

**LANGUAGE LEARNING STRATEGIES EMPLOYED BY
ENGINEERING STUDENTS LEARNING ENGLISH
AT THE TERTIARY LEVEL IN THAILAND**

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The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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ABSTRACT

The present investigation is descriptive-interpretative in nature. It has been designed a) to describe types of language learning strategies which Thai engineering students reported employing; b) to investigate patterns of variations in frequency of students' reported strategy use with reference to type of institution, gender, 'perceived' class size, location of institution, and language proficiency levels; and c) to examine the relationships between frequency of students' reported strategy use and the five independent variables. Two main strategy categories, i.e. classroom-related, and classroom-independent, have been examined. The data for the investigation were collected in two phases with different instruments. Semi-structured interviews, and a strategy questionnaire were used as the main methods for the first and second phases of data collection respectively.

The thesis comprises eight chapters. Chapter one is an introduction to the thesis. It provides both a background and a context to the present investigation. Chapter two presents the review of related literature and materials on language learning strategies in order to locate the present investigation in the context of previous research and authors' opinions. Chapter three reviews research methodology in language learning strategies, and the conceptual framework for the present investigation. Chapter four presents how the strategy inventory for the present investigation has been generated as the results of student interviews, and the construction of the strategy questionnaire. Chapter five presents the processes of the construction and validation of the proficiency test which was used to determine students' language proficiency levels. Chapter six examines frequency of strategy use reported by 570 Thai engineering students, ranging from overall strategy use to use of strategies at the individual level. Statistical methods such as mean of frequency, standard deviation, and percentage are used to help interpret the data. Chapter seven examines the relationships between frequency of students' reported use of strategies and the five variables. In doing so, an analysis of variance (ANOVA), chi-square tests, and a factor analysis are used as the main statistical methods. Chapter eight summarises the findings of the investigation and discusses the results of the research findings. In addition, the Chapter discusses limitations of the present investigation and proposals for future research. as well as the implications for the teaching and learning of English for engineering students in Thailand.

The findings of the research show that Thai engineering students, on the whole, reported medium frequency of strategy use. They reported higher frequency of use of classroom-related strategies than classroom-independent strategies. The results of the data analysis also demonstrate that frequency of students' overall reported use of strategies varied significantly in terms of 'type of institution', and 'language proficiency levels'. Regarding 'gender', 'perceived' class size, and 'location of institution', these three variables were not found to have much relationship to students' choices of strategy use. The results of the investigation also suggest that language proficiency may be related to students' employment of out-of-class strategies, especially those involving utilising media, as well as computer programmes in English as a source of the target language input.

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LIST OF ABBREVIATIONS

ANOVA	= Analysis of Variance
CI	= Classroom-Independent
CIP	= Classroom-Independent Purpose
CR	= Classroom-Related
CRP	= Classroom-Related Purpose
EFL	= English as a Foreign Language
ESL	= English as a Second Language
FL	= Foreign Language
Hi	= High
LL	= Language Learner
LLP	= Level of Language Proficiency
Lo	= Low
Lrg	= Large
MetroBKK/MetBKK	= Bangkok and the Metropolitan Areas
Mo/Mod	= Moderate
N.S.	= No Significance
NNSE	= Non-native Speaker of English
NSE	= Native Speaker of English
Opt	= Optimum
PRU	= Private-run University
PRUI	= Private-run University Interviewee
PTEST	= Proficiency Test in English for Science and Technology
RIT	= Rajamangala Institute of Technology
RITI	= Rajamangala Institute of Technology Interviewee
SCIP	= Strategy for Classroom-Independent Purpose
SCRIP	= Strategy for Classroom-Related Purpose
S.D.	= Standard Deviation
Sml	= Small
SPSS	= Statistical Package for the Social Sciences
SRU	= State-run University
SRUI	= State-run University Interviewee
TESOL	= Teaching of English to Speakers of Other Languages

CHAPTER 1
BACKGROUND TO STUDY

CHAPTER ONE

BACKGROUND TO STUDY

1.1. Introduction and Purpose of the Chapter

This chapter is an introduction to the thesis and provides both a background and a context for the present investigation. The ensuing sections cover the terms used in the context for the present investigation; English language teaching and learning in the context of Thailand; research objectives; and finally the expected outcomes. The chapter concludes with an outline of the thesis.

In the past two decades, much research in the field of language learning and teaching has looked at the relationships between characteristics of language learners and their language performance. The priority of the investigation, especially in the 1980's, seemed to focus on how language learners dealt with their target language learning. Very often, these language learners have been classified as 'good/poor' or 'successful/unsuccessful' language learners. Many researchers have investigated a series of factors which are basically hypothesised to have a relationship with how these language learners learn a language, specifically a foreign language. These factors include learner's foreign language experience, gender, field of study, status of the target language, or ethnicity. These early investigations inspired some researchers in the field to attempt to identify what language learners, especially 'good' or 'successful' language learners actually do when they learn a foreign language. The first attempts to scrutinise such good learner behaviours which were empirically evidenced, were carried out by Stern (1975), and Rubin (1975). Shortly after the lists of characteristics of good language learners had been proposed by both Rubin and Stern, more researchers started to turn their attention to investigate learning strategies of good language learners. Examples are Politzer (1983), Chesterfield and

Chesterfield (1985), O'Malley et al (1985b); Ramirez (1986), Chamot (1987) and Oxford (1989).

An initial review of available literature and other research materials appear to reveal that much of the research into language learning strategies has been carried out with native speakers of English learning a foreign language, or non-native speakers of English learning English as a second language (ESL). A small amount of research has been carried out with language learners learning English as a foreign language (EFL), such as in the context of Thailand. To date, a few research works have been carried out with Thai students in terms of their language learning strategies, and a small amount of research has been carried out to investigate language learning strategy use by Thai students studying at the tertiary level. It also appears that the majority of the subjects of these few investigations were students majoring in English. Examples are Sarawit (1986), Mullins (1992), Torut (1994), and Lappayawichit (1998). The use of language learning strategies by English major students or other successful language learners were the focal point of these studies. No empirical research has been carried out exclusively to investigate how non-English major students, more specifically engineering students, employ language learning strategies. The present investigation aims to fill this gap. The researcher decided to undertake an investigation which has been designed to identify types of language learning strategies employed by engineering students learning English at the tertiary level in Thailand. This investigation is descriptive-interpretative in nature rather than confirmatory, hypothesis-testing, or as termed by Skehan (1989) and Larsen-Freeman and Long (1991), it employs the 'research-then-theory' rather than the 'theory-then-research' format (cf. Graham, 1997). To put it simply, this investigation is not intended to reconfirm any theories or hypothesis about students' use of language learning strategies. Rather, it has been designed to examine the relationships between five

variables (two learner-related, two institution-related, and one language performance) and frequency of use of language learning strategies. In examining frequency of students' reported strategy use, the researcher looks into students' employment of strategies in two main categories, i.e. classroom-related and classroom-independent categories.

In summary, there are many variables or factors which researchers believe to affect or relate to students' choice of language learning strategies. The researcher for the present investigation realises that it is by no means possible to investigate all of the factors mentioned above in relation to choice of language learning strategy use of engineering students in Thailand. Consequently, the researcher has chosen carefully to investigate those variables that appear to be likely neglected by most researchers (type of institution, gender of students, 'perceived' class size, and location of institution) along with the variable most frequently studied by most researchers (levels of language proficiency). The theoretical framework and rationale for selecting/rejecting variables for the present investigation will be discussed in more detail in Chapter 3 (Section 3.4).

1.2. Terms Used in the Context of the Present Investigation

The following terms are those most frequently used in this investigation together with explanatory notes.

- **Engineering Students**

'Engineering students' for the present investigation refers to Thai students who undertake a course for a bachelor's degree in engineering in any of the three different types of institution (see below). These students may be at their first, second, third, or fourth year at their institution. They may be studying English or may have already finished the minimum requirement of English for their course of study by the time the data collection is conducted.

- **Types of Institution**

The three different ‘types of institution’ offering a degree in engineering in Thailand are:

1. **State-run universities under the jurisdiction of Ministry of the University Affairs**

These are located in different geographical regions of the country including Bangkok and the metropolitan areas. According to Ministry of the University Affairs (1991), 18 out of 24 state-run universities offer a degree in engineering. Examples are Chulalongkorn University in Bangkok, Chiang Mai University in the northern region, Burapha University in the eastern region, Silpakorn University in the central region, Suranaree University of Technology in the north-eastern region, and Prince of Songkhla University in the southern region of the country.

2. **Private-run universities under the jurisdiction of Ministry of the University Affairs**

These are located in different geographical regions of the country, mostly in Bangkok and the metropolitan areas. According to Ministry of the University Affairs (1995), 16 out of 35 private-run universities and institutions offer a degree in engineering. Examples are Sri Pathum University and Kasem Bundit University in Bangkok, Wongchavalitkul University and the North-eastern College in the north-eastern region.

3. **Rajamangala Institutes of Technology (RIT) under the jurisdiction of the Ministry of Education**

These are located in different geographical regions of the country including Bangkok and the metropolitan areas. There are six campuses offering a degree in engineering. Examples are RIT Payap, Chiang Mai in the northern region, RIT Nakhon Ratchasima in the northeastern, and Technical Bangkok Campus in Bangkok.

- **Students’ Language Proficiency Levels**

Three different levels of students’ language proficiency have been defined by the researcher for this particular study as high, moderate, and low. Students’ language

proficiency levels are determined by the students' test scores obtained through the researcher-constructed Proficiency Test in English for Science and Technology (PTEST) which will be discussed in detail in Chapter 5.

- **'Perceived' Class Size**

This variable refers to the size of the English class as perceived by the students themselves. The 'perceived' class size has been classified for this particular investigation as large, optimum, and small.

- **Location of Institution**

The locations of the participating institutions are classified as 'Bangkok and the metropolitan areas', and 'Regional'.

1.3. Thailand's Formal System of Education

By the late 1980's, the Thai Government determined that a national policy was essential to provide effective delivery of a systematic educational framework. The policy which was developed was called the National Education Scheme (Boonchuay and Siaroon, 1994). The government goals for the Thai educational system stated in the 1991 National Education Scheme emphasised four main characteristics: intellectual, spiritual, physical, and social development (Office of the National Education Commission, 1991).

At present, formal education in Thailand has four major sequential levels: pre-primary, primary, secondary, and higher-education. With the implementation of the new National Education Scheme of 1977, which effectively replaced the previous scheme of 1960, the Thai educational system was changed from 4:3:3:2:4 to 6:3:3:4 (Ministry of Education, 1977). The 4:3:3:2:4 system means four years at lower primary, which was compulsory, three years at upper primary, three years secondary, two years pre-university, and four years at higher education for a bachelor's degree. The 6:3:3:4 means that the new primary school system has only one level for six years from Prathom Suksa

1 to 6 (Year 1 to Year 6), which is compulsory. This is followed by secondary education, which consists of two levels: three years of lower-secondary school from Matthayom Suksa 1 to 3 (Year 7 to Year 9), and three years of upper-secondary school from Matthayom Suksa 4 to 6 (Year 10 to Year 12) and four years or more for university undergraduate degrees. Figure 1.1. below summarises the present school system in Thailand.

Figure 1.1: School system in Thailand

Primary Education	Secondary Education	Higher Education
Prathom Suksa 1 to 6 (Year 1 to Year 6) Ages 6-11	Lower Secondary Matthayom Suksa 1 to 3 (Year 7 to Year 9) Ages 12-14 Upper Secondary Matthayom Suksa 4 to 6 (Year 10 to Year 12) Ages 15-17	University or College 4 to 6 years

According to the Office of the National Education Commission (1991), Primary education may be considered to lay the firm foundation for the overall growth of children through the development of basic skills, character development, and work-oriented subjects, geared towards being a good member of the family and society. This level of education is compulsory and provided free of charge. Secondary education is for pre-adolescent and adolescent groups. The students in upper-secondary level are guided to concentrate on areas of specialisation needed for their chosen careers or occupations, while those in the lower-secondary level are equipped with knowledge, skills, capability, and potential to acquire continuous learning and take part in the preservation of natural resources and the community's arts and culture. Higher education includes

undergraduate and graduate studies. It aims at maximising the individual's intellect and intellectual maturity in order to facilitate the advancement of knowledge and technology, which, in turn, will result in the production of a high-level academic and professional labour force for national development (Office of the National Education Commission, 1991).

1.4. English Language Teaching and Learning in the Thai Contexts

The English language has played an important role in Thailand, increasingly so for the past decade, due to the development of science and technology. Of Thailand's 60 million population, 98 percent are Thai (Phanthufac, 1982). Thailand's language policy provides that there is only one official language, Standard Thai, which is used for communication at all levels throughout the country. It was in 1978 that the National Commission classified the languages of Thailand as: 1) the national language, 2) foreign languages, 3) regional or provincial languages (dialects), and 4) minority languages used among a certain group of minorities (Sukwiwat, 1985). Examples of minority languages are Suai or Saek in the Northeast.

In education, in terms of Thailand's educational policy, there are only two categories of languages, i.e. Thai, and foreign language. Officially, the English language is considered to have equal status with any other foreign language such as French, Japanese or German. Generally speaking, the English language may have a more distinctive role in present Thai society both socially and academically. In the social aspect, English has become more involved in many aspects in Thai daily ways of life such as entertainment, mass communications, and international contacts. In terms of academic aspects, it can be seen that there are more international institutions than before in which English is used as the medium of instruction, ranging from pre-primary education to higher education.

The following is a brief overview of English language teaching and learning at different educational levels in Thailand.

1.4.1. The English language at the primary level

The Ministry of Education is responsible for the curriculum for language teaching at the primary level. The English language is the only foreign language which can be taught at this level. The main objective is to provide the learner with an adequate background for their further study of the language. Emphasis is put on speaking, listening, and correct pronunciation (Ministry of Education, 1978a). The learner is expected to be able to converse and write in simple everyday language, as well as to understand the cultures of English-speaking countries which they might encounter in their reading or writing texts. It should be noted that private schools can start teaching English earlier if they have enough qualified teachers (Ministry of Education, 1978a). Alternatively, primary school pupils can choose another subject, for example, agriculture rather than English.

1.4.2. The English language at the lower-secondary level

At the lower secondary school level, the English language is generally taught for at least four 50-minute periods per week. The purpose of teaching English at this level is to enable the student to listen with comprehension and read with understanding about simple ideas and cultures of the English-speaking countries. They are also expected to be able to converse on everyday-life topics, using correct vocabulary and structure, as well as to write simple statements, letters, and short compositions (Ministry of Education, 1978b). The status of English is an elective subject at this level.

1.4.3. The English language at the upper-secondary level

At the upper secondary level, the English language is taught for at least six 50-minute periods per week to science, and language arts students, and for at least two 50-minute periods per week to students studying other disciplines such as agriculture or

industrial arts. Emphasis at this level is put on reading, speaking and writing for further studies. The learner should be able to converse, and write compositions, letters, and short statements in English. They are also expected to understand the given texts as well as the cultures of the English-speaking countries (Ministry of Education, 1977).

In secondary schools (Year 7 to Year 12), English continues to be an elective subject as are other foreign languages such as French, German, or Japanese.

1.4.4. English at the tertiary level

At the tertiary level, English may be part of the Faculties of Arts, Humanities, Science, or Social Science depending on the organisational arrangements in each institution. Although all universities are different in their organisational structure, they offer at least six credits of foreign languages as part of the general education required by the Ministry of University Affairs (Sukwiwat, 1985). English is one of the foreign languages offered and is chosen by the majority of Thai university students. The English courses offered at each institution differ in content and skill areas. However, these English courses can be classified as one of the following categories:

- General English skills courses dealing with general content of English in everyday use for non-science oriented students, for example, education, or social sciences.
- Advanced English skills courses emphasising those specialising in English for academic purposes (EAP) or English for specific purposes (ESP) for science-oriented students, for example, medicine, pharmacy, and engineering students.

1.4.5. The English language and engineering students

Many higher educational institutions in Thailand currently offer a degree in engineering. As mentioned earlier, engineering students are not exempted from studying English in most institutions. However, there are a few institutions where students can

choose a different foreign language such as Japanese or French to satisfy their minimum graduation requirement. English is considered to be of special importance to engineering students because a lot of the textbooks they are supposed to study are written in English (Ongsakul, 1984). As a result, a knowledge of English enables engineering students to read and understand the texts from the books better.

As previously mentioned, there are three different types of institution offering a degree in engineering in Thailand. Of the three types of institution, the state-run universities form the largest group and then the private-run universities and Rajamangala Institutes of Technology respectively (Ministry of the University Affairs, 1995). The Faculty of Engineering of each institution will have a different student population and a different number of English modules required. What is consistent though, is that students have to take at least six credits at each institution as prescribed by the Ministry of University Affairs. Basically, engineering students in Thailand are science-mathematics oriented in accordance with the subject contents of the field. The language used as a medium of instruction in most institutions is Thai, except for a few institutions, such as Thammasart University, or Assumption University, where an engineering programme is run in English and it is used as the medium of instruction accordingly.

In respect of effectiveness in language teaching and learning, it has been claimed that the teaching and learning of English in Thailand has not been satisfactory at any level (Sinlarat, 1987). Many attempts have been made to improve the teaching and learning of English and to raise students' awareness of the importance of English at every level. At the primary and secondary levels, the objectives and contents to be achieved are clearly stated in the national curricula. At the tertiary level, however, the curriculum depends largely on the individual institutions. Each institutional academic council makes a decision on the modules to be offered to students following the guidelines of Ministry of

the University Affairs and this must be approved by the ministerial academic council in the Ministry. English is a compulsory fundamental subject for almost every student at the tertiary level, but it depends on the individual institutions how English courses are run. Higher education in Thailand, as in other nations in the world, offers different fields of study, both sciences and social sciences, to students to the maximum potential capacity of each institution.

Attempts to improve the quality of English language education in Thailand have been made over the past two decades, as reported by Sukwiwat (1985). The most prominent organisation to emerge as a result is THAI/TESOL, which started in 1980 with the main purposes of stimulating the professional development of the teaching of English, establishing contacts with other agencies, collecting and disseminating information on new developments in the teaching of English language, and providing a forum for discussion of ELT issues and related areas of concern. THAI/TESOL can be viewed as an example of joint efforts among teachers of English in Thailand at all levels and those concerned with English language education (Sukwiwat, 1985).

1.5. Research Objectives

The present investigation aims at understanding how engineering students learn English in the classroom context at the tertiary level in Thailand, through an investigation of language learning strategies (see Chapter 2, Section 2.2, for the definition of language learning strategies for the present investigation). It is intended to describe types of language learning strategies which students report using both inside and outside the classroom settings.

The specific aims of the present investigation are:

1. To describe types of language learning strategies which Thai engineering students reported employing,

2. To examine the relationships between frequency of students' reported use of language learning strategies and the five independent variables, namely type of institution, gender of students, 'perceived' class size, location of institution, and levels of language proficiency, and
3. To investigate patterns of significant variation in the frequency of students' reported strategy use at different levels with reference to five independent variables as mentioned in (2) above.

