, the ears, the skin, and the bone joints.
3) To help overcome motion sickness, there are some useful strategies i) Selecting food 4) Have light meals 5) Avoid alcoholic and carbonated drinks during traveling 6) Choosing seats 7) Sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon	2) There are strategies concerning food, seats, and medicine. People should eat light meals and avoid alcoholic and carbonated drinks during traveling. Also they should sit at the front seat in a car, near the wings on a plane, and at the front on a boat looking at the horizon
8) Getting medical help 9) Take medicine that can be bought without prescription ii) Use ginger capsules to settle the stomach 10) Wear pressure wristbands	3) People should get medical help. They should take medicine that can be bought without prescription, use ginger capsules to settle the stomach, or use pressure wristbands

* i) and ii) were the items of the sample answers given in the test.

Appendix D: Semi-structure interview (the IT)

Semi-structure Interview

Test takers' reading and test-taking strategies (The IT)

……..

I. Reading strategies while responding to the prompt passage

Among these four reading strategies, which one did you use while responding to the prompt passage?

___ RS1. Expeditious reading at global level (skimming for main ideas)

___ RS2. Expeditious reading at local level (scanning for specific words)

___ RS3. Careful reading at global level (reading carefully, establishing main ideas)

___ RS4. Careful reading at local level (reading carefully, identifying lexis, syntax)

II. Reading strategies while responding to the IT

R1.Did you skim the passage and the options?

____ Yes ____ No

R2. Did you read every word of the passage and of the options?

____ Yes ____ No

R3. Could you distinguish the main ideas from the supporting details?

____ Yes ____ No ____ Not sure

R4. Did you scan the passage and the options by reading selectively for specific words or phrases?

____ Yes ____ No

R5. Did you read the passage and the options carefully then discard the options which are irrelevant information or minor details?

____ Yes ____ No

III. Test-taking strategies while responding to the IT

T1. Did you consider the graphic organizer so as to conceptualize major ideas from across the passage?

____ Yes ____ No

T3.Did you group the options that are relevant to each portion of the passage?

____ Yes ____ No

T4. Did you divide the passage into portions, get the gist of each portion, and look for specific words in the options?

____ Yes ____ No

T5. Did you select and discard options through vocabulary, sentence, paragraph overall meaning?

____ Yes ____ No

แบบสัมภาษณ์กลวิธีในการอ่านและกลวิธีในการทำข้อสอบ (การถ่ายโยงข้อมูล)

.....

1. ขั้นตอนแรก นักเรียนอ่านบทอ่านอย่างไร

___1.1 อ่านบทอ่านอย่างรวดเร็ว และเก็บใจความสำคัญโดยรวม อ่านข้ามรายละเอียดปลีกย่อย

___1.2 อ่านบทอ่านอย่างรวดเร็ว มองหาคำหรือวลีที่เฉพาะเจาะจง

___1.3 อ่านบทอ่านอย่างระมัดระวัง และเก็บใจความสำคัญโดยรวม อ่านข้ามรายละเอียดปลีกย่อย

___1.4 อ่านบทอ่านอย่างระมัดระวัง และเก็บรายละเอียดปลีกย่อยโดยทำความเข้าใจกับคำศัพท์และรูปประโยค

2. ขั้นตอนต่อมา นักเรียนใช้กลวิธีการอ่านบทอ่าน และตัวเลือกอย่างไร

2.1 อ่านบทอ่าน และตัวเลือกอย่างรวดเร็ว เพื่อดูใจความโดยรวม

___ใช่ ___ ไม่ใช่

2.2 อ่านบทอ่าน และตัวเลือกทุกๆคำ

___ใช่ ___ ไม่ใช่

2.3 แยกใจความสำคัญจากใจความรองของบทอ่านได้หรือไม่

___ได้ ___ไม่ได้ ___ ไม่แน่ใจ

2.4 อ่านบทอ่าน และตัวเลือกอย่างคร่าวๆ โดยมองหาเฉพาะคำหรือวลีที่เกี่ยวข้อง

___ใช่ ___ ไม่ใช่

2.5 อ่านบทอ่านและตัวเลือกอย่างระมัดระวัง และตัดตัวเลือกที่มีใจความซึ่งไม่เกี่ยวข้องกับใจความสำคัญของบทอ่าน

___ใช่ ___ ไม่ใช่

3. นักเรียนใช้กลวิธีการทำข้อสอบอย่างไร

3.1 พิจารณาแผนภาพแสดงความสัมพันธ์ของข้อความ เพื่อช่วยในความเข้าใจใจความสำคัญทั้งหมด

___ใช่ ___ ไม่ใช่

3.3 จัดกลุ่มตัวเลือกที่เกี่ยวข้องกับส่วนใดส่วนหนึ่งของบทอ่าน หรือ จัดกลุ่มตัวเลือกตามลำดับย่อหน้า

___ใช่ ___ ไม่ใช่

3.4 แบ่งข้อความในบทอ่านเป็นส่วนๆ จับใจความบทอ่านเฉพาะส่วน มองหาเฉพาะคำหรือวลีที่เกี่ยวข้องในตัวเลือก

___ใช่ ___ ไม่ใช่

3.5 เลือกและตัดตัวเลือกจากการพิจารณาความหมายโดยรวมของคำศัพท์ ประโยค และย่อหน้านั้นๆ

___ใช่ ___ ไม่ใช่

*ไม่มี 3.2 เพราะเป็นคำถามของกลวิธีการทำข้อสอบการย่อความบทอ่าน

Appendix E: Semi-structure interview (the ST)

Semi-structure Interview

Test takers' reading and test-taking strategies (The ST)

…….....

I. Reading strategies while responding to the prompt passage

Among these four reading strategies, which one did you use while responding to the prompt passage?

___ RS1. Expeditious reading at global level (skimming for main ideas)

___ RS2. Expeditious reading at local level (scanning for specific words)

___ RS3. Careful reading at global level (reading carefully, establishing main ideas)

___ RS4. Careful reading at local level (reading carefully, identifying lexis, syntax)

II. Reading strategies while responding to the ST

R1.Did you skim the passage and the options?

____ Yes ____ No

R2. Did you read every word of the passage and of the options?

____ Yes ____ No

R3. Could you distinguish the main ideas from the supporting details?

____ Yes ____ No ____ Not sure

R4. Did you scan the passage and the options by reading selectively for specific words or phrases?

____ Yes ____ No

R5. Did you read the passage and the options carefully then discard the options which are irrelevant information or minor details?

____ Yes ____ No

III. Test-taking strategies while responding to the ST

T2. Did you consider the introductory sentence of the prose summary so as to understand the overview of the passage?

____ Yes ____ No

T3.Did you group the options that are relevant to each portion of the passage?

____ Yes ____ No

T4.Did you divide the passage into portions, get the gist of each portion, and look for specific words in the options?

____ Yes ____ No

T5.Did you select and discard options through vocabulary, sentence, paragraph overall meaning?

____ Yes ____ No

แบบสอบถามกลวิธีในการอ่านและกลวิธีในการทำข้อสอบ (การย่อความบทอ่าน)

……..