1.6. The Expected Outcome

As this is the first known research to investigate language learning strategies employed by engineering students learning English at the tertiary level in Thailand, one outcome will be to identify and describe the types of language learning strategies reported to be employed by these students, both inside and outside the classroom settings. The expected outcomes will correspond to the research questions. The findings will reveal the relationship between these language learning strategies and the five variables, creating a clear picture of the variation patterns of strategy use of the research population for the present investigation.

1.7. Outline of the Thesis

In order to achieve the research objectives, the researcher first reviews the past research on, and related materials about, language learning strategies, and research methodology which contributes to the present investigation. This can be seen in Chapter 2 which includes a literature review on the work of different researchers, e.g. Rubin (1975; 1981), Stern (1975; 1983), and Carver (1984). The chapter summarises how language learning strategies are defined and classified by different researchers. Some language learning strategy characteristics are also discussed as well as the classification

systems put forward by the seven researchers mentioned above. Some research work on language learning strategies which contributes to the present investigation is presented.

Chapter 3 discusses some general principles of research design which apply to the present investigation. It discusses main research methods in language learning strategies, the theoretical framework of the research, rationale for selecting and rejecting variables, as well as the research questions for the present investigation. This is followed by the discussion about sampling and the rationales behind the choice of subjects and institutions for the investigation and the characteristics of the research population. The last part of this chapter deals with the data collection procedures of both phases and how the data obtained are reported, analysed, and interpreted.

Chapter 4 deals with the language learning strategy inventory which emerged from the data obtained through student oral interviews conducted with 39 engineering students learning English at three different types of institution in Thailand in 1998. Firstly, the procedures of eliciting information from the 39 students in the first phase of data collection are presented. This is followed by a report of how the preliminary language learning strategy inventory was generated based on the interview data, and the results of two validation exercises of the inventory. The generation of the language learning strategy inventory after the two validation exercises were carried out, and the strategy questionnaire which was used as the main instrument for the second phase of data collection are presented.

Chapter 5 presents the process of constructing the test which was used to determine students' language proficiency levels. This test is referred to as 'Proficiency Test in English for Science and Technology' or PTEST. The test is not related to or designed for any particular course of study of any students who are the subjects of the study. Apart from the theoretical background for test construction, reports on the pre-piloting,

piloting, and post-piloting stages are presented. The scores of those tested in the main scheme of data collection and their levels of language proficiency are included.

Chapter 6 describes and discusses the results of the research findings of the present investigation in terms of students' overall strategy use, use of strategies in the two main categories, i.e. classroom-related and classroom-independent categories, use of strategies to achieve classroom-related, as well as classroom-independent purposes, and use of individual learning strategies. In this chapter, significant variations in use of language learning strategies are not taken into consideration. As a result, comparisons of use of different language learning strategy categories by 570 students based on the holistic mean scores of frequency use are made.

Chapter 7 examines the relationship of language learning strategy use by 570 engineering students to the type of institution at which they are learning, their gender, their perception of their English class size, the location of the institution they are learning at, and their language proficiency levels. The use of language learning strategies is divided into: overall strategy use, use of strategies in the two main categories (see above in Chapter 6), use of strategies to achieve both classroom-related and classroom-independent purposes, and use of individual learning strategies. Apart from this, significant variations in frequency of use of language learning strategies according to the five independent variables are examined. The chapter describes and discusses the results of the analysis obtained from the data by different statistical methods such as an analysis of variance (ANOVA), chi-square tests, and a factor analysis.

Finally, Chapter 8 summarises the main findings of the present investigation in response to the research questions 1 to 8 presented in Chapter 3, including discussions of the research findings and implications for the teaching and learning of English for engineering students in Thailand. The contributions of the present investigation to the

related areas are preceded by the presentation of the limitations of the present investigations and proposals for future research.

1.8. Summary

In this chapter, the researcher has given a description of the background of the investigation in an attempt to put the study in context. This was followed by a brief overview of the educational system and status of the English language and the teaching of English in Thailand. Then, the research objectives, and the expected outcomes of the present investigation are briefly discussed. Lastly, the outline of the thesis is concluded.

CHAPTER 2

REVIEW OF RELATED LITERATURE AND RESEARCH ON LANGUAGE LEARNING STRATEGIES

CHAPTER TWO

REVIEW OF RELATED LITERATURE AND RESEARCH ON LANGUAGE LEARNING STRATEGIES

2.1. Introduction and Purpose of the Chapter

In recent years, research on language learning strategies has experienced tremendous growth and many researchers of the field have come to the most enduring conclusion that a variety of language learning strategies have the potential to facilitate language learning (Oxford, Lavine and Crookall, 1989; Nyikos and Oxford, 1993; MacIntyre and Noels, 1996). According to Carroll (1977), learning a foreign or a second language requires considerable effort. It can be a struggle for learners to find ways which are suitable and effective for themselves. Learning a foreign language can therefore be difficult and frustrating. MacIntyre and Noels (1996) suggest that the effort in finding such ways may help learners to comprehend, and retain knowledge of the target language, whether they are learning inside or outside a classroom setting. Concluding from the language learning research, Pearson (1988) suggests that individual learners must be consciously prepared to invest a great deal of their own time and energy in second-language learning, and that learners must want to become responsible for their own learning.

As can be seen in this chapter, many of the initial studies of language learning strategies were directed at defining learning strategies and developing taxonomies that could be used to classify them. Examples are Stern (1975), Rubin (1981), Carver (1984), Ellis and Sinclair (1989), Oxford (1990), O'Malley and Chamot (1990), and Coleman (1991b). Recently, interest in learning strategies has been focused on the relationships between learner characteristics and success in language learning (Bialystok, 1981;

Ehrman and Oxford, 1989; and Gradman and Hanania, 1991). The learner characteristics which relate to the success of second or foreign language learning include language learning aptitude, attitude and motivation, personality variables, socio-cultural variables, language practice and learning strategies. Besides, successful language learning may also relate to the characteristics of the learning situation such as length of exposure to the target language or the teaching methods. Further, another major area of second or foreign language learning research is on the complex relationship between the learner specific language learning behaviours or strategies, and the ultimate success of these behaviours or strategies in language learning (Bacon and Finnemann, 1990). That means, many researchers who are interested in language learning strategies tend to pay more attention to identifying the strategy use of successful language learners (e.g. Rubin, 1975; Bialystok, 1981; and O'Malley et al, 1985b).

A number of researchers have examined language learning strategies employed by language learners learning a target language, mainly English, in different contexts in different parts of the world, i.e. learning English as a foreign language (EFL), or learning English as a second language (ESL). Some researchers have also examined language learning strategies employed by native speakers of English learning a foreign language such as French, German, or Russian. Consequently, many of these researchers have come up with different findings which they have used to define and classify language learning strategies.

As this chapter is the beginning of an investigation of language learning strategies, the researcher attempts to locate the present investigation in the context of previous research and authors' opinions. In other words, the researcher attempts to present to the reader the knowledge base upon which the present study is built. The purpose is to examine how language learning strategies are defined and classified by different

researchers. In reviewing the research work on language learning strategies, the researcher will start with a brief discussion of definitions of learning strategies by different researchers, as well as some characteristics of language learning strategies. This is followed by a brief discussion of classification systems put forward by seven researchers. Finally, some research work on language learning strategies which contributes to the present investigation is presented.

2.2. Definition and Characteristics of Language Learning Strategies

The term 'learning strategies' is used in a variety of ways by different researchers and its precise meaning is sometimes difficult to ascertain (Stern, 1983; and Smith, 1994). Consistent with these comments, Ellis (1994) states that different researchers define learning strategies differently according to their personal perception and belief and that definitions of learning strategies have tended to be ad hoc and atheoretical. In addition, one of the best approaches to defining learning strategies is to list the main characteristics of the learning strategies defined and used in the studies by different researchers. Stevick (1990), however, suggests that no matter how different the definitions, they tend to share two common characteristics, the first to do with general characteristics of learners and the second to do with techniques.

What follow are the definitions produced by different researchers in the field of language learning strategies:

- Rubin (1975: 43) defines learning strategies as 'the techniques or devices which a learner may use to acquire knowledge.'
- Tarone (1980: 419; 1981: 290) offers a definition of language learning as 'an attempt to develop linguistic and sociolinguistic competence in the target language.'
- Stern (1983: 405) defines learning strategies as 'particular forms of observable learning behaviour, more or less consciously employed by the learner.'
- Bialystok (1985: 258) sees learning strategies as 'activities undertaken by learners whether consciously or not, that have the effect of promoting the learner's ability either to analyse the linguistic knowledge relevant to the language under study, or to

improve the control of procedures for selecting and applying the knowledge under specific contextual conditions.'

- Weinstein and Mayer (1986: 315) define language learning strategies as 'behaviours and thoughts that a learner engages in during learning that are intended to influence the learner's encoding process.'
- Wenden (1987: 6-7) defines learning strategies as 'actions or techniques, whether observable or unobservable, which can be learned and changed and which contribute either directly or indirectly to learning. Learners take these actions or employ these techniques either consciously or automatically in response to needs.'
- Schmeck (1988: 17) states that learning strategies are 'combinations of cognitive (thinking) skills implemented when a situation is perceived as one demanding learning.'
- Oxford (1989: 8) defines learning strategies as 'specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations.'
- O'Malley and Chamot (1990: 1) define learning strategies as 'the special thoughts or behaviours that individuals use to help them comprehend, learn, or retain new information.'
- MacIntyre (1994: 185) sees learning strategies as 'the techniques and tricks that learners use to make the language easier to master.'
- Ellis (1997: 76-77) offers a definition of learning strategies as 'particular approaches or techniques that learners employ to try to learn L2. They can be behavioural (for example, repeating new words aloud to help you remember them) or they can be mental (for example, using the linguistic or situational context to infer the meaning of a new word).'
- Graham (1997:174) defines learning strategies as 'thoughts or behaviours that help students to understand, learn or retain new information.'
- Cohen (1998: 4) defines learning strategies as 'learning processes which are consciously selected by the learner. The element of choice is important here because this is what gives a strategy its special character. These are also moves which the learner is at least partially aware of, even if full attention is not being given to them.'

A sample of definitions of language learning strategies apparently show that no two researchers define language learning strategies in exactly the same way. As observed by Baker and Derwing (1982), pursuing the term 'strategy' in the literature will present a range of impressions with the possibility of controversial issues with regards to the terminology ensuing. The researcher for the present investigation is therefore left with the question of how language learning strategies should be defined as a working

definition. However, it is not the purpose of this section to attempt to judge or determine which definition by which researcher is more perfect or better than another. Rather, it is to demonstrate that defining language learning strategies is subjective and problematic. Williams and Burden, (1997) make it clear that this has also proved difficult partly because terms which are referred to as 'strategies' are used differently by different people. These different terms are evidenced in the sample of definitions presented earlier, as well as later in this section. What follow are some difficulties and subjectivity in defining the term 'learning strategies' as observed by the researcher for the present investigation based upon the thirteen definitions presented above. These include:

1. Observable behaviours, unobservable mental processes, or as both

As seen above, it is not clear whether language learning strategies are perceived as observable behaviours, unobservable mental processes, or as both. Stern (1983), Oxford (1989), and MacIntyre (1994) appear to see them as observable behaviours, while Schmeck (1988) implies that learning strategies are unobservable (thinking skills) or thought processes. However, other researchers, e.g. Weinstein and Mayer (1986), Wenden (1987), O'Malley and Chamot (1990), Ellis (1997), and Graham (1997) see learning strategies as both observable behaviours and unobservable mental processes.

2. Conscious and intentional, or subconscious and automatic

Another problem of defining language learning strategies is whether they are to be seen as conscious and intentional, or subconscious and automatic. As can be seen from the sample of definitions above, many definitions avoid addressing this issue explicitly. However, a few researchers refer to language learning strategies as conscious or intentional (Stern, 1983; MacIntyre, 1994; and Cohen, 1998), while Wenden (1987); and Bialystok (1985) refer to them as either conscious or unconscious (automatic).

3. Terms referred to 'learning strategies'

Another potential problem is that different researchers may use different words when they refer to 'strategies'. Examples are 'behaviours' (Stern, 1983; Weinstein and Mayer, 1986; Oxford, 1989; O'Malley and Chamot, 1990; and Graham, 1997); 'device' (Rubin, 1975); 'thoughts' (Weinstein and Mayer, 1986; O'Malley and Chamot, 1990; and Graham, 1997); 'techniques' (Rubin, 1975; Wenden, 1987; MacIntyre, 1994; Ellis, 1997); 'activities' (Bialystok, 1985); 'tricks' (MacIntyre, 1994); 'procedures' (Ellis, 1997); or 'moves' (Cohen, 1998).

Lastly, as pointed out by Ellis (1994), there are differences in opinions about what motivates students in their use of language learning strategies. Though some differences have been pointed out, these definitions share some common characteristics, i.e. language learning strategies may contribute either directly or indirectly to language learning. All the definitions shown above recognise that language learners expend much effort to learn or master the target language. Additionally, Oxford (1989) suggests that the use of language learning strategies can have an affective purpose, i.e. to make their language learning more enjoyable.

In conclusion, the main characteristics of language learning strategies as observed from the definitions by different researchers can be summarised as follows:

Language learning strategies:

- are either general approaches, or specific actions, behaviours, or techniques
- are problem-orientated
- are employed either consciously and intentionally, or unconsciously and automatically
- have either direct or indirect contributions to language learning
- are either observable, or unobservable
- are amenable to change or modification through strategy training or teaching or through students' language learning experiences
- are influenced by a variety of factors
- involve many aspects of learners such as cognitive, metacognitive, or social and affective

To sum up, a language learner has to struggle and expend much effort to cope with the difficulties of learning a foreign language. To achieve success in the target language the individual learner is learning, a suitable and effective choice of learning strategies must be made. Each definition proposed by different researchers mainly emerges from what they have focused on, in what context their research has been carried out, and the parameters imposed by the research population.

Having studied the ideas of different researchers, the researcher has proposed to define language learning strategies in order to suit the context of the present investigation. Language learning strategies have been defined, specifically for this present investigation, as any set of techniques or learning behaviours, whether observable or unobservable, which engineering students reported employing for the purpose of enhancing their language learning either in the classroom setting, or outside the classroom setting. Furthermore, the researcher recognises that different learners can make their own choices of learning strategies to facilitate the learning of the target language. It is also recognised that language learning strategies will never be effective or useful unless the learners know and use them appropriately in order to help facilitate their language learning.

2.3. Language Learning Strategy Classification System

In classifying language learning strategies by different researchers, various strategy names are used, rather than a standard and consistent set of terminology. According to Oxford and Crookall (1989), it is impossible to provide a complete glossary of technical terms used in all studies. This makes it difficult in many cases to compare strategies reported in one study with those reported in another (Chamot, 1987; Ellis and Sinclair, 1989). Hence, the researcher for the present investigation will not attempt to make

comparisons of any of the strategy classifications proposed by different researchers in terms of comprehensiveness or coverage.

Ellis (1994) notes that learning strategies differ in a number of ways, reflecting the particular subjects that the researchers worked with, the setting, and the particular interests of the researchers. As can be seen below, different researchers have different ways of classifying learning strategies. This strategy classification may be based on their own experience as language learners, or language teachers (e.g. Stern, 1983), their own language learning strategy investigation (e.g. Rubin, 1981; O'Malley and Chamot, 1990; Oxford, 1990; Cohen, 1990; and Coleman, 1991), or their reviews of other researchers' work (e.g. Rubin, 1981; Stern, 1983; Carver, 1984; and Ellis and Sinclair, 1989).

What follows is a consideration of the language learning strategy classification systems which have been identified as the result of research on language learning strategies in different contexts by different researchers. These have made an important contribution to the knowledge of language learning strategies. The following section summarises, as well as discusses briefly strategy classification systems proposed by seven researchers. These include the works of Stern (1975; 1983); Rubin (1975; 1981); Carver (1984); Ellis and Sinclair (1989); Oxford (1990); O'Malley and Chamot (1990); and Coleman (1991b).

2.3.1. Language Learning Strategy Classification by Stern

Stern (1975; 1983) A) 'Strategies for good language learners'

- | | |
|----------------------------|--------------------------------|
| 1. Planning strategies | 2. Active strategies |
| 3. Emphatic strategies | 4. Formal strategies |
| 5. Experimental strategies | 6. Semantic strategies |
| 7. Practice strategies | 8. Communication strategies |
| 9. Monitoring strategies | 10. Internalisation strategies |

B) 'Basic Strategies for good language learners'

- 1. Active planning strategy**
 - Select goals/sub-goals, recognise stages, and participate actively in the learning process

2. Explicit learning strategy

- Pay attention to linguistic features of the target language, conscious learning, practice, memorisation, and progress monitoring

3. Social learning strategy

- Seek communication with target language users and language community, develop communication strategies, become involved as participants in authentic language use

4. Affective strategy

- Approach task with positive frame of mind, develop necessary energy to overcome frustrations, and cope with emotional and motivational problems

Stern (1975; 1983) has drawn up a list of ten strategies of good language learners.

Historically, this list of learning strategies appears to have been influential for other researchers in their classification of language learning strategies. These strategies are derived from three main sources which are: (1) his own interpretation of language competence and the three main areas of language acquisition which are (a) the disparity- the condition or fact of being unequal as in age difference- between the inevitable and deep-seated presence of the first language and other languages previously learned as a reference system and the inadequate development of the new language as a new reference system; (b) the code communication dilemma, that is, the learner has to find a way of dealing with both the linguistic forms and message to be conveyed; and (c) the choice between rational and intuitive learning; (2) his experience as a teacher and a learner, and (3) his literature review on language learning of Nida (1957); Gudschinsky (1967); Larson and Smalley (1972); and Rubin (1975). Apart from the ten learning strategies on the list, Stern has also derived the four basic sets of learning strategies which good language learners are likely to employ while less successful learners employ them only weakly, fail to maintain them concurrently, or fail to develop them altogether. In his view, the four basic sets of learning strategies are required for effective language learning. It is not necessary that all learners employ all four strategies equally and at all times (Stern, 1983).

2.3.2. Language Learning Strategy Classification by Rubin

Rubin (1975; 1981) 1. The strategies which may contribute directly to language learning:

1.1. Clarification/verification

- Asking for an example of how to use a particular word or expression

1.2. Guessing/inductive inferencing

- Using clues from other items in the sentence/phrase, or key words in a sentence to guess

1.3. Deductive reasoning

- Inferring grammatical rules by analogy, or grouping words according to similarity of endings

1.4. Practice

- Experimenting with new words in isolation and in context, or using mirror for practice

1.5. Memorisation

- Taking notes of new items with or without texts

1.6. Monitoring

- Correcting errors in own/other's pronunciation, vocabulary, spelling, grammar and style

2. The strategies which may contribute indirectly to language learning:

2.1. Create opportunity for practice

- Initiating conversation with fellow student/teacher/native speaker, or creating situation with natives in order to verify/test/practise

2.2. Production tricks

- Related to communication focus/drive, probably related to motivation and opportunity for exposure such as using circumlocution and paraphrase to get to get message across, or repeating sentence to further understanding

Rubin (1975; 1981) began to pursue the idea of investigating language learning by studying the strategies of successful language learners (Stern, 1983). She presents a list of six general strategies which may contribute directly to language learning, and two strategies which may contribute indirectly to language learning. They are based on basic psychological characteristics such as risk-taking, tolerance for ambiguity and empathy among others. In the data collection, classroom observations and student interviews were conducted. Rubin has modified what she calls the 'Observation Schedule' through direct classroom observations or on videotape and through student self-reports and diaries. Apart from this, she also observed herself in language learning situations, and elicited observations from second language teachers (Stern, 1983). She has also modified it through consideration of the research on language learning strategies of some

researchers, e.g. Naiman, Fröhlich and Stern (1975); Fillmore (1976); Tarone (1977); and Cohen and Apeh (1978).

2.3.3. Language Learning Strategy Classification by Carver

- Carver (1984)**
- 1. Strategies for coping with target language rules**
- Generalisation, or simplification
 - 2. Strategies for receiving performance**
- Inferring from probability, or from knowledge of the world
 - 3. Strategies for producing performance**
- Repeating oneself, or rehearsing before production
 - 4. Strategies for organising learning**
- Contacting with teachers or peers

Carver (1984) has proposed that learner strategies can be subdivided into four categories. This classification system is based on the research of Selinker (1978) and of Tarone (1978; 1980). Carver also suggests that learner strategies are either overt or covert behaviour, conscious or unconscious, arising directly from learning styles and work habit. In addition, learner strategies tend to be adventitious and unplanned. When learning styles and work habits are mediated through conscious plans, the outcome of learner strategies may be more effective and more satisfying for the learner.

2.3.4. Language Learning Strategy Classification by Ellis and Sinclair

- Ellis and Sinclair (1989)**
- 1. Metacognitive strategies**
- Advance preparation, or directing attention
 - 2. Cognitive strategies**
- Audio-recording such as recording themselves for the purpose of self-assessment
 - 3. Social strategies**
- Discussing or sharing ideas and experiences with other students or teachers
 - 4. Communication strategies**
- Asking a speaker to speak more slowly or clearly

Ellis and Sinclair (1989) have made a list of learning strategies under four categories which are Metacognitive, Cognitive, Social and Communication strategies. These learning strategies are based on the work of O'Malley et al (1985), and the studies

described in Faerch and Kasper (1983) and Riley (1985). They also extended these categories and adapted descriptions where they found necessary.

2.3.5. Language Learning Strategy Classification System by Oxford

Oxford (1990)

1. Direct Strategies

1.1. Memory strategies

- Creating mental linkages such as grouping, associating, or placing new words into a context

1.2. Cognitive strategies

- Practising such as repeating, formally practising with sounds and writing systems, or recombining

1.3. Compensation strategies

- Guessing intelligently such as using linguistic clues, or using other clues

2. Indirect Strategies

2.1. Metacognitive strategies

- Centering your learning such as overviewing and linking with already known material, or paying attention

2.2. Affective strategies

- Lowering your anxiety such as using progressive relaxation, deep breathing, or meditation

2.3. Social strategies

- Asking questions such as asking for clarification or verification

Oxford (1990) has classified language learning strategies into two main categories: direct and indirect strategies. Each has three sub-categories i.e. the direct strategy category consists of memory, cognitive and compensation strategies; and the indirect strategy category consists of metacognitive, social, and affective strategies. Within the category of direct strategies, there are memory strategies, which help learners to store and retrieve new information; cognitive strategies, which learners use to understand and to produce the new language; and compensation strategies, which learners use when they encounter a gap in their knowledge of the target language and which enable them to deal with this deficiency. Within the indirect strategies, they include metacognitive strategies, which relate to the organisation of the learning process; affective strategies, by which learners regulate their emotions, motivations and attitudes; and social strategies, which

direct learners' interaction with other people for the purpose of language learning. Learners can have an interaction with teacher, fellow friends, proficient target language speakers or native speakers of the target language. Both direct and indirect strategies do not work separately and clear-cut. In other words, one category of learning strategies may use strategies under another category to help, e.g. the direct strategies under the category of metacognitive strategies "centering your learning" or "overviewing and linking with already known material". This strategy seems to involve the use of a number of direct strategies such as one or more strategies under the category of memory strategies e.g. semantic mapping; cognitive strategies e.g. practising (recognising formulas and patterns); analysing and reasoning, e.g. analysing expressions or "creating structure for input and output", e.g. highlighting. Therefore, there is an interaction among the various categories. However compensation strategies may be regarded as communication strategies by other researchers as it seems to serve the learners' communication purpose when they have a problem in using the target language. Still it serves to promote language learning.

2.3.6. Language Learning Strategy Classification System by O'Malley and Chamot

- O'Malley and Chamot (1990)**
- 1. Metacognitive strategies**
 - Planning such as previewing the organising concept or principle of an anticipated learning task (advance organisation)
 - 2. Cognitive strategies**
 - Repetition such as repeating a chunk of language-a word, or a phrase- in the course of performing a task
 - 3. Social/Affective strategies**
 - Questioning for clarification such as asking for explanations, verification, or posing questions to self

O'Malley and Chamot (1990) classify learning strategies into three general categories which are (1) metacognitive strategies, which learners make use of their knowledge about cognitive processes and constitute an attempt to regulate language learning by

means of planning, monitoring and evaluating; (2) cognitive strategies, which refer to the steps or operations used in problem-solving that require direct analysis, transformation or synthesis of learning; and (3) social-affective strategies, which concern the ways in which learners select to interact with other learners and native speakers. The classification system of the learning strategies is based on research on the use of learning strategies in second language acquisition and learning and is in accordance with the information-processing model as appeared in the main categories i.e. cognitive, metacognitive, and social and affective. They also examine some studies of learning strategies for learning tasks in a first language. According to Chamot (1987), a valuable insight gained from reviewing the studies was identification of a classification scheme that was capable of subsuming the various types of learning strategies identified by second language researchers.

2.3.7. Language Learning Strategies Classification by Coleman

Coleman (1991b)

1. The strategies which are related to the taught programme

1.1. Before the class

- Preparing the lesson before coming to class

1.2. In the class

- Asking questions, or paying attention

1.3. After class

- Contacting the teacher and asking questions, or contacting friends

2. The strategies which are extra to the class

- Mixing with English speakers, or using libraries or media

3. The strategies which are termed as 'bucking the system'

- Finding privileged information, or sitting near bright students

Apart from the previously shown language learning strategies classification system of some recognised researchers in the field, Coleman (1991b) has another interesting and practical way of classifying learning strategies, especially learning language in the setting of large classes. He proposes in "Strategies in the large class" in addition to the learning strategies such as cognitive, metacognitive, affective and social strategies, that it may be necessary to consider a new category of language learning strategies; he proposes an

“environmental” or “contextual” strategy. In this category, some features of both the social and metacognitive strategies would be shared, but it would enable researchers to explore how successful and unsuccessful language learners manage themselves in the context of a large class. The list of the strategies under his classification was given by overseas participants in some of the in-service teacher development programmes at School of Education, the University of Leeds, and all of whom have had experience of studying in large classes in their respective home countries. Further, Coleman (1991b) identifies language learning strategies of university students based on the preliminary data provided by approximately 40 Thai teachers, most of who work as university teachers. These teachers are believed to represent good language learners due to their high accomplishment in language learning. They produced a list of 77 learning strategies altogether and the obtained data were classified under 18 strategy types. These 18 strategy types were further grouped into three broad categories as elaborately developed by the investigator.

In conclusion, as shown above, different researchers have different ways of classifying language learning strategies. Their distinction seems to overlap, but is not identical (Larsen-Freeman and Long, 1991). The most common or outstanding strategy categories are cognitive, metacognitive, social and affective.

2.4. Research on Language Learning Strategies

As mentioned earlier, many of the initial studies of language learning strategies were directed at defining learning strategies and developing taxonomies that could be used to classify them. The primary purpose of this section is to describe a survey of research on language learning strategies carried out by different researchers in different contexts.

The research findings presented show that although many variables have been investigated, e.g. level of proficiency, the gender of students, and ‘perceived’ class size,

there are other aspects which should be taken into consideration. With this in mind, the researcher attempts to present some analysis of past research including the purpose of study, the status of the target language in the context where the research has been conducted or the native language of the learners, the educational level of the participants, the main instrument(s) used in the study, and investigated factors or variables. Table 2.1. below shows the structure of the analysis.

Table 2.1 : Research on Language Learning Strategies Analysis

Researcher	Language Learner (LL)	Focus of Study	Educational Level	Method of Data Collection	Investigated Variable
1) Politzer 1983	NSE learning FL	Good LL's learning behaviours	Tertiary	Questionnaire	Students' grade -Language being learned course level - Gender
2) Chesterfield & Chesterfield 1985	NNSE learning ESL	Overall Strategy Use	Primary	Observation	Level of Language Proficiency (LLP)
3) Politzer & McGroarty 1985	NNSE learning ESL	- Overall Strategy Use - Strategy use by good and poor LL's	Adult	- Interview - Questionnaire	- LLP - Students' cultural background - Field of specialisation
4) Ramirez 1986	NSE learning FL	- Strategy use by good LL	Secondary	Questionnaire	LLP
5) Huang & vanNaerssen 1987	NNSE learning EFL	Strategy use by good and poor LL's	Tertiary	- Interview - Questionnaire	LLP
6) Pearson 1988	NNSE learning EFL	Strategy use by good and poor LL's	Adult	Interview	LLP
7) Porte 1988	NNSE learning EFL	Strategy use by poor LL	Adult	Interview	- LLP - Language learning experience
8) Tran 1988	NNSE learning ESL	-English language acculturation and strategy use	Adult	-Interview -Questionnaire	-Age -Gender

Notes: NSE stands for Native Speakers of English; NNSE: Non-native Speakers of English; EFL: English as a Foreign Language; ESL: English as a Second Language; FL: Foreign language; LL: Language Learner

Table 2.1 (contd): Research on Language Learning Strategies Analysis

Researcher	Language Learner (LL)	Focus of Study	Educational Level	Method of Data Collection	Investigated Variable
9) Prokop 1989	NSE learning FL	-Patterns of strategy use	Tertiary	Questionnaire	-Level of instruction -Achievement -Gender -Motivation
10) Oxford & Nyikos 1989	NSE learning FL	Overall Strategy Use	Tertiary	Questionnaire	- LLP -Gender of learner -Major field of study - Course status
11) Ehrman & Oxford 1989	NSE learning FL	Overall Strategy Use	Adult	Questionnaire	- LLP -Gender -Aptitude - Learning style -Motivation -Personality type - Anxiety -Teacher perceptions
12) Nyikos 1990	NSE learning FL	Overall Strategy Use	Tertiary	Experiment	-Gender
13) Khaldi 1990	NNSE learning EFL	- Strategy use by good and poor LL's	Tertiary	-Interview -Questionnaire	-Previous learning experience -Teacher's background and teaching practice
14) Vann and Abraham 1990	NNSE learning ESL	Strategy use by poor LL	Adult	Think-aloud	Level of language proficiency
15) Coleman 1991b	NNSE learning EFL	Strategy use by good LL	Adult	Questionnaire	Perceived Class Size
16) Sarwar 1992	NNSE learning ESL	Overall strategy use	Tertiary	Questionnaire	-LLP - Perceived Class Size
17) Nyikos & Oxford 1993	NSE learning FL	Overall strategy use	Tertiary	Questionnaire	-LLP -Motivation -University major
18) Green & Oxford 1995	NNSE learning ESL	- Overall strategy use - Strategy use by good and poor LL's	Tertiary	Questionnaire	- LLP -Gender

Table 2.1 (contd): Research on Language Learning Strategies Analysis

Researcher	Language Learner (LL)	Focus of Study	Educational Level	Method of Data Collection	Investigated Variable
19) Mebo 1995	NNSE learning EFL	Overall strategy use	Tertiary	-Observation -Interview Questionnaire	-LLP -Perceived Class Size
20) Oxford & Ehrman 1995	NSE learning FL	Overall strategy use	Adult	Questionnaire	-LLP -Gender -Aptitude - Learning style -Motivation -Personality type - Anxiety -Teacher perceptions
21) MacIntyre & Noels 1996	NSE learning FL	Overall strategy use	Tertiary	Questionnaire	-LLP - Motivation -Language anxiety
22) Embi 1996	NNSE learning EFL	-Overall strategy use - Strategy use by good and poor LL's	Secondary	-Observation -Interview -Questionnaire	-LLP -Gender -Perceived Class Size -Ethnic group -Language use outside class
23) Young 1996	NNSE learning ESL	Strategy use by good and poor LL's	Tertiary	Think-aloud	-Achievement -Gender - Self-rating ability -Topic familiarity
24) Kayaoglu 1997	NNSE learning EFL/ESL	Strategy use by good and by poor LL's	Adult	-Observation -Interview -Questionnaire	-Learner beliefs -Assumptions about language learning

Table 2.1. above summarises the research work on language learning strategies from the early 1980's towards the late 1990's. Through an extensive review of research on language learning strategies, the researcher attempts to show how different variables are found to be related to students' use of language learning strategies. In this regard, the focus will be on three of the five variables, which are to be investigated for the present investigation, i.e. levels of language proficiency, gender, and 'perceived' class size.

Unfortunately, no empirical research in the field has been carried out to examine students' use of strategies in relation to the other two variables for the present investigation, i.e. type of institution, and location of institution (see Rationale for selecting and rejecting the variables for the present investigation in Chapter 3). They are now commented as below.

2.4.1. Language Learning Strategies and Levels of Language Proficiency

Learners' language proficiency levels, sometimes implied by course level and number of years of language study (Oxford, 1989), has been the variable most studied by researchers in the field of language learning strategies. Generally, researchers classify language learners as one of these dichotomies: successful / unsuccessful; high / low proficiency level; effective / ineffective; or good / poor. A few researchers classify learners' proficiency levels into more categories as high, moderate, and low. No matter how language learners are classified, most research results to date reveal that language learners with a higher proficiency level tend to employ language learning strategies significantly more frequently or have greater range of language learning strategies than those with a lower proficiency level. There are certain learning strategies which were reported to relate to success in language learning. Researchers in the field have examined strategy use in relation to language proficiency levels of different learners in association with their educational levels, i.e. primary, secondary, tertiary, and adults.

The strategy use of primary school children was studied by Chesterfield and Chesterfield (1985). They observed strategy use of 14 Mexican-American bilingual pre-school, and year one children through school experiences. The results of the study revealed some strategies commonly used by these children. These strategies include, for example, repetition, memorisation, talk to self, and appeal for assistance. The use of language learning strategies in relation to level of language proficiency levels of

secondary school students were examined by a few researchers. For example, Embi (1996) investigated language learning strategies employed by 515 secondary students learning English as a foreign language in Malaysia. The research results revealed that students with a higher level of language proficiency reported employing language learning strategies significantly more frequently than those with a lower level of language proficiency.

Language learning strategies employed by university students have been examined by many researchers to date. Green and Oxford (1995), for example, examined the use of language learning strategies by 374 students learning English at the University of Puerto Rico at Mayagüez. Students were classified as Prebasic, Basic, and Intermediate. The results of the research revealed that the students who were in Basic and Intermediate courses reported employing language learning strategies significantly more frequently than those in the Prebasic courses. However, the results of the study by Khaldi (1990) are different. Khaldi investigated language learning strategies by 171 English major students in Algeria; 99 students were classified as intermediate learners and 72 were advanced learners. These students had at least six years' experience of English at the secondary school level. The findings showed that learning strategies were inherent to the learning process itself and were used by all learners, irrespective of their proficiency in the foreign language. Some strategies were used more frequently than others with the acquisition of a particular area of the language.

With adult language learners, Pearson (1988), for example, examined the use of language strategies by 5 Japanese adults working in Singapore where English is extensively used at work. Two of the five were then selected for study. Of these, one was classified as a successful language learner and the other one as unsuccessful. The results of the research revealed that the successful language learner reported using

strategies significantly more frequently than the unsuccessful one. Another study of adults' strategy use was conducted by Vann and Abraham (1990). They investigated the use of language learning strategies of two Saudi Arabian students taking an intensive English programme (IEP) at an American university through think-aloud protocols. The results revealed that these two unsuccessful learners appeared to be active strategy users, though sometimes they applied strategies inappropriately.

In conclusion, most, if not all, of the studies which take learners' proficiency levels into consideration, suggest a relationship between this variable and students' use of language learning strategies. In general terms, higher-proficiency learners or learners with more years of study differ from lower-proficiency learners or those with fewer years of language study in terms of range and frequency of their use of learning strategies. However, as observed by the researcher for the present investigation, many researchers who examined learners' proficiency levels in relation to their strategy use seem to fail to recognise that the relationship between strategy use and levels of language proficiency is still complex. That is to say, strategy use may be as much a result of proficiency levels as a cause.

2.4.2. Language Learning Strategies and Gender of Students

According to Oxford (1989) most researchers have not investigated gender differences in language learning strategy use. In other words, most researchers have ignored the possibility of different approaches being taken by gender of the learner as an important variable in their investigation. However, gender differences in strategy use may be more important than previously thought. To date, only a small amount of research work has been carried out in this area. One of the studies carried out by Politzer (1983) revealed that variations in use of language learning strategies due to the gender of

language learners seemed to be relatively minor, but it showed that female language learners used social learning strategies significantly more frequently than did males.

In a study of adult language learners, Ehrman and Oxford (1989) examined relationships among learner characteristics on language learning strategies in relation to gender differences. The findings of the investigation revealed that female language learners reported using four language learning strategies in four categories significantly more frequently than their male counterparts. These four strategy categories include: general study strategies, authentic language use, strategies for searching for and communicating meaning and self-management strategies. The results of strategy use by 327 Vietnamese adult refugees in America (196 males and 131 females) reported in Tran (1988) are not consistent with most studies. In this study, males were found to use more learning strategies to improve their English language skills than did females. These strategies include taking ESL classes, living in American neighbourhoods, practising with American friends, having an English tutor, practising with families and Vietnamese friends, and watching television or listening to the radio.

Oxford and Nyikos (1989) examined variables which affected choice of language learning strategies of slightly more than 1,200 American university students learning a foreign language. It was found that female students reported using three out of five learning strategy factors significantly more frequently than did male students. These three strategy factors were: formal rule-based practice strategies, general study strategies, and conversational/input elicitation strategies. Nyikos (1990) discovered another interesting gender difference in her training study of the use of mnemonic strategies for German vocabulary learning among 135 beginning level university foreign language students in the United States of America. These students had no previous experience in learning German. After the training, male students outperformed female

students in the colour-plus-picture mnemonic combination, which was explained as potentially relating to males' greater visual-spatial acuity, while female students outperformed their male counterparts in the colour-only condition, which was explained by females' documented interest in colour as an attractor. Embi (1996) reported from his investigation carried out with secondary school students in Malaysia that female students generally reported using language learning strategies significantly more frequently than their male counterparts.