1. ขั้นตอนแรก นักเรียนอ่านบทอ่านอย่างไร

___1.1 อ่านบทอ่านอย่างรวดเร็ว และเก็บใจความสำคัญโดยรวม อ่านข้ามรายละเอียดปลีกย่อย

___1.2 อ่านบทอ่านอย่างรวดเร็ว มองหาคำหรือวลีที่เฉพาะเจาะจง

___1.3 อ่านบทอ่านอย่างระมัดระวัง และเก็บใจความสำคัญโดยรวม อ่านข้ามรายละเอียดปลีกย่อย

___1.4 อ่านบทอ่านอย่างระมัดระวัง และเก็บรายละเอียดปลีกย่อยโดยทำความเข้าใจกับคำศัพท์และรูปประโยค

2. ขั้นตอนต่อมา นักเรียนใช้กลวิธีการอ่านบทอ่าน และตัวเลือกอย่างไร

2.1 อ่านบทอ่าน และตัวเลือกอย่างรวดเร็ว เพื่อดูใจความโดยรวม

___ใช่ ___ ไม่ใช่

2.2 อ่านบทอ่าน และตัวเลือกทุกๆคำ

___ใช่ ___ ไม่ใช่

2.3 แยกใจความสำคัญจากใจความรองของบทอ่านได้หรือไม่

___ได้ ___ไม่ได้ ___ ไม่แน่ใจ

2.4 อ่านบทอ่าน และตัวเลือกอย่างคร่าวๆ โดยมองหาเฉพาะคำหรือวลีที่เกี่ยวข้อง

___ใช่ ___ ไม่ใช่

2.5 อ่านบทอ่านและตัวเลือกอย่างระมัดระวัง และตัดตัวเลือกที่มีใจความซึ่งไม่เกี่ยวข้องกับใจความสำคัญของบทอ่าน

___ใช่ ___ ไม่ใช่

3. นักเรียนใช้กลวิธีการทำข้อสอบอย่างไร

3.2 พิจารณาประโยคนำของส่วนที่เป็นบทย่อความเพื่อให้เข้าใจข้อความโดยรวมของบทอ่าน

___ใช่ ___ ไม่ใช่

3.3 จัดกลุ่มตัวเลือกที่เกี่ยวข้องกับส่วนใดส่วนหนึ่งของบทอ่าน หรือ จัดกลุ่มตัวเลือกตามลำดับย่อหน้า

___ใช่ ___ ไม่ใช่

3.4 แบ่งข้อความในบทอ่านเป็นส่วนๆ จับใจความบทอ่านเฉพาะส่วน มองหาเฉพาะคำหรือวลีที่เกี่ยวข้องในตัวเลือก

___ใช่ ___ ไม่ใช่

3.5 เลือกและตัดตัวเลือกจากการพิจารณาความหมายโดยรวมของคำศัพท์ ประโยค และย่อหน้านั้นๆ

___ใช่ ___ ไม่ใช่

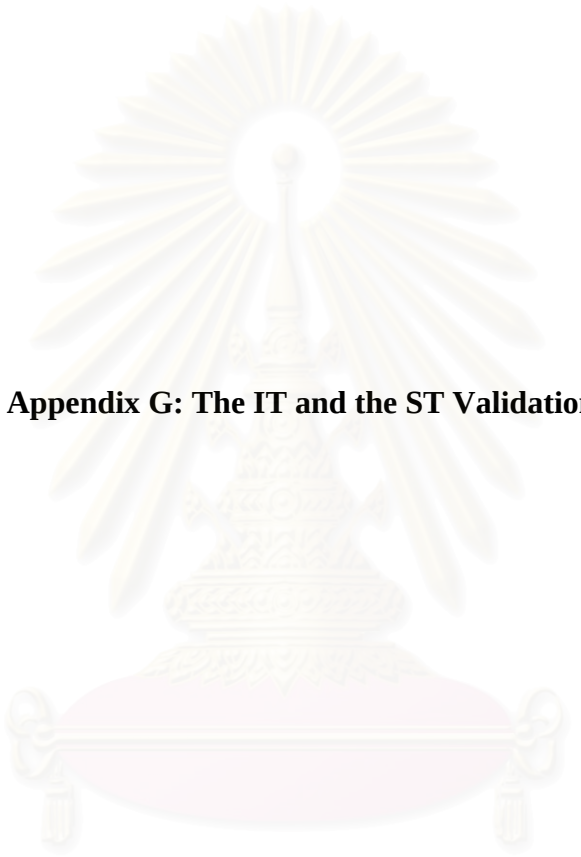
*ไม่มี 3.1 เพราะเป็นคำถามของกลวิธีการทำข้อสอบการถ่ายโยงข้อมูล