Prokop (1989) conducted a study of the learning strategies employed by 98 Canadian university students learning German. Instead of relying merely on a statistical comparison, he attempted to explore the patterns of students' accepting and rejecting certain learning strategies. The results of the study revealed that male students reported employing risk-taking and creative approach to the learning tasks more frequently than their female counterparts did. Male students tried to be original in oral and written expressions regardless of correctness of their language. On the other hand, female students tried to get correct responses rather than wanting to be creative in their responses. They more frequently checked the correctness of their pronunciation and grammar. Females also expressed their opinion that they tried to associate new words with actual situations.

From the research findings above, it appears that females were generally reported to use certain learning strategies, i.e. social strategies, significantly more frequently than did their male counterparts. Ehrman and Oxford (1989) and Oxford and Nyikos (1989) reported in their studies that these gender differences might be accounted for by women's greater social orientation, stronger verbal skills and greater conformity to norms both linguistically and academically. However, there is also a special case which other factors such as the male-dominant cultural backgrounds or socio-economic status

which is a good predictor for exposure in the target language, may affect learners' strategy use.

In summary, the gender difference findings demonstrate that in most cases of the language learning situations, female language learners use certain strategies significantly more frequently than male language learners. However, after strategy training, males and females both show distinct strengths in using certain types of strategies.

2.4.3. Language Learning Strategies and 'Perceived' Class Size

Classrooms may be seen as the place where teaching and learning take place most of the time in the context of formal education. There are many factors that affect teaching and learning in the classroom such as size of the room, physical facilities and acoustic levels or the number of students in the class. The number of students in the classroom cannot on its own be the best indicator of whether the class is 'large', 'optimum', or 'small'. Coleman (1989b) suggests that it is difficult to define 'class size' as 'large' in terms of a single number. Class size can also vary from country to country and from one type of institution to another. Ryan and Greenfield (1975 cf. Coleman 1989b) agree that there is no such thing as a small or large class. A 'small' class of 30 may prove to be as effective as a 'small' class of 20, so it appears that the absolute size may not be the vital factor. In addition, Shamim (1993) comments that the number of students in one class seems to be necessary for defining class size, but it is not sufficient on its own. Other factors such as students' previous experience, the average class size in the immediate educational contexts, the size of the classroom and the ease or difficulty in doing certain types of activity in the classroom are also taken into consideration. Nolasco and Arthur (1991) state that the answer to the question 'What is a large class?' still varies and depends on the experience of the individual teacher. Students also have a perception of class size. It should not be viewed only from the teachers' perception (see e.g. LoCastro,

1989). Wulff et al. (1987) conducted a survey on students' perceptions of large classes which found no clear evidence from students' responses that they defined large classes consistently in any one particular way.

In coping with language learning in varying class sizes, students might employ different strategies. However, it has been shown that the definition of class size is still subjective with different teachers and students having different perceptions of the size of class they find themselves in. If students find themselves studying in a large class, they have to cope with many difficulties, particularly when learning a foreign language. Students in a larger class have to find suitable and workable learning strategies in order to carry on their learning successfully. This could be because students in larger classes begin to take more responsibility for their learning due to the difficulty of establishing teacher-student interaction and the relative anonymity of the large class situation (Allwright, 1989). Similarly, Weimer (1987) comments that for students, the environment of large classes tends to be impersonal and the opportunity for dialogue with the 'great mind' teaching the course is almost non-existent. It has also been hypothesised by Williams et al. (1985) that students, especially at the university level, probably take more responsibility for their learning and use more self-study methods which could affect the relationship between class size and results achieved.

As with gender differences, few researchers to date have paid attention to students' perception of their class sizes. Most researchers concentrate on classroom learning and overall strategies or other things, but fail to take class size into consideration. That is, they fail to look into how students studying in classes of different sizes, particularly those who perceive their class size as large, manage to learn.

Coleman (1991b) investigated language learning strategies in tertiary-level large classes by making use of the data provided by approximately 40 Thai teachers who

taught English to Thai students, mainly at universities, but a few at the secondary level. The participants were asked to make a list of learning strategies they found to be effective in their own experience of learning language in classes which they perceived as large, and what advice they would give to their students. The results provided three broad strategy categories further developed by the investigator (see Section 2.3.7 for the strategy classification).

Sarwar (1992) explored learning strategies of 144 students learning English at the tertiary level in Pakistan when learning English in large classes. It was found that the majority of Pakistani students enjoyed studying English, finding it manageable, and that their proficiency in English was average. Mebo (1995) conducted a comparative study of indirect learning strategy use by 101 Kenyan university students studying communication skills in classes of different sizes. It was found that students adopted very specific strategies for the large class environment of learning and that there was a more relaxed atmosphere in smaller classes than in the larger; students in larger classes used a greater range of, and individual strategies more frequently than those in smaller classes.

Lastly, Embi (1996) reported from his study with 515 secondary school students learning English in Malaysia that students who perceived their class size as 'large' reported using greater range of language learning strategies than those perceiving their class size as 'small'.

2.4.4. Research on Language Learning Strategies Carried Out with Thai Students

As seen earlier in this chapter, there are relatively few research works carried out elsewhere outside the United States. Having looked into what has been done with Thai students in respect of language learning strategies to date, the researcher for the present investigation has found that a few researchers have examined the use of strategies by

Thai students in a more narrowly focused aspect, where only few factors have been taken into consideration. Table 2.2 outlines the research conducted with Thai students.

Table 2.2 : Research on Language Learning Strategies Conducted with Thai Students

Researcher	Language Learner (LL)	Focus of Study	Educational Level	Method of Data Collection	Investigated Variable
1) Sarawit 1986	NNSE learning EFL	- Overall Strategy Use - Strategy use by good LL	Tertiary	Questionnaire	LLP
2) Ratchadawisitkul 1986	NNSE learning EFL	- Strategy use by good and poor LL's	Secondary	Questionnaire	LLP
3) Potjasan 1988	NNSE learning EFL	- Strategy use by good and poor LL's	Secondary	Questionnaire	LLP
4) Rattana-prucks 1990	NNSE learning EFL	Strategy use by good LL	Tertiary	-Interview -Questionnaire	LLP
5) Mullins 1992	NNSE learning EFL	Overall strategy use	Tertiary	Questionnaire	LLP
6) Torut 1994	NNSE learning EFL	- Strategy use by good and poor LL's	Tertiary	Questionnaire	-LLP -University major
7) Lappayawichit 1998	NNSE learning EFL	Strategy use by good and by poor LL's	Tertiary	Questionnaire	LLP

The first research work on language learning strategies in Thailand was carried out by Sarawit (1986). It was a very small scale of study. She examined language learning strategies employed by 31 English major students, also referred to as successful language learners, at Naresuan University, then Sri Nakharinwirot University at Phitsanulok. The Behaviour Questionnaire by Politzer and McGroarty (1985) was adapted as the research instrument. The results of the study revealed that these successful language learners did not consistently use learner strategies that have been identified as successful language learners by Stern (1975). In the same year as Sarawit, Ratchadawisitkul (1986) examined language learning strategies employed by year-twelve students in Bangkok Metropolis.

The research instrument used was the researcher-developed strategy questionnaire asking students in the aspects of the strategy use to understand the language, the practice of English, and the monitoring of the learning. The use of learning strategies between high and low achievers was also compared. It was found that there was a significant difference in strategy use between high and low achievers. Unfortunately, the researcher failed to demonstrate how the strategy questionnaire was developed.

Potjasaan (1988) examined the use of learning strategies by 326 high school students in Phitsanulok province in relation to their language achievement levels. The behaviour questionnaire adapted from Politzer and McGroarty (1985) was used as the instrument for data collection. It was found that high achievers reported using 7 learning strategies significantly more frequently than medium and low achievers. These strategies include three strategies in the 'Interaction outside the classroom' category, i.e. ask the speaker to repeat if you do not understand him/her; correct yourself when you notice that you have made a mistake; and 'use gestures to communicate what you want to say. In 1990, Rattanaprucks looked into the use of language learning strategies by 3 outstanding medical students at Chulalongkorn University. The strategy questionnaire developed by the researcher was used as the research instrument. The findings revealed that these students generally reported a high frequency of use of certain strategies, for example, ask teacher immediately or when appropriate, classmates, to solve the problems encountered in the classroom lessons; guess the meaning of a new word from the context; and check the answers against the ones provided by the teacher. Mullins (1992) examined language learning strategies employed by 110 students majoring in English at Chulalongkorn University in Bangkok. The instrument used was the strategy questionnaire developed by Oxford (1990). The findings also revealed that higher-proficiency students reported using strategies significantly more frequently than did lower-proficiency students. Torut

(1994) examined language learning strategies employed by 611 university students studying in three different disciplines at three different universities. The strategy questionnaire by Oxford (1990) was used to collect data. The findings revealed that students studying different major subjects employed strategies differently. Unfortunately, the researcher failed to make a clear distinction in terms of frequency of strategy use. The available most recent research in this field conducted with Thai students was carried out by Lappayawichit (1998). She examined the use of learning strategies by 140 English major students, the Faculty of Arts, Chulalongkorn University. It was found that higher-proficiency students reported employing learning strategies at a high level.

It can be seen that the research involving language learning strategies employed by Thai students has been carried out mainly with university students, particularly those majoring in English. Levels of language proficiency or language achievement has been taken as one of the variables relating to students' use of strategy. The research instrument used for data collection was a strategy questionnaire, either researcher-developed, or other researcher's work. The latter researcher-developed instruments were those of Politzer and McGroarty (1985), and Oxford (1990).

In summary, Tables 2.1. and 2.2 shown above summarise the analysis of research work on language learning strategies ranging from the early 1980's to the late 1990's. Other aspects than variables relating to learners' use of strategies are presented as follows.

1. Native Language of Learners and Language Status of the Target Language

According to the information shown in the table above, it can be seen that the native language of learners and language status of the target language can be classified as:

- Native speakers of English learning a foreign language (NSE learning FL)
- Non-native speakers of English learning English as a second language (NNSE learning ESL)

- Non-native speakers of English learning English as a foreign language (NNSE learning EFL)

Of the thirty-one research works reviewed, nine were conducted with native speakers of English learning a foreign language (NSE learning FL). Most of the research populations in this category were Americans learning French, German, Spanish, Italian, or Russian. Eight were conducted with non-native speakers of English learning English as a second language (NNSE learning ESL). Though the research populations for Chesterfield and Chesterfield (1985), Politzer and McGroarty (1985), Tran (1988), and Vann and Abraham (1990) were non-native speakers of English, they learned English in the United States of America. Some of the research subjects of Kayaoglu (1997) learned English in either the United States of America or in the United Kingdom. Those for Sarwar (1992) were Pakistani, and for Green and Oxford (1995) they were Puerto Rican. The other fourteen were conducted with non-native speakers of English learning English as a foreign language (NNSE learning EFL). The research populations for Huang and van Naerssen (1987) were Chinese; for Porte (1988) were not identified; for Pearson (1988) were Japanese; for Khaldi (1990) were Algerian; for Sarawit (1986), Ratchadawisitkul (1986), Potjasan (1988), Rattanaprucks, (1990), Mullins (1992), Torut (1994), and Lappayawichit (1998) were Thai; for Mebo (1995) were Kenyan; and for Embi (1996) were Malaysian, Chinese-Malaysian, and Indian-Malaysian.

It can be seen that the majority of these research works were carried out in the United States of America, and relatively few were in other parts of the world like Asia, Britain and Africa. Thus further research should be conducted in places outside the United States so that the findings could contribute to our understanding more about strategy use of language learners in a wider perspective in different cultural contexts.

2. The Focal Point of Study

The research focal point of study can be classified as:

- An investigation of the overall strategy use
- An investigation of the strategy use of successful or good language learners
- An investigation of the strategy use of unsuccessful or poor language learners

It can be seen that most of the researchers tended to investigate the overall strategy use of learners. A few researchers paid attention to how good and poor language learners dealt with language learning. A few researchers paid attention to only how good language learners dealt with their language learning. Only two researchers paid attention to how poor language learners dealt with their language learning (see Porte, 1988; and Vann and Abraham, 1990).

In short, the majority of researchers have attempted to identify the overall strategy use of language learners whilst relatively few have attempted to identify the strategy use of good and/or poor language learners.

3. Educational Level of the Research Population

The educational level of the research population can be classified as:

- Primary school pupils
- Secondary school students
- Tertiary-level or university students
- Adult language learners

The majority of the researchers paid attention to how either university students or adults learn foreign languages. Three researchers dealt with secondary school students (see Ramirez, 1986; Ratchadawisitkul, 1986; and Embi, 1996). Only one researcher dealt with primary school pupils or young learners (see Chesterfield and Chesterfield, 1985).

4. Methods of Data Collection

There are many methods that researchers used to investigate how language learners, regardless of their degree of success, employed language learning strategies in order to

cope with the language problem or to enhance their language learning. Each method of strategy investigation will be discussed in Chapter 3. These methods include

- Observation
- Interview
- Self-report questionnaire
- Diary-keeping
- Think-aloud

From the overall picture presented in Tables 2.1 and 2.2, we can see that most of the researchers used strategy questionnaires to collect data. Some researchers relied solely on this self-report strategy questionnaire. The least frequently used methods of data collection as seen in Tables 2.1 and 2.2 are observation and think-aloud. Only one researcher relied solely on observation in investigating learning strategies (see Chesterfield and Chesterfield, 1985), and two researchers relied solely on think-aloud protocols (see Vann and Abraham, 1990; and Young, 1996). Two researchers used only interview as the main methods to collect data (see Pearson, 1988; and Porte, 1988). A few researchers made use of a triangulation technique which combined observation, interview, and questionnaire together, e.g. Mebo (1995), Embi (1996), and Kayaoglu (1997).

2.5. Summary

The term 'learning strategy' has been used on a number of occasions by different researchers to refer to the purposeful actions learners engage in more or less consciously with the goal of promoting their understanding of or ability in the target language. However, defining language learning strategies is still very subjective. This means that different researchers have defined language learning strategies differently. Some researchers see language learning strategies as mental processes which are unobservable; some see them as observable behaviours; and others see them as both. The researcher has defined learning strategies, specifically for the present investigation, as any set of

techniques including learning behaviours whether observable or unobservable reported being employed by engineering students in order to deal with English language learning either in a classroom setting while studying with the teacher, or outside a classroom setting in order to improve their language skills in general.

In respect of language learning strategy classification, it also appears that researchers have used different classification systems. Researchers may have derived their classification from their personal experience as language learners or language teachers; on other researchers' work, or on their own research work. This may be concluded that defining and classifying language learning strategies depends on an individual researcher regarding their research population, the context where a research work has been carried out, and personal interests. However, as shown earlier, there are a few fundamental categories which a few researchers have applied in their classification schemes, i.e. cognitive, metacognitive, and social/affective. Tudor (1996) suggests that more detailed breakdown of learning strategies is still required. There is no single perfect definition that can apply to every situation. As Oxford (1990) points out, it is important to remember that any current understanding of language learning strategies is necessarily in its infancy, and any existing system of strategies is only a proposal to be tested through practical classroom use and through research. It is still important to recognise the limits of the current understanding of this area of language learning. At this stage in the review of language learning strategy research, there is no complete agreement on exactly what language learning strategies are; how many language learning strategies exist; how they should be defined, demarcated, and classified; and whether it is - or ever will be - possible to create a real, scientifically validated hierarchy of strategies. Above all, it has enabled the researcher to locate the present investigation in the context of the reviewed research, as well as authors' opinions.

Past research has been carried out in a variety of settings, target populations, methods of data collection, focal points of the investigation, and other factors taken into consideration when looking into learners' choice of strategy use. Chapter 3 deals with how the present investigation has been carried out.

CHAPTER 3

RESEARCH METHODOLOGY AND THEORETICAL FRAMEWORK IN LANGUAGE LEARNING STRATEGIES

CHAPTER THREE

RESEARCH METHODOLOGY AND THEORETICAL FRAMEWORK IN LANGUAGE LEARNING STRATEGIES

3.1. Introduction and Purpose of the Chapter

The purpose of this chapter is to discuss the conceptual framework of the research, as well as some general principles of research design which apply to the present investigation. It discusses research methods in language learning strategies, and the research questions for the present investigation. This is followed by the conceptual framework for the present investigation. A discussion of the data collection procedures of both phases and how the data obtained are reported, analysed, and interpreted follows. The last part of this chapter deals with sampling and the rationales behind the choice of subjects and institutions for the investigation and the characteristics of the research population.

Robson (1993) suggests that any research work can be classified in terms of its purpose, and the research strategy used. The purpose of any research work can be explanatory, descriptive, or exploratory. It can possibly be a combination of two or all of these purposes, but often one will predominate. The purpose may also change as the investigation proceeds. The purpose of the research work can be classified by looking at what the researcher wants to find out. Robson (1993) explains his classification of the purposes of research work as follows:

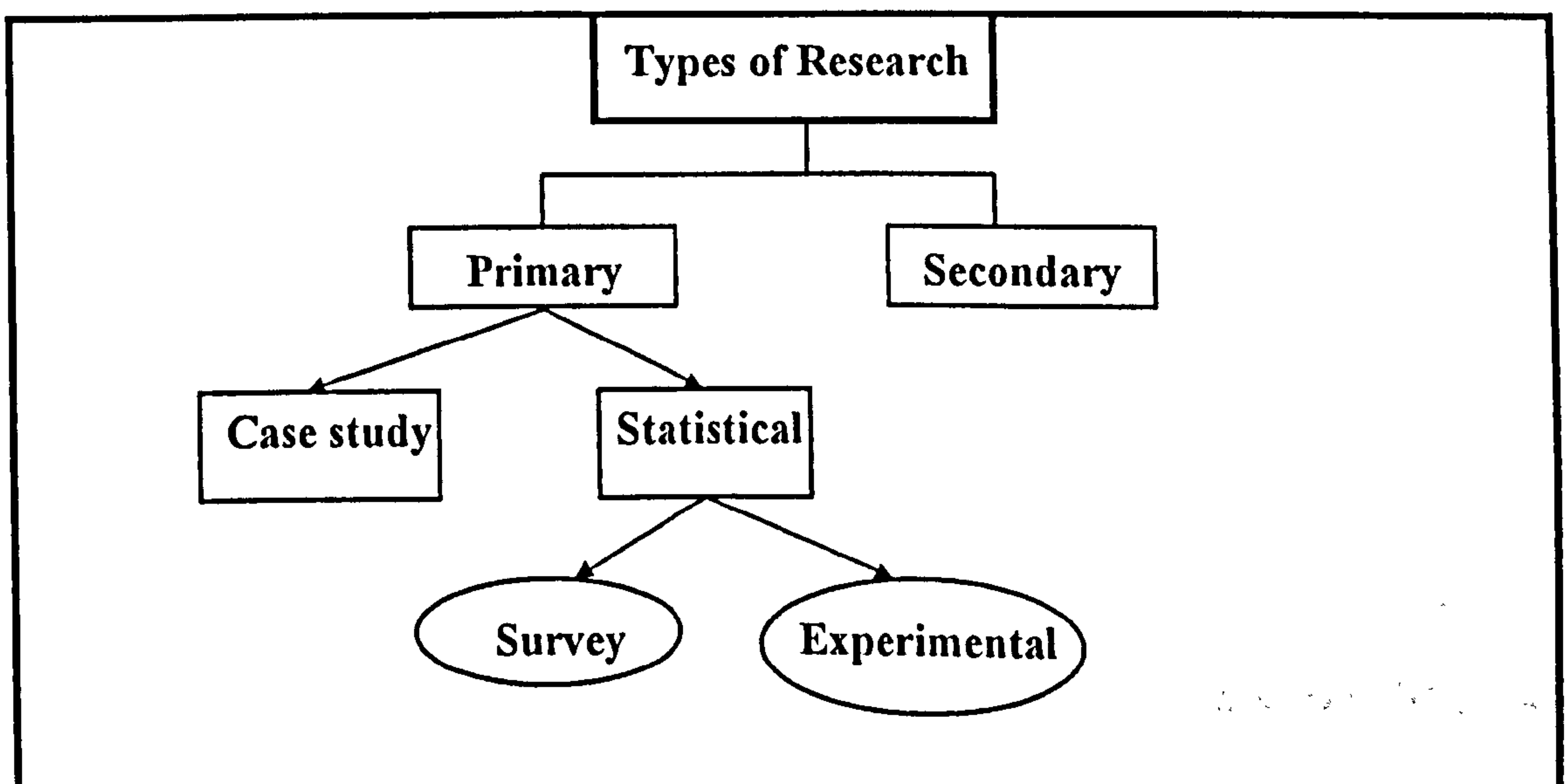
1. *Explanatory* : a researcher seeks an explanation of a situation or problem, usually in the form of causal relationships. This type of research may be qualitative and/or quantitative.

2. *Descriptive* : a researcher tries to portray an accurate profile of persons, events or situations. It requires extensive knowledge of the situation to be researched or described so that a researcher knows appropriate aspects on which to gather information. This type of research may be qualitative and/or quantitative.
3. *Exploratory* : a researcher tries to find out what is happening; to seek new insights; to ask questions; or to assess phenomena in a new light. This type of research is usually, but not necessarily, qualitative.

In addition to research purposes, it is also worth looking at research design which is concerned with the planning of the study. Johnson (1977) proposes that the research design describes the purposes of the study, how subjects of the study are to be selected, methods or procedures to be followed, measurements to be collected and comparisons or other analyses to be made. Further, Robson (1993) suggests that whatever research strategy a researcher chooses or feels appropriate, the research questions must be the primary consideration as they have a strong influence on the strategy to be chosen.

In order to provide an overall picture of research design, Figure 3.1 below shows types of research as developed by Brown (1988 cf. Nunan 1992: 9).

Figure 3.1 : Types of Research



In Figure 3.1, Brown (1988) classifies types of research as primary and secondary. The distinction between primary and secondary research is based on how the information or data is obtained. In the primary research model, data is obtained from primary sources, e.g. a group of students who are learning a foreign language. In the secondary research model, data is obtained through reviewing literature in a given area and synthesising the work carried out by other researchers. Primary research is subdivided into two categories: case studies and statistical studies. Statistical studies are further subdivided into survey studies and experimental studies.

When constructing an investigation, the researcher must consider which of the types of primary research is most appropriate given the purpose of the work i.e. explanatory, descriptive, or exploratory. Robson (1993) has suggested the appropriate use of these three types of research as follows:

1. Case studies are appropriate with the 'how' and 'why' research type of questions. The focus of the research is on current events. The case studies are used for developing detailed, intensive knowledge about a single case or of a small number of related cases.
2. Survey studies are appropriate with the 'who, what, where, how many and how much' research type of question. They are used for collecting information in standardised form from groups of people, usually employing questionnaires or interviews.
3. Experimental studies are appropriate with the 'how and why' research type of question. Unlike case studies or survey studies, the control of variables and events is necessary. Hypothesis testing is always involved.

The purpose of the present investigation is to look into language learning strategies reported as being employed by engineering students learning English at the tertiary level in Thailand. Taking into account the purposes of research outlined above, the present

investigation can be classified as exploratory and descriptive. The research is basically both qualitative and quantitative.

3.2. Methods in Language Learning Strategy Research

Johnson (1977: 9) states that “research methods are procedures a researcher follows in attempting to achieve the goals of a study”. Hence, the research methods used to investigate language learning strategies are procedures a researcher follows in attempting to achieve the goals of a study of language learning strategies, i.e. to elicit information about language learning strategies employed by students or language learners when they learn a language, especially the target language.

Oxford and Crookall (1989) suggest that language learning strategy research involves a range of procedures from simple lists of strategies to much more sophisticated investigations. At the present time, no single research method prevails in the field; certain research methods are well established but imperfect (Cohen and Scott, 1996). There are many methods which a researcher can use to investigate how learning strategies are employed by students or language learners in order to cope with language problems, or to enhance their language learning. Each method has both weak and strong points, but whatever method a researcher employs, he or she must take the main purpose of the study into consideration. (Robson, 1993).

In this section, the main research methods or procedures used to gather data on language learning strategies will be discussed. This is followed by the framework of methods for data collection for the present investigation. The main research methods for language learning strategies include: 1) Classroom Observations; 2) Oral Interviews; 3) Written Questionnaires; 4) Think-Aloud; and 5) Diary Studies

3.2.1. Classroom Observations

Attempts have been made to identify different language learning strategies by observing language learners performing a variety of tasks, usually in classroom settings (Ellis, 1994). Observations are easy to use in the classroom and they can be conducted either formally or informally (Oxford and Burry-Stock, 1995). Meaningful classroom observations of language learning strategy use are possible for certain kinds of observable strategies, e.g. co-operating with peers, asking questions for clarification or verification, and gesturing to convey meaning, but not for other strategies which are unobservable or invisible e.g. associating/elaborating, or using imagery (Oxford and Crookall, 1989). Consequently, some researchers, Rubin (1981) for example, found that this method was not very productive, as it reveals nothing about the mental strategies learners use and because frequently classroom teachers afford little opportunity for learners to exercise behavioural strategies. Naiman et al. (1978), Cohen and Apehek (1981), and Graham (1997) also found that this method is inadequate to provide much information about language learning strategies that learners employ. However, this method is still fruitful and workable as Chesterfield and Chesterfield (1985) reported in a study that revealed a number of learning strategies used in a bilingual classroom by young learners. It may be that classroom observation works with young children whose behaviour may serve as a good indicator of their mental activity (Ellis, 1994)

3.2.2. Oral Interviews

In investigating a student's language learning strategies, a researcher can ask the student to describe what language learning strategies he or she uses and how they are used to deal with aspects of language learning. One way to do this is to interview students. A student interview calls for retrospective accounts of strategies he or she has employed (Ellis, 1994).

Interviews can be characterised in terms of their degree of formality and can be placed on a continuum ranging from unstructured through semi-structured to structured (Nunan, 1992). Whether they are structured or unstructured, student interviews provide personalised information on many types of language learning strategies which would not be available through classroom observations (Oxford and Burry-Stock, 1995). An unstructured interview is guided by the responses of the interviewee and the interviewer exercises little or no control over the interview. This makes the direction of the interview relatively unpredictable. In a semi-structured interview, the interviewer has a general idea of where he or she wants the interview to go, and what should come out of it. However, the interviewer does not enter the interview with a list of predetermined questions. On the other hand, in a structured interview, the agenda is totally predetermined by the interviewer. Whatever type of interview a researcher wants to use as a method for data collection, he or she should consider the nature of the research and the degree of control he or she wishes to exert. Of the three types of interview mentioned above, the semi-structured interview seems to be popular among researchers. The reason for its popularity is stated by Nunan (1992: 149) "...because of its flexibility, the semi-structured interview has found favour with many researchers, particularly those working within an interpretative research tradition". Besides the flexibility it gives to the interviewer, the semi-structured interview also gives the interviewee a degree of power and control over the course of the interview. However, according to Robson (1993), to make profitable use of its flexibility calls for skill and experience in the interviewer. The lack of standardisation raises concerns about reliability. Biases are difficult to rule out, and the interview may be time-consuming.

3.2.3. Written Questionnaires

Like oral interviews, written questionnaires are used to elicit learner responses to a set of questions, and they require the researcher to make choices regarding question format and research procedures (Cohen and Scott, 1996). In addition, Oxford and Crookall, (1989) suggest that written questionnaires typically cover a range of language learning strategies and are usually structured and objective (closed) in nature. In other words, informants have little or no freedom in providing their own responses to the questions as choices for responses are normally provided. Question items in written questionnaires can range from those asking for 'yes' or 'no' responses or indications of frequency (e.g. Likert Scales) to less structured items asking respondents to describe or discuss language learning strategies they employ in detail. In this scenario, the respondents have more control over the information included in their responses. The responses to structured questionnaires may be simplistic or contain only brief information about any one language learning strategy. The questionnaires that require the respondents to indicate frequency of use of language learning strategies, like Likert Scales, are easy and quick to give, provide a general assessment of each respondent's typical strategies, and may be the most cost-effective mode of strategy assessment. They are also almost non-threatening when administered using paper and pencil under conditions of confidentiality (Oxford and Burry-Stock, 1995). Further, written questionnaires enable the researcher to collect data in field settings and the data obtained are more amenable to quantification than those collected through free-form field notes, participant observing journals or the transcripts of oral language (Nunan, 1992). However, there are a few weak points with this kind of questionnaire. The data may be superficial. There is little or no check on honesty or seriousness of responses. This may be seen as a challenge for a novice researcher with regards to his or her own ability to

deal with such limitations. More importantly, while analysis may be easy, but time-consuming, interpretation can be problematic (Robson, 1993; and Walker, 1985).

3.2.4. Think Aloud

Gerloff (1987:137) defines a think-aloud protocol as “a moment-by-moment description which an individual gives of his or her own thoughts and behaviours during the performance of a particular task”. Methods of thinking aloud have been used mainly to investigate the processes of translation and communication in a foreign language (Feldmann and Stemmer, 1987). In the literature regarding language learning strategies, the use of verbal protocols which require the subjects to think aloud while tackling a task was unusual (Cavalcanti, 1987). However, some researchers have used this method to investigate language learning strategies of students, i.e. the researcher listens to learners as they think aloud. In doing this, Oxford and Burry-Stock (1989) note that ‘think aloud’ protocols offer the most detailed information of all because the student describes strategies while doing a language task, but these protocols are usually used only on a one-to-one basis. They also take a great deal of time, reflect strategies related only to the task at hand and are not summative across students for group information. To put it simply, this method provides a researcher with individual information rather than as a group. The procedure may also interfere with the task which the learner is carrying out.

3.2.5. Diary Studies

In an effort to collect data on language learning strategies employed by students over a period of time, some researchers have turned to diaries as a research tool (Cohen and Scott, 1996). Bailey (1990 :215) defines the diary study as “a first-person account of a language learning or teaching experience, documented through regular, candid entries in a personal journal and then analysed for recurring patterns or salient events”. Since diaries are learner-generated and usually unstructured, the entries may cover a wide

range of themes and issues. They may include learners' written reports of the cognitive, metacognitive, and social strategies they use daily in language learning (Cohen and Scott, 1996). Further, diaries are usually subjective or open-ended, requiring a student's constructed responses, and free-form although they can be guided by teacher suggestions (Oxford and Crookall, 1989). Bailey and Ochsner (1983 cf. Nunan 1992: 120) suggest ways to shape diary studies in order to make them suitable as research documents. For example, the data collection should be as candid as possible despite the potential embarrassment of some of the entries. The initial database can be revised for public consumption. Patterns and significant events are identified and the factors which appeared to be important in language learning are discussed and interpreted. Nunan (1992) suggests that it is probably a good idea to avoid analysing and interpreting the data until a substantial amount of material has been collected. This can help the researcher avoid coming to premature conclusions which may be inaccurate or incorrect.

Diary studies may be highly problematic for a researcher because:

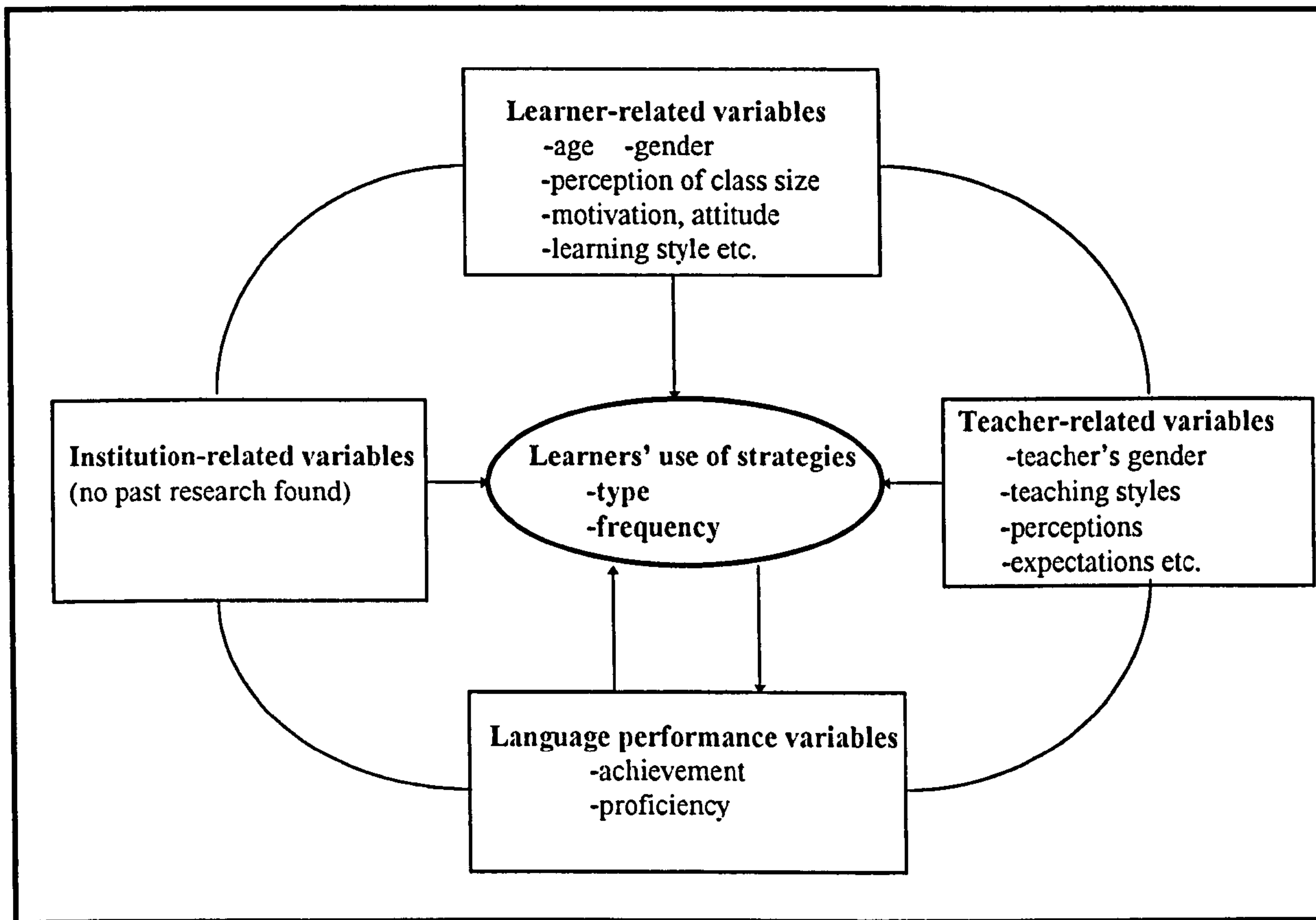
1. learners may be unfamiliar with diaries
2. researcher and learners may not share the same language, so there is a problem which language should be used
3. learners may want a 'reward' for the effort, e.g. feedback from the researcher.

3.3. Theoretical Framework and Rationale for Selecting and Rejecting Variables for the Present Investigation

The main purpose of carrying out an extensive review of available related literature and other materials on language learning strategies in Chapter 2 was to find evidence which would aid the researcher in developing a theoretical framework, locating the present investigation in the context of past research and other authors' opinions, and creating the rationale for selecting and rejecting variables for the present study. Figure 3.2 below demonstrates the theoretical framework for examining language

learning strategies reported being employed by engineering students learning English at the tertiary level in Thailand.

Figure 3.2. : Theoretical Framework for the Present Investigation



The proposed theoretical framework, which essentially is based on the related literature on language learning strategy research, demonstrates that types of language learning strategies and learner's frequency of language learning strategy use have conventionally been hypothesised to have a one-directional relationship with two main types of variables, i.e. learner-related variables (e.g. age, gender, and 'perceived' class size); and teacher-related variables (e.g. teacher expectation and teaching styles). What has been left as a question for this investigation to look into is institution-related variables. With regards to language performance variables (i.e. levels of language achievement and levels of language proficiency), the relationship between learner's strategy use and this variable is 'two-directional' or 'mutual'. The relationship between

learner's language performance and learner's strategy use is still complex. That is to say, language performance could be a result of language learning strategy use as much as a cause. All of the four main types of variables shown in the theoretical framework are presumably interactive or linked with one another in terms of language learning and teaching process in a formal setting. To put it simply, the three variables, i.e. learner, teacher and institution are sources for language learning and teaching to take place, and language performance is the product which is equally interactive with language learning strategies as a result of the teaching and learning process.

Through an extensive review of research on language learning strategies in Chapter 2, we can see that a number of variables, which are believed to be related to students' use of strategies, have been taken into account for investigation by researchers in the field. Some variables have been reported to have a strong relationship, while others have little or no relationship with students' use of strategies. This largely depends on the context of an investigation, for example, the subjects of the investigation. There are still some variables which seem to be neglected by past researchers. As the present investigation has been designed to examine strategy use of Thai engineering students learning English, the researcher has to look at the educational context in Thailand in order to determine the variables to be investigated. One of the major motivations for carrying out this study has been the hope that it will be possible to make use of the research findings to help improve language learning and teaching to Thai engineering students. Initially, the philosophy of foreign language instruction suggested by Cohen (1998) was reviewed. Cohen suggests that at present foreign language instruction has changed to be more interactive and less teacher-centred, and this particular investigation has been intended to find an appropriate way to encourage engineering students learning English at different types of institution to take responsibility for their own learning and to

become more self-reliant. Therefore, students and institutions have been the focal points of interest for the researcher for the present investigation. The theoretical framework illustrates that four main types of variables could be investigated. However, it is impossible for the researcher to investigate most, if not all, of the variables found in the related literature. In this respect, it is recognised that previous researchers have investigated some learner-related variables more extensively (e.g. previous language learning experience, and motivation), than other variables in relation to learner's strategy use. A few variables have been neglected by most researchers (e.g. gender and perception of class size). As seen in the theoretical framework, no institution-related variables have been investigated, even though they are hypothesised to be related to learner's strategy use.