Appendix F: Reading Strategies and Test-Taking Strategies Coding Rubric

Reading Strategy while responding to the prompt passage	Description
RS1	Expeditious reading at global level (skimming for main ideas)
RS2	Expeditious reading at local level (scanning for specific words)
RS3	Careful reading at global level (reading carefully, establishing main ideas)
RS4	Careful reading at local level (reading carefully, identifying lexis, syntax)

Reading Strategy while responding to the IT/the ST	Description
R1	Skimming
R2	Reading every word of the passage and of the options establishing main ideas
R3	Distinguishing the main ideas from the supporting details
R4	Scanning the passage and the options by reading selectively for specific words or phrases
R5	Reading the passage and the options carefully then discarding the options which are irrelevant information or minor details

Test-taking Strategy while responding to the IT/ST	Description
T1	Considering the graphic organizer so as to conceptualize major ideas from across the passage
T2	Considering the introductory sentence of the prose summary so as to understand the overview of the passage
T3	Grouping the options that are relevant to each portion of the passage
T4	Dividing the passage into portions, getting the gist of each portion and looking for specific words in the options
T5	Selecting and discarding options through vocabulary, sentence, paragraph overall meaning



Appendix G: The IT and the ST Validation Form

The IT and ST Validation Form

I. Introduction

These tests are called Global Comprehension Reading Tests—Information-transfer Technique (IT) and the Global Comprehension Test—Summary Technique (ST). 'Global Comprehension' refers to ' the understanding of propositions beyond the level of microstructure, that is, any macro propositions in the macrostructure, including main ideas and important details (Weir *et al.*, 2000:23). These tests have been developed as a proficiency test for the 9th grade Thai high school students whose context is to study English as a foreign language. They are assumed to have experienced studying English since their primary education and to have a purpose to further their study in the higher secondary education- grade 10th to 12th, and in the tertiary education. At these higher levels, macro-level reading comprehension skills, which refer to the ability to comprehend the entire text by reading for main ideas and supporting details, are more important than micro-level reading comprehension skills which refer to the understanding of the discrete points of the text.

The IT and the ST have been designed to measure the macro-level reading comprehension skills which can be investigated by two types of test techniques: Information-transfer and Summary. The Information-transfer technique (IT: Booklet Form A) intends to measure the extent to which test takers can complete a 'graphic organizer' by selecting answers of main ideas and important details from 'multiple-selection' multiple-choices. The Summary technique (ST: Booklet Form B) intends to measure the extent to which test takers can complete a 'prose summary' by selecting answers of main ideas and important details from 'multiple-selection' multiple-choices.

II. Specification: skills and items in the test formats

There are altogether 6 reading passages (including 1 passage as an example) written in the 'problem-solution' text structure. They are Example Passage : "Household Hazardous Wastes", Passage 1 "Recycling Can Reduce Pollution", Passage 2 " Stress", Passage 3 " Protection From the Sun", Passage 4 " Understanding And Overcoming Motion Sickness", and Passage 5: "Safety in Cyberspace". In each reading passage, there are 10 test items for the Information-transfer technique (Booklet Form A), and 3 test items for the Summary technique (Booklet Form B).

Please read each passage and then

(A) do the reading tasks: 10 test items for the Information-transfer technique (Booklet Form A) ,and 3 test items for the Summary technique (Booklet Form B). Please provide any suggestions of the correct answers and the distracters.

(B) provide your judgment about (a) Topic familiarity and language difficulty; (b) Skills tested in the Information-transfer format and the Summary format; (c) Skills tested in each item of the test (d) Other comments on the overview of the IT and the ST.

……

(a) Topic familiarity and language difficulty

Put a tick (/) in the appropriate columns of "Topic Familiarity", " Language Difficulty". These passages are for the 9th grade Thai high school students (Mathayom 3)

H = high M = medium L = low N = not at all

Passage	Title	Topic familiarity				Language Difficulty				Comments
		H	M	L	N	H	M	L	N	
Example Passage	Household Hazardous Wastes									
Passage 1	Recycling can Reduce Pollution									
Passage 2	Stress									
Passage 3	Protection from the Sun									
Passage 4	Understanding and Overcoming Motion Sickness									
Passage 5	Safety in Cyberspace									

(b) Skills tested in the Information-transfer format and the Summary format
Put a tick (/) in the column " Agree" or "Disagree" and add any comments

Skills tested in <u>the Information-transfer format (IT)</u>
Skills' definitions
'Skimming' refers to reading for gist. The reader asks 'what is this text as a whole about?'
'Distinguishing main ideas from supporting details' refers to selecting extraction of relevant points from a text
'Scanning for specifics' refers to reading selectively and looking for specific words or phrases

Skills	Agree	Disagree	Comments
Skimming			
Distinguishing main ideas from supporting details			
Scanning for specifics			

Skills tested in <u>the Summary format (ST)</u>
Skills' definitions
'Reading carefully' refers to reading for important ideas and important details/ reading every word of the passage and the options
'Distinguishing main ideas from supporting details' refers to selecting extraction of relevant points from a text
'Summarizing' refers to rejecting irrelevant information or minor details

Skills	Agree	Disagree	Comments
Skimming			
Distinguishing main ideas from supporting details			
Summarizing			

(c) Skills tested in each item of the test
Example Passage : "Household Hazardous Wastes"
Skills tested in the items of Information-transfer format (IT)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding important supporting details			
4	Understanding main ideas			
5	Understanding important supporting details			
6	Understanding main ideas			
7	Understanding important supporting details			
8	Understanding main ideas			
9	Understanding important supporting details			
10	Understanding important supporting details			

Example Passage : "Household Hazardous Wastes"
Skills tested in the items of the Summary format (ST)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

Passage 1: "Recycling Can Reduce Pollution"
Skills tested in <u>the items of Information-transfer format (IT)</u>

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding important supporting details			
4	Understanding main ideas			
5	Understanding main ideas			
6	Understanding important supporting details			
7	Understanding important supporting details			
8	Understanding main ideas			
9	Understanding important supporting details			
10	Understanding important supporting details			

Passage 1: "Recycling Can Reduce Pollution"
Skills tested in <u>the items of the Summary format (ST)</u>

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

Passage 2: "Stress"

Skills tested in <u>the items of Information-transfer format (IT)</u>

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding important supporting details			
4	Understanding main ideas			
5	Understand important supporting details			
6	Understanding main ideas			
7	Understanding important supporting details			
8	Understanding main ideas			
9	Understanding important supporting details			
10	Understanding important supporting details			

Passage 2: "Stress"

Skills tested in <u>the items of the Summary format (ST)</u>

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

Passage 3: "Protection From The Sun"
Skills tested in the items of Information-transfer format (IT)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding important supporting details			
4	Understanding important supporting details			
5	Understanding main ideas			
6	Understanding important supporting details			
7	Understanding main ideas			
8	Understanding important supporting details			
9	Understanding important supporting details			
10	Understanding important supporting details			

Passage 3: "Protection From The Sun"
Skills tested in the items of the Summary format (ST)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

Passage 4: "Understanding And Overcoming Motion Sickness"
Skills tested in the items of Information-transfer format (IT)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding main ideas			
4	Understanding important supporting details			
5	Understanding important supporting details			
6	Understanding main ideas			
7	Understanding important supporting details			
8	Understanding main ideas			
9	Understanding important supporting details			
10	Understanding important supporting details			

Passage 4: "Understanding And Overcoming Motion Sickness"
Skills tested in the items of the Summary format (ST)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

Passage 5: "Safety in Cyberspace"
Skills tested in the items of Information-transfer format (IT)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas			
2	Understanding important supporting details			
3	Understanding important supporting details			
4	Understanding main ideas			
5	Understanding important supporting details			
6	Understanding important supporting details			
7	Understanding main ideas			
8	Understanding important supporting details			
9	Understanding main ideas			
10	Understanding important supporting details			

Passage 5: "Safety in Cyberspace"
Skills tested in the items of the Summary format (ST)

Item no.	Skills	Agree	Disagree	Comments
1	Understanding main ideas and important supporting details			
2	Understanding main ideas and important supporting details			
3	Understanding main ideas and important supporting details			

(d) Other comments on the overview of the IT and the ST.