To be practical and realistic, the researcher for the present study will explore the variables which have been neglected by most researchers in order to build up a new perspective in the area of language learning strategies. These variables include two institution-related variables (i.e. type of institution and location of institution); two learner-related variables (gender and perception of class size); and one language performance variable, i.e. language proficiency. One may argue that the language performance variable has been the focus of most researchers for their investigation. However, a closer look at this variable has revealed that most, if not all, researchers have classified language performance in either one of two categories, i.e. good and poor language learners, or more successful and less successful language learners. Examples of the studies examining strategy use of either good language learners or poor language learners are those carried out by a few researchers, for example, Ramirez (1986); Sarawit, (1986); Porte (1988); Vann and Abraham (1990); Rattanaprucks (1990); and Coleman (1991b). Examples of the previous studies which were carried out to explore

strategy use by good and poor language learners are those carried out by Politzer and McGroarty (1985); Huang and van Naerssen (1987); Pearson (1988); Khaldi (1990); Torut (1994); Green and Oxford (1995); Embi (1996); Young (1996); Ratchadawisitkul (1996); Potjasan (1996); Kayaoglu (1997); and Lappayawichit (1998). In this study, the researcher will simultaneously look into three different levels of language proficiency, i.e. high, moderate, and low. It is noted that high-proficiency students in this study can equate either good or effective language learners in the past research. Similarly, low-proficiency students can be compared to either poor or ineffective language learners as classified in previous investigations. Besides strategy use of these two groups (high and low), the present study will also explore how moderate-proficiency students, who are not classified as either good or poor language learners, report employing language learning strategies.

What follows is a discussion of basic assumptions about the relationships between learner's strategy use and the five variables, based upon the theoretical framework, related literature and other authors' opinions.

3.3.1. Students' Use of Language Learning Strategies and Types of Institution

As indicated earlier, there are three different types of institution offering a degree in engineering in Thailand (for detail of 'types of institution', see terms used in the context of the present investigation in Chapter 1, Section 1.2). In terms of language learning and teaching, most, if not all, institutions have autonomy in designing English courses for their students and in setting criteria by which performance in English is measured. This will probably affect how each institution runs its English classes. Equally, there may be some factors that affect students' use of strategies in different institutions, for example, learning facilities provided for students such as computers, library or other resources. Apart from this, students' socio-economic status and the intakes for different types of

institution might relate to their choices of strategy use. Students studying at private-run university are mainly those who cannot pass the university entrance examination to state-run universities. Private universities are generally more expensive than both state universities and Rajamangala Institutes of Technology in terms of tuition fees. Therefore, the majority of the students tend to come from well-to-do families (Achava-Amrung, 1992). Unfortunately, no previous empirical research could be found in terms of the relationship between students' choices of strategy use and this variable. However, the present investigation will be carried out to see whether or not this difference has an effect on students' use of language learning strategies.

3.3.2. Students' Use of Language Learning Strategies and their Gender

Male and female students are believed to display some differences in using language learning strategies. In other words, males and females have their own ways, though not totally different, of dealing with the target language, be it a foreign or second language. Past research work on language learning strategies, in which the gender of students has been taken into account (e.g. Ehrman and Oxford, 1989; Oxford and Nyikos, 1989; Oxford and Ehrman, 1995; Oxford and Green, 1995; and Embi, 1996), provided empirical evidence with regards to the relationship of this variable with students' use of strategies. In this regard, female students were generally reported to use a greater range of learning strategies than did their male counterparts. However, the studies of Prokop (1989), Nyikos (1990), and Young (1996) revealed that males and females demonstrated different strengths in strategy use. Prokop, for example, reported that male students employed strategies involving risk-taking, and creative approach to learning tasks, while females employed strategies involving getting correct responses rather than being creative. In this study, engineering students are both males and females. Our purpose is

to examine whether or not gender differences among these students will associate with their choice of strategy use.

3.3.3. Students' Use of Language Learning Strategies and 'Perceived' Class Size

Different students may perceive the size of the class they find themselves in differently. In this investigation, the variable of class size will be based on the perception of students, whether they perceive their English class size as large, optimum, or small. The perception of class size may affect how students manage themselves in learning. Coleman (1991 a) suggests that it is likely that learners who find themselves studying in large class contexts need to develop a range of specific strategies. Additionally, some research findings reveal that students who perceived their class size as 'large' tended to employ a greater range of learning strategies than those who perceived their class size as smaller (see Sarwar, 1992; Mebo, 1995; and Embi, 1996). This may be due to many disadvantages students have found when they feel they are learning in a larger class, such as lack of motivation, lack of teacher's attention or their own concentration. They have to manage themselves in order to overcome such problems which may be seen as barriers to their language learning. In the context of the present investigation, students' perception of their class sizes may vary; therefore, this study will explore whether or not different perceptions of their class sizes will show relationships with their choice of strategy use.

3.3.4. Students' Use of Language Learning Strategies and Location of Institution

The institutions offering a degree in engineering in Thailand can be classified according to their location, i.e. Bangkok and the metropolitan areas, and other regions which will be referred to as 'regional'. As Thailand is still a developing country, the distribution of advanced technology is still seen mostly in Bangkok and the metropolitan areas or a few other major cities of the regions. Some institutions are located in more

rural or isolated areas. Public transportation and communications may not be very good. This may affect students' choice of strategy use due to some limitation of the location of the institutions at which they are studying. This may also relate to the economic status of the students. Like type of institution, no past empirical study has been conducted in order to examine the relationship between this variable and students' use of strategies. The present investigation, therefore, aims at exploring such a relationship to see whether or not this difference will affect students' use of strategies.

3.3.5. Students' Use of Language Learning Strategies and Levels of Language Proficiency

Through an extensive review of related literature, the researcher has found that the proficiency factor has been one of the most frequently studied by researchers. The results of several recent researches have revealed that students of a higher level of language proficiency tend to report using a greater range of language learning strategies than those of a lower level of language and that the low-proficiency students not only report using fewer learning strategies, but also using them inappropriately. Examples are Pearson, (1988); Khaldi (1990); Vann and Abraham, (1990); and Green and Oxford, (1995). Obviously, most studies have concentrated on the study of language learning strategies at one particular level of language proficiency, either intermediate or advanced level. Alternatively, a number of researchers have classified language learners as successful and unsuccessful, or good and poor language learners. The present investigation will simultaneously explore three distinct levels of language proficiency, i.e. high, moderate, and low, to see whether or not this difference has an effect on students' use of strategies.

3.4. Research Questions

Based on the proposed relationship of learners' use of language learning strategies and the five independent variables (see 3.3 above), and the extensive review of literature,

the research questions can be formed. The present investigation attempts to describe the language learning strategies employed by engineering students learning English at the tertiary level in Thailand. In order to establish some empirical data on the context of language learning of engineering students in Thailand, the present investigation is designed to answer the following specific questions:

1. What are the types of language learning strategies reported to be employed by engineering students learning English at the tertiary level in Thailand?
2. What is the frequency with which these language learning strategies are reported to be used by these students?
3. Do students' choices of language learning strategies vary significantly according to the type of institution they belong to? If they do, what are the main patterns of variation?
4. Do students' choices of language learning strategies vary significantly with their gender? If they do, what are the main patterns of variation?
5. Do students' choices of language learning strategies vary significantly according to their perception of the size of class they find themselves in? If they do, what are the main patterns of variation?
6. Do students' choices of language learning strategies vary significantly according to the location of the institution at which they are studying? If they do, what are the main patterns of variation?
7. Do students' choices of language learning strategies vary significantly according to their level of language proficiency? If they do, what are the main patterns of variation?
8. What are the implications of these research findings for the teaching and learning of English for engineering students in Thailand?

3.5. Sampling and Rationales for Choice of Subjects

Kane (1983: 90) defines a sample as 'a portion of the universe and, ideally, it reflects with reasonable accuracy the opinions, attitudes or behaviour of the entire group....Further, the result from a sample cannot be expected to be precisely the same as the result obtained from studying the universe. The sample has to be similar to the universe or the population. If not, the results of the study are useless'. In addition to this respect, Cohen and Manion (1994: 89) note that 'the correct sample size depends on the purpose of the study and the nature of the population under scrutiny'.

Since it is doubtful that the entire population can be tested, a sample will have to be used. The sample should provide results similar to those that would have been obtained had the entire population been studied. In selecting the subjects for an investigation, several questions arise (Drew, 1980), for example, whether or not the subjects are appropriate for the research question, whether or not the subjects are representative, and how many subjects should be used. The first two questions pose no problems, but the third one is more difficult to answer. According to Drew (1980), sample size presents a problematic question because no set answer or rule may be given. If the sample does not accurately represent the population, interpretations of the results may not be accurate for individuals other than those actually used as subjects. If the researcher is unaware that the sample is unrepresentative, incorrect inferences may be drawn concerning the population in general.

This investigation is broadly exploratory and it is the intention of the researcher to go for a sample size sufficient to serve the purpose of the investigation. The researcher has to keep in mind that the sample size should not be too big to be manageable. In this regard, Locke et al (1998) suggest that the adequacy of the sample is important because it determines whether or not it is reasonable to believe that the results of the research

would hold for any other situation or group of people. That is, they represent Thai engineering students. In any event, the researcher must attempt to address some issues when selecting the sample by taking some crucial factors dealing with the variables for the present investigations into consideration as already discussed in Section 3.4. above.

Altogether eighteen institutions participated in this investigation. Four institutions took part in the first phase of data collection which involved ten students from each institution in student oral interviews, except for one state-run university where there were nine students taking part in this stage. Fourteen institutions took part in the second phase of data collection and the number of students participating in this phase varied from one institution to another. Principally, the students were selected on the basis of convenience and availability. Even though the total number of students did not reach the target as planned (50 students from each individual institution), these 570 students provided the researcher with enough information to serve the purpose of the present investigation and they at least covered three variables for the investigation, i.e. these 570 students: 1) had different levels of language proficiency determined by the researcher-constructed proficiency test (the test construction will be discussed in full detail in Chapter 5); 2) represented both male and female students; and 3) perceived their language class sizes differently as large, optimum, or small. The other two variables which are 'type of institution', and 'location of institution' were automatically covered by the sampling method.

3.6. Characteristics of the Research Population

Tables 3.1-3.4 present the breakdown of the number of participating students related to each variable in the data collection in order to give a context for the results obtained through the data analysis for the present investigation. This breakdown has been cross-

tabulated and chi-square tests were employed to determine whether the subject distribution among the variables was significantly different or not.

Table 3.1 : Number of Students by Type of Institution in Terms of Gender 'Perceived' Class Size, Location of Institution, and Language Proficiency Levels

Type of Institution	Gender		Perceived 'Class Size'			Location of Institution		Language Proficiency Levels		
	Male	Female	Lrg	Opt	Sml	Metro-BKK	Region	Hi	Mo	Lo
State-run University (N = 231)	192	39	43	177	11	64	167	121	68	42
Private-run University (N = 201)	191	10	42	139	20	158	43	26	67	108
Rajamangala Institute of Technology (N = 138)*	123	15	24	98	16	49	89	44	49	45
Totals N = 570	506	64	109	414	47	271	299	191	184	195
χ^2 Value	$\chi^2 = 15.31$ p = .00		N.S.			$\chi^2 = 122.24$ p = .00		$\chi^2 = 90.98$ p = .00		

The information in Table 3.1. shows the number of students in each group of the four variables when related to 'type of institution'. Of the four variables presented in the 'white' areas, the chi-square results show that the distribution of the subjects varied significantly within 'gender', 'location of institution', and 'language proficiency levels'. That is to say, there are more male than female students; more students studying at private-run universities located in Bangkok than in the other regions; and more students studying at state-run universities located in the other regions than in Bangkok and the metropolitan areas. In respect of students' proficiency levels, a large number of 'high' proficiency students study at state-run universities and more than half of the 'low' proficiency students study at private-run universities. When looking at the number of students and their perception of their English class sizes, it appears that the patterns of 'perceived' class size are consistent irrespective of type of institution.

Table 3.2 : Number of Students by 'Gender' in Terms of "Perceived' Class Size' 'Location of Institution' and 'Language Proficiency Levels'

Gender	Perceived 'Class Size'			Location of Institution		Language Proficiency Levels		
	Lrg	Opt	Sml	Metro-BKK	Region	Hi	Mod	Lo
Male (N = 506)	95	365	46	249	257	158	161	187
Female (N = 64)	14	49	1	22	42	33	23	8
Totals N = 570	109	414	47	271	299	191	184	195
χ^2 Value	N.S.			$\chi^2 = 5.01$ $p = .03$		$\chi^2 = 17.24$ $p = .00$		

In respect of gender of students related with the other three variables as presented in Table 3.2, the chi-square result shows that the distribution of the male and female subjects varied significantly within 'location of institution' and 'language proficiency levels'. That is, there are more male and female students studying at the institutions located in the regions than at those located in Bangkok, and also a higher proportion of female students are of 'high' and 'moderate' language proficiency levels than of the 'low' level. However, both male and female students have similar perceptions of their class sizes.

Table 3.3 : Number of Students by 'Perceived 'Class Size' in Terms of 'Location of Institution', and 'Language Proficiency Levels'

Perceived 'Class Size'	Location of Institution		Language Proficiency Levels		
	Metro-BKK	Regional	Hi	Mod	Low
Large (N = 109)	43	66	37	35	37
Optimum (N = 414)	194	220	144	131	139
Small (N = 47)	34	13	10	18	19
Totals N = 570	271	299	191	184	195
χ^2 Value	$\chi^2 = 14.53$ $p = .001$		N.S.		

Table 3.3 demonstrates the number of students by 'perceived' class size in terms of 'location of institutions', and 'language proficiency levels'. The chi-square result reveals that students studying at the institutions located in Bangkok and the metropolitan areas, and those studying at the institutions located in the regional areas of the country have different perceptions about their class sizes. A higher proportion of students studying at the institutions located in both sites perceived their class size as 'optimum' rather than 'large' or 'small'. However, a higher proportion students studying at the institutions located in Metro Bangkok perceived their class size as 'small'. The distribution of students with different perceptions of their class sizes is not significantly different in respect of their language proficiency levels.

Table 3.4 : Number of Students by 'Location of Institution' in Terms of 'Language Proficiency Levels'

Location of Institution	Language Proficiency Levels		
	High	Moderate	Low
Metro- Bangkok (N = 271)	88	93	90
Regional (N = 299)	103	91	105
Totals N = 570	191	184	195
χ^2 Value	N.S.		

When the number of students studying at the institutions located in the two different locations is related to their language proficiency levels as shown in Table 3.4, the chi-square result reveals that there is no significant variation in the distribution of language proficiency levels among the students who study at the institutions located in Bangkok and the metropolitan areas, and those located in the other regions other than metro-Bangkok.

Table 3.5 summarises the characteristics of the research population when the distribution of the number of students among the variables is examined. The information demonstrates whether or not the distribution of the research population varies significantly when related to different variables. This population characterisation will help us to interpret some cases of the research findings in Chapter 7.

Table 3.5 : Summary of the Variation of the Research Population Characteristics

Variables	Gender	'Perceived' Class Size	Location of Institution	Language Proficiency Levels
Type of Institution	YES	NO	YES	YES
Gender		NO	YES	YES
'Perceived' Class Size			YES	NO
Location of Institution				NO

Note: 'yes' means the population varies significantly; and 'no' means the population does not.

The characteristics of the research population can be summarised as follows:

- The number of students studying at Rajamangala Institutes of Technology is much smaller than those studying at either state-run universities or private-run universities
- The number of male students is much larger than the number of their female counterparts
- The majority of students perceived their class size as 'optimum'
- A larger number of female students fall in the 'higher' language proficiency level than fall in the 'lower' language proficiency level
- A larger number of female students study at state-run universities than study at the other two types of institution
- A larger number of private-run university students study in Bangkok and the metropolitan areas than study in the regions

- A larger number of state-run university students study outside Bangkok and the metropolitan areas than those studying at the private-run universities
- A larger number of state-run university students fall in the 'high' language proficiency level than those studying at the other two types of institution
- A larger number of students with the 'low' language proficiency level study at private-run universities than those studying at the other two types of institution.

What follow is a brief discussion of some constraints of the subject characteristics for the present investigation.

The characteristics of the subject distribution are generally satisfactory, though the distribution itself is not perfectly well-balanced or proportioned as planned due to a few extraneous factors or obligations which were beyond the manageability of the researcher.

These factors or obligations can be briefly summarised as follows:

1. The limited location of the institutions

Most of the private-run universities which offer a degree in engineering are located in Bangkok and metropolitan areas. This affects the number of students studying at different types of institution and location of institution.

2. The students selection (male and female students proportion)

The researcher made an assumption about gender of engineering students by generalising that there would be a large number of female students studying engineering at other institutions like at his university. It is true that engineering is male-oriented at many institutions, so it is impossible for the researcher to get an ideally well-balanced proportion of the two genders. As a result, the number of the participating female students for the present investigation is relatively small when compared with their male counterparts. However, these female students had provided the researcher with very useful information for the investigation.

3. The students' language proficiency levels

It is unforeseeable whether students studying at which certain type of institution would do the proficiency test better than others. As a result of the test for the present investigation, the larger percentages of 'high' and 'low' proficiency levels students were distributed to one particular type of institution as shown in the Table 3.4 above.

3.7. Framework of Data Collection Methods for the Present Investigation

As mentioned earlier, different methods for data collection may lead to different conclusions about the character and use of language learning strategies. Having studied the main methods for data collection of language learning strategies thoroughly, the researcher for the present investigation decided to employ multiple data collection methods as suggested by Robson (1993) below in order to accomplish the purposes of the study.

“There is no rule that says that only one method must be used in an investigation. Using more than one method in an investigation can have substantial advantages, even though it almost inevitably adds to the time investment required. One important benefit of multiple methods is in the reduction of inappropriate uncertainty. Using a single method and finding a pretty clear-cut result may delude investigators into believing that they have found the right answer.” (Robson, 1993: 290)

To investigate language learning strategies employed by engineering students learning English at the tertiary level in Thailand, student oral interviews and a written strategy questionnaire were used as the main methods of data collection. These two methods are suitable for the present investigation because the researcher did not investigate the language learning strategies which students employed while they were performing a particular language task, or how students employed language learning strategies to deal with certain language modalities or skills. Rather, the researcher looked into how students managed themselves in learning English both within and outside the classroom in order to achieve certain learning purposes to be seen later in Chapter 4. In addition, the researcher examined how these engineering students improved their

English language skills in general. In doing this, students were required to recall accounts of the language learning strategies they had employed in different settings. Both student oral interviews and the written strategy questionnaire served the purposes of the present investigation as they provided the researcher with adequate amounts of information about language learning strategies. This is consistent with O'Malley and Chamot (1990), and Ellis (1994). O'Malley and Chamot state that questionnaires and guided interviews provide the broadest range of coverage for strategy use because of the structure given to the questions. The narrowest range of strategy coverage seems likely to occur with think-aloud procedures because the data collector is constrained from using prompts for additional strategies by the nature of the approach. In addition, Ellis notes that structured interviews and questionnaires, both of which call for retrospective accounts of the strategies learners employ, are found to be more successful in gaining data about language learning strategies from learners.