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Thank you very much for your contribution

Appendix H: Item analysis of the IT and the ST

Item Analysis of the IT
(Pilot Version)

Item No.		Item Facility (IF)	Item Discrimination (ID)	Point-Biserial (rpbi)
Passage 1:	1	0.76	0.58	0.57
	2	0.27	0.58	0.63
	3	0.65	0.50	0.45
Passage 2:	4	0.51	0.83	0.64
	5	0.59	0.92	0.76
	6	0.68	0.75	0.75
Passage 3:	7	0.57	0.58	0.48
	8	0.73	0.67	0.71
	9	**0.08**	**0.08**	**0.21**
Passage 4:	10	0.32	0.58	0.44
	11	0.62	0.83	0.70
	12	0.51	0.58	0.59
Passage 5:	13	0.81	0.58	0.63
	14	0.78	0.58	0.64
	15	0.51	0.58	0.60

Kuder Richardson formula 20 (KR-20) = 0.87
Standard error of measurement (SEM)= 1.47

……

Note:
Items 1-3 are test items in Passage 1: Recycling can reduce pollution
Items 4-6 are test items in Passage 2: Stress
Items 7-9 are test items in Passage 3: Protection from the sun
Items 10-12 are test items in Passage 4: Understanding motion sickness
Items 13-15 are test items in Passage 5: Safety in cyberspace

Item Analysis of the ST
(Pilot Version)

Item No.		Item Facility (IF)	Item Discrimination (ID)	Point-Biserial (rpbi)
Passage 1:	1	0.70	0.42	0.52
	2	0.41	0.58	0.56
	3	0.62	0.67	0.48
Passage 2:	4	0.73	0.50	0.56
	5	0.81	0.42	0.57
	6	0.68	0.58	0.60
Passage 3:	7	0.81	0.42	0.48
	8	0.68	0.42	0.46
	9	0.59	0.83	0.72
Passage 4:	10	0.84	0.50	0.45
	11	0.86	0.42	0.65
	12	0.84	0.50	0.71
Passage 5:	**13**	**0.97**	**0.08**	**0.10**
	14	0.73	0.50	0.43
	15	0.78	0.50	0.54

Kuder Richardson formula 20 (KR-20) = 0.82
Standard error of measurement (SEM) = 1.43

……

Note:
Items 1-3 are test items in Passage 1: Recycling can reduce pollution
Items 4-6 are test items in Passage 2: Stress
Items 7-9 are test items in Passage 3: Protection from the sun
Items 10-12 are test items in Passage 4: Understanding motion sickness
Items 13-15 are test items in Passage 5: Safety in cyberspace