3.8. Methods for Data Collection and Data Generation

In collecting data to answer the research questions for the present investigation, student oral interviews and a written strategy questionnaire were used as the main methods. Student oral interviews were conducted in the first phase, and the language learning strategy questionnaire was used in the second phase of data collection or the main fieldwork scheme.

3.8.1. Student Oral Interviews

Student oral interviews were conducted in two stages: the piloting stage, and the main stage. This section only reports how the piloting stage of student oral interviews was conducted and the resulting implications for the main interview stage. The main stage of the interviews will be presented in Chapter 4, as well as the results obtained

through the second stage alongside the language learning strategy inventory and the strategy questionnaire for the present investigation.

3.8.1.1. The Piloting Stage of Student Oral Interviews

Oppenheim (1992), suggests that each survey presents its own problems and difficulties, and expert advice is no substitute for well-organised pilot work. Piloting can help the researcher not only with the wording of questions but also with procedural matters such as the ordering of question sequences and the reduction of non-response rates. The researcher should realise from the very beginning that pilot work is expensive and time-consuming. The length of time taken by the pilot work can differ greatly and should not be underestimated.

Having taken the reasoning mentioned above into consideration, the researcher carried out the pilot work for student oral interviews before the main data collection stage took place. The purposes of this pilot work were:

1. To see if the thirteen interview questions worked properly (see Chapter 4 Section 4.2. for the interview guide summary). That is, whether the students who were interviewed provided information which the researcher could make use of in generating the strategy questionnaire.
2. To see if there was anything wrong with the question items, question sequences, way of interview including other factors like timing, recording, or other technical problems that may occur in the actual data collection scheme.
3. To see whether there would be any difference in responses to the questions between the students who had the interview guide to prepare themselves in advance and those who did not have the interview guide in advance.
4. To see whether it made any difference for students to be interviewed in English or in Thai.

5. To ensure that the student oral interviews for the first phase of data collection would be effective and serve the purpose of the present investigation.

At this piloting stage, the student oral interviews were conducted with six Thai students studying at the University of Leeds. Though none of these students were studying for a degree in engineering, they shared some basic characteristics with the engineering students who are the subjects of the study in Thailand in that they were science-oriented like engineering students and they studied English for Science and Technology (EST) in their first degree at a Thai university. Further, both male and female students were interviewed. Referring to Oppenheim (1992), samples are not necessarily representative or may only be representative of part of a population.

The researcher started the interviews by:

1. Having a meeting with all six Thai students and informing them of the purpose of the interviews.
2. Giving the interview guides to four students so that they could prepare their responses in advance.
3. Making an appointment with each student.

The interviews took place at the researcher's workstation on campus at the University of Leeds as planned. Before each interview started, the researcher asked each interviewee if it was all right to record the interviews. Every interviewee was very co-operative and agreed that the tape-recording could be made though one or two students were reluctant at the beginning because they felt embarrassed to learn that their voice would be tape-recorded. The tape-recording allowed the interviews to be transcribed later, so the researcher could study the responses to the questions. The researcher always kept in mind the purposes of conducting interviews at this stage. Four students were interviewed in English and the other two were interviewed in Thai, which

is the students' native language. Each interview lasted between twenty-five and forty minutes. The piloting stage produced implications which were taken into consideration for the main stage of student oral interviews. These implications are presented in the following section.

3.8.1.2. Some Implications for the Actual Data Collection in Thailand

The following are some useful implications drawn from the piloting scheme of student oral interviews.

- **Language to be Used for the Oral Interview**

Both English and Thai were used in conducting the oral interviews in the piloting stage. It was found that the English language was workable with all the four interviewees because these students were studying in Leeds already and they had to deal with the language every day. Still it was doubtful if this would work with the students who would be taking part in the interviews for the first phase of data collection. There was no problem with the two students who were interviewed in Thai as this language is their native language. They provided the researcher with significant information about language learning strategies. In addition, these latter students reported feeling very comfortable while the interview was conducted. In this regard, the researcher had to ensure that each student would provide enough useful information about their language learning strategy use. So, it was decided that the student oral interviews in the main stage would be conducted in Thai. Accordingly, the interview questions would be translated into Thai by the researcher.

- **Recording Interviews**

Errors in recording responses occur when the interviewer inaccurately records the interviewee's replies during an interview. This may pose some special difficulties to the interviewer (Sax, 1979). At one extreme is the attempt to write the report from memory

after the interview has terminated and at the other extreme is the attempt to make a written record of the entire interview while the interview is taking place. Tape-recording interviews can effectively address the latter point. It could help the researcher obtain more accurate information though one may argue that it may cause another problem for the researcher such as transcription for data analysis because this process is not only time-consuming but also expensive. Still the researcher for the present investigation believed that it would be worth his efforts tape-recording and transcribing the interviews, though it would be possible for the researcher to analyse the data directly from the tape recording without transcribing first as Sax (1979) suggests. Moreover, the researcher found it more advantageous to tape record the interview than to take full notes while the interview is being conducted because taking notes while conducting the interview can interrupt the interview process and eventually it could result in the failure of the interview.

- **Type of Interview**

In this piloting scheme, the researcher decided to use a one-to-one semi-structured interview. This interview method has an advantage in that it has a structured overall framework but allows for greater flexibility (McDonough and McDonough, 1997). For example, answers to some questions could be probed further. The interviewer remains in control of the direction of the interview but with much more leeway. Further, the one-to-one interview allows an interviewee to generate a description of the most important aspects of the language learning strategies he or she employs. The group interview was not considered because although it is cost-effective and time effective, it has some shortcomings. With other interviewees listening, an interviewee may be fearful of producing a socially unacceptable answer. Furthermore, the information obtained could

be excessively influenced by students who are the most outspoken in the group (Cohen and Scott, 1996).

The researcher believes that the one-to-one interview is more productive and worthwhile in spite of the fact that it is time-consuming. Another advantage of this technique is that it is easy for the researcher to transcribe the recordings and so this provides the researcher with useful information for the analysis later on.

- **Probes and prompts are still needed**

In the Interviewer's Manual of the University of Michigan Survey Research Centre (1976 cf. Frankfort-Nachmias and Nachmias, 1996) 'probing' is defined as:

"the technique used by the interviewer to stimulate discussion and obtain more information. A question has been asked and an answer given. For any number of reasons, the answer may be inadequate and require the interviewer to seek more information to meet the survey objectives. Probing is the act of getting additional information." (Frankfort-Nachmias and Nachmias, 1996: 241).

Additionally, Robson (1993) suggests that a probe like 'Anything more?' 'Anything else?' or 'Could you go over that again?' is a device to get the interviewee to expand on a response when the interviewer intuits that he or she has more to give. At times, the researcher had to use a probe in order to get the answers particularly for the questions about language learning strategies. It is possible that because these students graduated a relatively long time ago and have not studied English since, they find it difficult to recall what they did in order to help them understand their English lessons better. When they were guided, they tended to be able to recall what they had done when they learned English. Furthermore, Cohen and Scott (1996) suggest that a researcher should focus on recent language learning strategy use. This may be because, from time to time, students may be unaware of the strategy they have used. To deal with this problem, an example of 'a learning strategy' would be given. However, the researcher is confident that the students taking part in the main data collection stage would be able to provide more

information about their strategy use because they are currently learning English or may have just finished studying English. More importantly, a larger number of students would be involved in the student oral interviews.

- **Student's preparation is important**

One question that can be posed is whether it is necessary for the interviewer to give the interview questions to the students beforehand. The researcher found it helpful to give the questions to the students in advance because students could ask the researcher if they happened to have any questions before the interview took place, and also they would have enough time to prepare themselves to answer. In this piloting scheme, the students were given the questions at different intervals before their interviews. It was found that the ones who got questions longer before the interview could provide more information than those who got the questions with very short notice.

- **Timing in conducting an interview is also crucial**

Each interview lasted between twenty-five and forty minutes. This was felt to be about right as it allowed the researcher to explore the main points of the interview. The interview could have become boring and tiring for the interviewee if it had taken too long. This would have probably resulted in the interviewee's reluctance in answering the questions or providing useful information. However, this does not mean that the interview could not go beyond this time limit. The interview could proceed as long as both the interviewer and interviewee felt there were still issues to discuss and the discussion served the purpose of the study.

- **Transcription and translation into English can be very helpful**

As mentioned earlier in this section, it was decided to use the Thai language for the student oral interviews in order to elicit as much useful information about language learning strategies from students as possible. In order to enable the researcher to make

the maximum use of the data obtained, the interview recordings would be transcribed in Thai and then the translation from Thai into English would be conducted. This would also enable the researcher to analyse the data in a better manner than analysing the data directly from the recordings, since the researcher could read the transcripts. Moreover, the research could go over the transcripts time and again in order to analyse the data more precisely.

- **Some questions need improving**

Robson (1993) suggests that there are a few questions to avoid in an interview like long questions, double- or multi-barrelled questions, questions involving jargon, leading questions or biased questions. In the light of this, the researcher found that a few questions in the initial interview guide could be discarded or improved. To make the questions clear and easy for the interviewees for the main stage of data collection to understand, these questions would be translated into Thai in order to serve the research purpose. However, some more questions based on the information gathered in the piloting scheme, would be added in case an interviewee could not think of the strategies he or she had employed in learning English. The rest of the questions were considered appropriate to enable the researcher to elicit useful information about the language learning strategies from the subjects involved.

3.8.2. Written Strategy Questionnaire

The written strategy questionnaire was used as the main instrument for the second phase of data collection for the present investigation. It was administered alongside the proficiency test to engineering students who are the research population for this particular investigation. It was carried out with engineering students in Thailand between mid-January and mid-February 1999. Before the data collection actually took place, an official letter requesting permission and co-operation was sent out to each institution. A

few institutions reconfirmed the permission and co-operation via emails while the researcher was still in Leeds. Once the fieldwork was ready to start, the researcher went back to Thailand and spent the first whole week of January 1999 preparing all the materials.

The researcher made every attempt to ensure the readiness of everything for when the data collection started. In addition, the work timetable had to be followed carefully in order to gain the maximum information. The researcher had to meet one of the lecturers of the School of Engineering of each institution in order to confirm arrangements. Most of the participating institutions were very co-operative. When meeting with students, the researcher started the classroom process by briefing them on the purpose of the data collection and the use of the outcome of this investigation. The students were asked to look through the questionnaire and they were allowed to ask about any questions that they did not understand. They were also asked to complete the background questionnaire which was appended to the strategy questionnaire. Generally, most students spent about twenty minutes completing the questionnaire before they went on to the test. The researcher was always at hand in case students had any questions while completing the questionnaire. Once the students had finished, they were asked to hand in the questionnaire in person because the researcher wanted to make sure that every part of the questionnaire was correctly completed. The researcher ensured this aspect by looking through page by page. If any incomplete part of the task was spotted, that particular student was asked to go back to complete that part again. A few students tended to leave blanks to indicate that they did not employ the stated strategy; in such cases they were asked to check the appropriate frequency column for that response. Going through the questionnaire page by page was very helpful though it was time-consuming. In this case, the researcher apologised to the students beforehand for any inconvenience caused by the

process. As a result, only three of the strategy questionnaires were not completed as intended. This classroom process was carried out at every institution.

The researcher returned to Leeds with 570 sets of strategy questionnaires along with the test answer sheets and the background questionnaires. The written strategy questionnaires were then processed and analysed with the assistance of the Statistical Package for the Social Sciences or SPSS programme in early March 1999. The full results of the analyses as well as a discussion of the findings are presented in Chapters 6 and 7.

3.9. Reporting, Analysing, and Interpreting Data

The data obtained through both phases of data collection: from the student oral interviews; and from the language learning strategy questionnaire, were analysed by the researcher. For the latter, the analyses were carried out with the assistance of the SPSS programme. The analysis procedures are presented as follows.

3.9.1. Student Oral Interviews

The purpose of the student oral interview analysis is to explore the perceptions of students in relation to class size, their own language ability and language learning strategies they employ within and outside the classroom and to improve their language skills in general. The researcher also investigated what the students found difficult in learning English and how they attempted to solve the problems. Lastly, the students were asked to express their opinions or comments about English learning and teaching from their own experience. The interviews were tape-recorded and transcribed more or less verbatim. The transcripts were then translated into English for the purpose of analysing the language learning strategies the students had reported using. The researcher sought to analyse and categorise the data, which were later used to generate the language learning strategy questionnaire for the second phase of data collection. Two validation

exercises of the language learning strategy categorisation were also carried out so as to make the categorisation more valid and reliable. The details of the categorisation validation will be discussed later in Chapter 4.

3.9.2. Written Strategy Questionnaire

The purpose of the questionnaire analysis is to answer the research questions in relation to use of language learning strategies of engineering students learning English at the tertiary level in Thailand. The data obtained were quantified and the SPSS programme was used to analyse the data. The appropriate statistical methods were employed to analyse the obtained data in order to examine the relationship between students' use of strategies and each of the five variables, i.e. type of institution (state-run university, private-run university, and Rajamangala Institute of Technology); gender of students; 'perceived' class size (large, optimum, and small); location of institution (Bangkok and the metropolitan areas, and regional); and levels of language proficiency (high, moderate, and low). Further, the researcher sought to identify whether there are patterns of language learning strategy use in relation to each of the five variables, and if so to analyse them to see what kinds of significant variation patterns exist.

The following statistical methods were used through the assistance of the SPSS programme in order to achieve the research objectives regarding analysing and interpreting the data obtained through the written strategy questionnaire.

1. Frequency of Strategy Use

To compare the extent to which strategies were reported to be used frequently or infrequently by students in general, three levels of strategy use: 'high use', 'medium use', and 'low use' based on the holistic mean scores of frequency of strategy use by 570 engineering students are defined.

2. Analysis of Variance (ANOVA)

This statistical method was used to determine the relationship between learners' overall reported strategy use and 1) 'type of institution': state-run universities, private-run universities, or Rajamangala Institutes of Technology; 2) 'gender of students'; 3) " 'perceived' class size': large, optimum, or small; and 4) 'location of institution': Bangkok and metropolitan areas, and Regional; and 5) 'levels of language proficiency': high, moderate, or low.

3. The post hoc Scheffe test

This test is used to determine the significant differences as the results of ANOVA where the variable has more than two groups. This test is used to indicate which pair of the groups under such a variable contributes to the overall differences.

4. Chi-square Tests

The chi-square tests are employed to determine the significant variation patterns in students' reported strategy use at the individual item level. These tests are employed to check all the strategy items for significant variations by 1) type of institution; 2) gender of students 3) 'perceived' class size; 4) location of institution; and 5) levels of language proficiency. This test compares the actual frequencies with which students give different responses on the 4-point rating scale, a method of analysis closer to the raw data than comparisons based on average responses for each item. For the Chi-square tests, responses of 1 and 2 ('Never', and 'Sometimes') were consolidated into a single "low strategy use" category and responses of 3 and 4 ('Often' and 'Always or almost always') were combined into a single "high strategy use" category. The purpose of consolidating the four response levels into two categories of strategy use is to obtain cell sizes with expected values high enough to ensure a valid analysis (Green and Oxford, 1995: 271).

5. Factor Analysis

Factor analysis is a way of determining the nature of underlying patterns among a large number of variables (Cohen and Manion, 1994). For this particular investigation, the researcher seeks the underlying patterns of language learning strategies which emerged from such analysis and the variation patterns which are strongly related to each of the five independent variables.

3.10. Summary

In summary, the present investigation was conducted in two phases. The research methods and instruments were different in both phases in accordance with the research purposes of each phase. The first phase of data collection, student oral interviews, involved 39 informants. The data obtained through this stage were later used to generate the language learning strategy questionnaire which was the main research instrument for the second phase of data collection. The second phase, a large-scale investigation, involved 570 informants. At the second stage, the students were requested to respond to the written strategy questionnaire. In addition, the characteristics of these 570 students who were the research population were identified.

The results of the data analyses for the student oral interviews and written strategy questionnaire are to be presented in the next chapters. Chapter 4 concerns mainly the results of the student oral interviews which later generated the language learning strategy inventory and the language learning strategy questionnaire for the present investigation.

As mentioned above, the student's level of language proficiency for this particular investigation was determined by the researcher-constructed proficiency test. Chapter 5 deals with the test construction process, and the results obtained through the test which provided the researcher with the criteria for level of language proficiency classification. Lastly, Chapters 6 and 7 deal with the data obtained through the strategy questionnaire.

CHAPTER 4

LANGUAGE LEARNING STRATEGY INVENTORY AND THE STRATEGY QUESTIONNAIRE FOR THE PRESENT INVESTIGATION

CHAPTER FOUR

LANGUAGE LEARNING STRATEGY INVENTORY AND THE STRATEGY QUESTIONNAIRE FOR THE PRESENT INVESTIGATION

4.1. Introduction and Purpose of the Chapter

This chapter mainly deals with the language learning strategy inventory which emerged from the data obtained through student oral interviews conducted with 39 engineering students learning English at three different types of institution in Thailand in 1998. Firstly, the procedures of eliciting information from the 39 students in the first phase of data collection are presented. This is followed by a description of how the preliminary strategy inventory was generated based on interview data. Then the results of two validation exercises of the inventory were reported. This is followed by the generation of the definitive language learning strategy inventory after the two validation exercises had been carried out (see Chapter 8, Section 8.2.1 for the full version of the language learning strategy inventory). The last part of the chapter presents the strategy questionnaire which was used as the main instrument for the second phase of data collection.

As seen in Chapter 2, different researchers have different ways of classifying language learning strategies based on their own or other researchers' research work, or on a review of related literature in the subject areas. It is also noted that no single classification system is perfect. What is suitable for a researcher to use to elicit the use of language learning strategies with one group of language learners may not be suitable for another. Against this background, the researcher carefully planned that the most suitable and effective method for the task in hand to elicit language learning strategies from

engineering students in Thailand was to make use of the information reported by Thai engineering students themselves.