students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
4	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	14
10	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	14
13	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	14
9	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	13
5	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12
6	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	12
12	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12
16	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	12
25	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12
50	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	12
1	1	0	0	1	1	1	1	1	0	1	1	0	1	1	1	11
3	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	11
14	1	0	1	0	1	1	1	1	0	0	1	1	1	1	1	11
20	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	11
18	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	10
26	1	0	0	0	1	1	0	1	0	1	1	1	1	1	1	10
45	1	1	0	1	1	1	0	1	0	0	1	0	1	1	1	10
43	1	0	1	1	1	1	1	1	0	0	1	0	1	0	0	9
49	1	0	1	0	1	1	0	1	0	0	1	1	1	1	0	9
28	1	0	1	1	0	0	1	0	0	0	1	0	1	1	1	8
29	0	0	1	0	0	1	1	0	0	0	1	1	1	1	0	7
33	1	0	0	0	1	0	1	1	0	0	1	0	1	1	0	7
36	1	0	0	0	1	1	1	1	0	0	0	0	1	1	0	7
24	0	0	1	0	0	0	0	1	0	0	1	0	1	1	1	6
31	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	6
39	0	0	1	1	0	1	0	0	0	0	0	1	0	1	1	6
27	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	5
40	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	5
21	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	4
41	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	4
23	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	3
30	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3
35	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
32	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
42	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
46	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
IF	0.76	0.27	0.65	0.51	0.59	0.68	0.57	0.73	0.08	0.32	0.62	0.51	0.81	0.78	0.51	
Ifupper	1.00	0.58	0.92	1.00	1.00	1.00	0.83	1.00	0.17	0.75	0.92	0.83	1.00	1.00	0.75	
Iflower	0.42	0.00	0.42	0.17	0.08	0.25	0.25	0.33	0.08	0.17	0.08	0.25	0.42	0.42	0.17	
ID	0.58	0.58	0.50	0.83	0.92	0.75	0.58	0.67	0.08	0.58	0.83	0.58	0.58	0.58	0.58	
rpbi	0.57	0.63	0.45	0.64	0.76	0.75	0.48	0.71	0.21	0.44	0.70	0.59	0.63	0.64	0.60	

Item Analysis of the IT

students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
6	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	14
20	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	14
4	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	13
5	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	13
23	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	13
27	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	13
29	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	13
33	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	13
36	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	13
37	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	13
13	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	12
14	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	12
30	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	12
10	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	11
12	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	11
16	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	11
21	0	0	1	0	1	1	1	1	1	1	1	1	1	0	0	10
7	0	1	1	1	1	0	0	0	0	1	1	1	1	0	1	9
25	1	0	0	1	0	1	0	0	0	1	1	1	1	1	1	9
28	1	1	1	1	0	0	1	1	1	0	0	1	0	1	0	9
47	1	0	1	0	1	0	1	1	0	0	1	0	1	1	1	9
17	0	0	1	1	0	1	0	1	0	0	0	1	1	1	1	8
22	0	0	0	1	1	1	0	1	1	0	1	1	1	0	0	8
34	0	0	0	0	1	1	1	1	0	0	1	1	1	0	1	8
44	1	0	0	1	1	0	1	0	0	1	1	1	1	0	0	8
24	1	0	0	1	1	0	1	0	0	1	1	0	1	0	0	7
48	1	0	0	0	1	0	1	0	0	1	1	0	1	0	1	7
35	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	4
38	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	4
39	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	3
IF	0.70	0.41	0.62	0.73	0.81	0.68	0.81	0.68	0.59	0.84	0.86	0.84	0.97	0.73	0.78	
Ifupper	0.92	0.67	1.00	1.00	0.92	0.92	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Iflower	0.50	0.08	0.33	0.50	0.50	0.33	0.58	0.50	0.17	0.50	0.58	0.50	0.92	0.50	0.50	
ID	0.42	0.58	0.67	0.50	0.42	0.58	0.42	0.42	0.83	0.50	0.42	0.50	0.08	0.50	0.50	
rpbi	0.52	0.56	0.48	0.56	0.57	0.60	0.48	0.46	0.72	0.45	0.65	0.71	0.10	0.43	0.54	

Item Analysis of the ST

students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total	
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
4	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	14	
10	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	14	
13	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	14	
9	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	13	
5	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12	
6	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	12	
12	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12	
16	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	12	
25	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	12	
50	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	12	
1	1	0	0	1	1	1	1	1	0	1	1	0	1	1	1	11	
3	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	11	
14	1	0	1	0	1	1	1	1	0	0	1	1	1	1	1	11	
20	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	11	
18	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	10	
26	1	0	0	0	1	1	0	1	0	1	1	1	1	1	1	10	
45	1	1	0	1	1	1	0	1	0	0	1	0	1	1	1	10	
43	1	0	1	1	1	1	1	1	0	0	1	0	1	0	0	9	
49	1	0	1	0	1	1	0	1	0	0	1	1	1	1	0	9	
28	1	0	1	1	0	0	1	0	0	0	1	0	1	1	1	8	
29	0	0	1	0	0	1	1	0	0	0	1	1	1	1	0	7	
33	1	0	0	0	1	0	1	1	0	0	1	0	1	1	0	7	
36	1	0	0	0	1	1	1	1	0	0	0	0	1	1	0	7	
24	0	0	1	0	0	0	0	1	0	0	1	0	1	1	1	6	
31	1	0	1	0	0	0	1	1	0	0	0	1	0	1	0	6	
39	0	0	1	1	0	1	0	0	0	0	0	1	0	1	1	6	
27	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	5	
40	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	5	
21	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	4	
41	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	4	
23	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	3	
30	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3	
35	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	
32	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	
42	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
46	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
																8.41	M
IF	0.76	0.27	0.65	0.51	0.59	0.68	0.57	0.73	0.08	0.32	0.62	0.51	0.81	0.78	0.51	4.05	St
1−IF	0.24	0.73	0.35	0.49	0.41	0.32	0.43	0.27	0.92	0.68	0.38	0.49	0.19	0.22	0.49	16.40	St2
Si2	0.18	0.20	0.23	0.25	0.24	0.22	0.25	0.20	0.07	0.22	0.24	0.25	0.15	0.17	0.25	3.11	Si2
																15	k
																1.07	k/k−1
																0.87	K−R20
																0.83	K−R21
																1.47	SEM

Item Analysis of the IT (K−R20)

students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	
6	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	14	
20	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	14	
4	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	13	
5	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	13	
23	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	13	
27	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	13	
29	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	13	
33	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	13	
36	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	13	
37	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	13	
13	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	12	
14	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	12	
30	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	12	
10	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	11	
12	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	11	
16	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	11	
21	0	0	1	0	1	1	1	1	1	1	1	1	1	0	0	10	
7	0	1	1	1	1	0	0	0	0	1	1	1	1	0	1	9	
25	1	0	0	1	0	1	0	0	0	1	1	1	1	1	1	9	
28	1	1	1	1	0	0	1	1	1	0	0	1	0	1	0	9	
47	1	0	1	0	1	0	1	1	0	0	1	0	1	1	1	9	
17	0	0	1	1	0	1	0	1	0	0	0	1	1	1	1	8	
22	0	0	0	1	1	1	0	1	1	0	1	1	1	0	0	8	
34	0	0	0	0	1	1	1	1	0	0	1	1	1	0	1	8	
44	1	0	0	1	1	0	1	0	0	1	1	1	1	0	0	8	
24	1	0	0	1	1	0	1	0	0	1	1	0	1	0	0	7	
48	1	0	0	0	1	0	1	0	0	1	1	0	1	0	1	7	
35	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	4	
38	0	0	0	0	0	0	1	1	0	1	0	0	1	0	0	4	
39	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	3	
																11.05	M
IF	0.70	0.41	0.62	0.73	0.81	0.68	0.81	0.68	0.59	0.84	0.86	0.84	0.97	0.73	0.78	3.34	St
1-IF	0.30	0.59	0.38	0.27	0.19	0.32	0.19	0.32	0.41	0.16	0.14	0.16	0.03	0.27	0.22	11.13	St2
s2	0.21	0.24	0.24	0.20	0.15	0.22	0.15	0.22	0.24	0.14	0.12	0.14	0.03	0.20	0.17	2.65	Si2
																15	k
																1.07	k/k-1
																0.82	K-R20
																0.79	K-R21
																1.43	SEM

Item Analysis of the ST (K-R20)

BIOGRAPHY

Duangchai Chongthanakorn received her bachelor's degree majoring English from the Faculty of Education, Srinakharinwirot University, Patumwan Campus in the academic year 1986. She obtained her master's degree majoring Teaching English as a Foreign Language from the Faculty of Education, Chulalongkorn University in the academic year 1992. She has been working at Patumwan Demonstration School since 1987. Her research interest is in the areas of language assessment, reading instruction and teaching material development.