4.2. The Main Stage of the Student Oral Interviews

The first phase of data collection was the main stage of the student oral interviews conducted with engineering students in Thailand from July 1998 to mid-August 1998 (see Appendix 2 for the interview timetable). A semi-structured oral interview was used. The purpose of the student oral interviews at this stage was to elicit students' use of language learning strategies both within and outside the classroom settings, as well as to find out how they improved their English language skills in general. The researcher also took implications obtained at the piloting stage into consideration in the design of the interviews. The questions posed for the students dealt with their perceptions about their class size, and their language ability, and with the language learning strategies they employed both within and outside classroom settings. Questions about what they found difficult in learning English and how they solved their problems were also included. The content of the questions emerged partly from reading literature and available research related to the field of investigation, and partly through the researcher's personal experience about language learning strategies (see Appendix 3 for the interview question guide). The questions can be summarised as follows:

Q1 : a general introductory question including the interviewee's name

Q2 : an investigation of the number of English courses each student is studying or has already studied

Q3 : the number of students studying English in one class

Q4 : an investigation of each student's perception of class size

Q5.1, Q5.2 : an investigation of each student's opinion if the class size he or she has perceived is a problem

Q6, Q7 : an investigation of the frequency of English classes each student has a week and if it is enough

Q8 : an investigation of each student's perception of his or her language ability

Q9.1, Q9.2, Q9.3 : an elicitation of the informant's language learning strategies in a classroom setting (before, during, and after class)

Q10 : an elicitation of each student's language improvement strategies

Q11, Q12 : an investigation of each student's opinion about what he or she finds difficult in learning English and how those problems were solved

Q13 : an investigation of each student's comments about English learning and teaching from their experience

The researcher started the process by getting official letters from the supervisor asking for co-operation from the four institutions chosen to be the subjects in this phase. The letters were addressed to the administrator of each Faculty of Engineering requesting permission for the researcher to conduct the data collection with ten engineering students. The selection of ten students studying at each of three different types of institution which were the subjects of study was to ensure there would be enough useful information for the researcher to generate a strategy questionnaire to be used in the second phase of data collection. In addition, these students were representatives of the students who, it was hoped, would be the research population in the second phase of data collection. Among these students who would be interviewed, twenty-four students were male and fifteen were female.

The researcher spent the last week of June 1998 at his University in Thailand preparing and reproducing materials for the data collection. The materials included the interview schedule, interview guides, and blank cassette tapes for interview recordings. The researcher prepared his work schedule in advance in order not to waste time because the first phase of data collection could be costly, and time-consuming.

The student oral interviews were commenced with ten students at Suranaree University of Technology. It was not difficult to get co-operation from both the university and students. When it came to arranging appointments, the researcher had to be particularly patient because the students' regular timetables seemed to leave very little free time and the researcher did not want to use their in-class time. The researcher requested the students to spare some free time when they did not have classes.

When the researcher was arranging the appointments, he informed the students of what they would be required to do. At the end of the meeting, the students asked about the interview questions and general questions about the interview. One thing which seemed to worry many students was the language being used for the interview. Even though the researcher informed them at the very beginning that the language to be used for the interview would be Thai, they still wanted to make sure that the interview would not be conducted in English. The interview timetable was then arranged and the interview question guide was given out to every student together with a questionnaire about the student's background (see Appendix 4). As mentioned in Chapter 3 (Section 3.8.1.2), it was found to be helpful for students to have an interview question guide before the interview took place in terms of their preparation for responses to the proposed questions.

While the interview was being conducted, the researcher addressed the students by their name, either by nickname, or by the formal name called by their teacher. This depended on their preference. Asking the interviewee's name was one way to build a relationship between the interviewer and the student, and instil trust and confidence while conducting the interview (Measor, 1985). This was very helpful and the students reported that they did not feel anxious or frustrated when being interviewed. The researcher also followed the suggestions along with the guideline suggested by

Robson (1993); and Frankfort-Nachmias and Nachmias (1996). These require that the researcher should listen to the student more than speak; should not ask leading questions; should not intimidate the students while interviewing; should look satisfied with responses (even though he may not be in reality); and the researcher should make interviewees feel that they will be understanding and easy to talk to. A similar process was conducted at the other three institutions.

In summary, the first phase of data collection was carried out as scheduled and things generally went smoothly. A transcription of each interview recording was made as soon as possible and translated from Thai into English by the researcher. After translation, the data were analysed to seek the language learning strategies reported to be employed by these engineering students. It took the researcher almost two months to finish the transcription, and the translation. The subsequent data analysis was used to generate the language learning strategy inventory, and subsequently, the strategy questionnaire for the second phase of data collection.

4.3. How the Preliminary Language Learning Strategy Inventory was Generated

Once the interview recordings were transcribed and translated into English, the researcher started generating the preliminary language strategy inventory through the following steps.

1. The researcher looked through the interview data provided by 39 informants through the first phase of data collection in order to get a whole picture of what the interviewees reported doing.
2. The researcher started to look at each interview script in detail and then noted what could be regarded as learning behaviours or learning strategies. At this stage, the researcher always kept in mind what language strategies are as particularly defined for the present investigation (see Chapter 2, Section 2.2). Each individual language

learning behaviour or strategy was singled out. Each language learning behaviour or strategy had to be consistent with the definition of the language learning strategy which was specified for this particular investigation. Special care was taken at this stage to ensure that every single reported learning behaviour or strategy was identified and none was left out.

3. The researcher started to look at differences and similarities between the reported statements as a whole. From the list, it was found that the interviewees produced altogether 438 statements about language learning behaviours or strategies. At this stage, the researcher started to think of how these reported statements should be grouped.
4. The researcher started to group these 438 statements according to the similarities of the context or situation in which the learning behaviours were reported to be used. It was found that these statements reported behaviours which were used mostly to achieve some learning purposes. However, at this stage, the researcher was left with the question of how to classify these reported statements. They could be classified roughly under three main categories: before class; while in class; and after class; or the researcher could use a classification system like those of Rubin (1981), Politzer and McGroarty (1985), Oxford (1990), or Coleman (1991b). After a clearer picture of the whole range of these strategies emerged, the researcher recalled what was suggested by the examiners during his upgrading examination that these language learning strategies could also be classified according to the purpose of strategy use. Consistent with the suggestions, Richterich (1996: 44) comments that 'strategies are formed by a series of co-ordinated actions for the purpose of achieving an objective reflected by the acquisition of knowledge, know-how, attitude, and learning skills'. The researcher

finally decided to try the preliminary classification based on the reported purposes of strategy use. The next stage could then start.

5. At this stage, both actions and purposes were taken into consideration. For example, one student reported, "I study vocabulary beforehand because I will understand if the teacher happens to use these vocabulary during the class..." (sample interview). Another student reported a similar statement, "I'll read what I'm going to study beforehand and I want to know if I have enough background about the topic to study. I also want to know if I can answer the questions when asked by the teacher" (sample interview; see a full sample interview in Appendix 5). This means that 'studying beforehand' is an action for both students and they share the same purpose, i.e. to be well-prepared for the classroom lessons. It is noted that students did not use the precise words for the purpose, so the researcher had to interpret and look for the most suitable words to describe the purpose they reported trying to achieve. Initially, fifty-four main groups emerged from the 438 reported statements. Because of the importance of this stage, which was iterative, it was extensively reviewed before moving on to the next one. This is because the researcher had to make sure that the reported statements in each group shared the similar characteristics in the context or situation in which they were reported to be used.
6. The next step was to identify each group of learning behaviours. It was not easy to find the suitable name to cover most, if not all, of the reported statements which came under the same group. Once each individual group of learning behaviour or strategy was identified, the next step could then start.
7. After some intensive revisions, the researcher had to make a clear distinction between the definition of language learning strategies for the present investigation and other types of strategies, especially communication strategies. It is recognised the comments

made by Tarone (1980) that these two types of strategies may not be distinguishable in some cases in terms of learner's linguistic behaviours. Regarding the definition of communication strategies proposed by a few researchers (e.g. Corder, 1983; Faerch and Kasper, 1983; and Paribakht, 1985), 'communication strategies' have been defined as devices employed by second language learners when they encounter problems or face some difficulty in reaching a particular communicative goal. In addition, Bygate (1995) defines communication strategies as ways of achieving communication by using language in the most effective way. Besides the observed definitions of communication strategies, the suggested necessary criteria to determine whether a strategy is for communication or learning by Tarone (1980) were taken into consideration. These criteria include: a) a speaker desires to communicate a message to a listener; b) the speaker believes the linguistic or sociolinguistic structure desired to communicate a message is not shared with the listener; thus c) the speaker chooses to either avoid or attempt to communicate a message. According to Tarone (1980), any learning behaviour lacking one of the three criteria is regarded as a learning strategy. Consequently, five groups of the reported language behaviours were excluded with regards to the definition of communication strategies above, along with the criteria to determine communication strategies suggested by Tarone (1980). The excluded language learning behaviours include the strategies which students reported in order to be able to get the message across while conversing in English. They are:

1. *Use gestures or non-verbal language*, e.g. SRUI9:....in reality, when I have to use the language, I will use non-verbal language to help if I don't know how to say....
2. *Ask an interlocutor to speak more slowly*, e.g. SRUI 8:....a problem for me in understanding conversations. When I talk with a foreigner, I have to ask him/her to slow down....

3. *Ask an interlocutor for repetition or clarification*, e.g. SRUI8:....when talking with friends [in English], I will ask them directly how to spell certain words if I don't understand...
4. *Use simple words, phrases or sentences*, e.g. SRUI5:....when we speak English....most of the time we use easy words, not too difficult to understand... and
5. *Think in Thai first and then translate into English*, e.g. RITI6:....before I speak a sentence in English, I have to think of what I am going to speak in Thai first and then translate it into English.

Eventually, forty-nine groups of learning behaviours or strategies existed. It should be noted that classifying learning strategies was again an iterative, tedious and time-consuming process.

8. At this stage, the individual forty-nine strategy items, which were already identified, were again considered and then grouped together according to the purpose of each strategy use. The researcher was again left with the question of how to classify these individual strategy items. The classification proposed by different researchers as mentioned in stage 5 above were again taken into consideration. However, the researcher had to keep in mind again that different researchers could differently classify language learning strategies based on the literature review in Chapter 2. Thus, it appeared that every strategy item shared one prominent characteristic, i.e. each strategy was reported being used in order to enable students to achieve a certain purpose. The researcher started to look at purposes of strategy use which students reported and came up with twelve purposes. Appropriate names for purposes of strategy use were initially given. The next step was to match strategy items and each purpose.
9. Once the individual strategy items and the purposes were matched and more or less settled, the researcher started to reconsider if these twelve groups of strategy use could be classified any further. The researcher tried very hard to see if there was a

prominent characteristics these purposes might share. It was found that these purposes could be further classified into two categories. These purposes were determined according to classroom-based usage. Consequently, two appropriate categories were identified as classroom-related purposes, and classroom-independent purposes. Like the stage mentioned in (7) above, the researcher started to match the two main categories with each of the twelve purposes. This was another difficult step, so every attempt was made to ensure that each individual strategy was matched with the appropriate purpose and each purpose was matched with the appropriate main category. Eventually, 'The Proposed Language Learning Strategy Inventory' came into being. The classroom-related category comprises seven purposes, and the classroom-independent category comprises 5 purposes. In order to apply a structure and reference system to the data, main category 1 Classroom-Related Category has been abbreviated to **CR**, and main category 2 Classroom-Independent Category to **CI**. Each purpose which students reported employing individual strategies to try to achieve is allotted a number within each main category. For example, Classroom-related Purpose 1 is abbreviated to **CRP1**, or Classroom-independent Purpose 1 to **CIP1**, as is each individual strategy for each purpose to be achieved. An individual strategy for a classroom-related purpose is abbreviated to **SCRP**, and an out-of-class strategy for the classroom-independent purpose is abbreviated to **SCIP**. The resulting references for the present strategy inventory run from **SCRP 1.1 to SCR P 7.4** and from **SCIP 1.1 to SCIP 5.4**. So for example **SCR P 7.4** is the fourth individual language learning strategy which students reported employing to try to achieve the seventh classroom-related purpose in the strategy inventory.

In classifying language learning strategies for the present investigation, the researcher always recognises that the language learning strategies in both classroom-related and

classroom-independent categories are always supportive with each other. That is, the strategies which students reported employing in order to deal with their language learning in class may help them improve their language skills in general to some extent. In the same effect, the out-of-class or classroom-independent strategies which students reported employing to expand their knowledge of English vocabulary, improve their language skills in general and acquire general knowledge in English may also help them in terms of language learning in the classroom setting. As will be seen here and thereafter in the next chapters, the strategies in the classroom-independent category (CI) are interchangeably referred to as 'out-of-class strategies' and 'classroom-independent strategies'. This is because all of the strategies in this category were reported being employed outside the classroom setting. However, the classroom-related strategies could also possibly be employed either inside or outside the classroom setting. In other words, classroom-related strategies were reported to be used before, while in class, or after class. So, both classroom-related strategies and out-of-class or classroom-independent strategies are not clear-cut. That is to say, the language learning strategies under the two categories are interactive and have a spiral relationship rather than linear.

To sum up, initially, the researcher looked through the transcriptions of the 39 translated interview recordings carefully, attempting to find the common characteristics of the reported statements such as learning behaviours and a purpose of using such learning behaviours. It emerged that most of the statements which could be regarded as 'learning strategies' were reported by students in order to achieve a particular language learning purpose, identified later as classroom-related and classroom-independent. In other words, students reported using certain strategies because they had a purpose in mind to achieve. The process of classifying these reported learning behaviours or strategies together with purposes of using certain learning behaviours was iterative.

Moreover, the researcher had to reconsider different aspects of the classification, for example, terms used to identify purposes of strategy use and labels to identify strategies as the whole system, several times in order to reach a satisfactory classification. Figure 4.1. below summarises the outline of the learning strategy inventory which emerged from the data analysis obtained through student oral interviews for the present investigation.

Figure 4.1 : The Outline of the Language Learning Strategy Classification for the Present Investigation

Language Learning Strategy Inventory		
Main Category	Purpose to be Achieved	Individual Strategy
Main Category 1 Classroom-Related (CR)	CRP 1 CRP 2 CRP 3 CRP 4 CRP 5 CRP 6 CRP 7	SCRP 1.1 - SCRP 1.4 SCRP 2.1 - SCRP 2.4 SCRP 3.1 - SCRP 3.3 SCRP 4.1 - SCRP 4.6 SCRP 5.1 - SCRP 5.4 SCRP 6.1 - SCRP 6.4 SCRP 7.1 - SCRP 7.4
Main Category 2 Classroom-Independent (CI)	CIP 1 CIP 2 CIP 3 CIP 4 CIP 5	SCIP 1.1 - SCIP 1.4 SCIP 2.1 - SCIP 2.4 SCIP 3.1 - SCIP 3.5 SCIP 4.1 - SCIP 4.3 SCIP 5.1 - SCIP 5.4

This stage took the researcher over a month to seek and develop a satisfactory strategy inventory. This preliminary strategy inventory needed validation. In doing this, it could be proved more reliable when different people other than the researcher himself, had an opportunity to examine and made comments about this strategy inventory. What follows is a description of the validation exercises carried out to validate this strategy inventory.

4.4. Language Learning Strategy Inventory and the Validation Exercises

The present investigation focuses on language learning strategies which engineering students reported employing in order to achieve their classroom learning, and their

language improvement in general. Through the student oral interviews, the students reported using language learning strategies which may enhance their language learning both inside and outside the classroom settings. Language learning strategies which may help them to improve their English skills in general were also reported. Two validation exercises were carried out in order to help eliminate problems which may have occurred with the classification system. The interview data obtained through the first phase of data collection provided the researcher with the significant language learning strategy inventory for the present investigation. In order to check that this proposed language learning strategy classification is valid, the validation processes were conducted with both English language teachers and non-English language teachers. The results of the strategy inventory validation are presented in the following sections.

4.4.1. The First Strategy Inventory Validation

The first validation took place immediately after the researcher finished compiling the proposed categorisation system. The primary purpose of the validation was to see whether or not other respondents would agree with the proposed inventory, as well as to see if any improvement was needed. The researcher produced a list of 49 language learning strategies and then randomly selected 60 reported statements. These language learning strategies and reported statements were randomly ordered. Respondents were then asked to match the reported statements to the language learning strategies. At this stage, the task was given to nine TESOL students studying at the University of Leeds (six doing M.Ed. and three doing Ph.D.) and seven of nine responded. What follows is the sample task for this validation. Figure 4.2 shows the sample task.

Figure 4.2 : A Sample Task for the First Validation

Sample: 1 Instructions: Please match the reported statements in (B) with the appropriate language learning strategies in (A). Please note that each reported statement can be used ONCE only.

A: List of language learning strategies

-1.1. Memorising new words with or without the vocabulary lists in order to learn new vocabulary for the classroom lessons
-1.2. Studying the lessons beforehand (such as the subject content or the objective of each lesson) in order to be well-prepared for the lessons
-1.3. Listening to English songs or cassette tapes of English conversations in order to improve one's listening skill
-1.4. Attending the class regularly in order to keep up with the teacher in the classroom
-1.5. Attending extra classes in order to pass the English tests
-1.6. Using a computer programme like a 'chat' programme in order to improve their speaking skill

B: List of reported statements

- a... 'before coming to class, I like to try new exercises. This can help me understand better when studying with the teacher in class....'
- b. 'I can ask someone who knows English to teach me...This will help me understand better....'
- c. ... 'I study vocabulary beforehand because I will understand if the teacher happens to use these vocabulary during the class....'
- d.... ' I sometimes go to an English-speaking film with my friends. I can learn about listening. I understand when they speak sentence by sentence, but not long sentences. I also learn about the accent, tone of voice, and intonations....'
- e.... 'I read an easy English newspaper 'Student Weekly'. This can help me a lot....there are some difficult words and I translate them in small blocks...'
- f.... 'I'll bring my book which I study at the Institute with me to AUA and I can ask the teacher there if I have a question about the lesson.... I sometimes ask my father....'
- g.... 'I also attend extra classes at 'Serm Laksutr' Language School to improve my knowledge of English...'

Once the responded were collated, the researcher tabulated the responses provided by the respondents. The response for each strategy item was then tallied. The researcher considered any strategy item problematic if fewer than five respondents gave the expected response to strategy item. The result of the first validation revealed that fifty-two of sixty reported statements were consistent with one another. These responses were also consistent with those proposed by the researcher. Those which were not consistent with one another or with those proposed by the researcher needed to be reconsidered. The first validation revealed that a lack of clarity or insufficient information of the reported statements may have caused the confusion or misunderstanding

presumably. For example, the respondents did not understand what 'AUA' stands for [American University Alumni, which is a language school in Thailand]. The problematic items were validated for a second time along with some of the non-problematic ones after refinements of statements. The refinements of the statements included providing more information, or full words for any abbreviations.

4.4.2. The Second Strategy Inventory Validation

The task designed for the second validation was more or less the same as the first one except that twenty reported statements were included in the task (eight problematic and twelve non-problematic). The second validation was carried out with another group of respondents. These respondents included four TESOL students, and three non- TESOL students studying at the University of Leeds. The purpose of the second validation was to see whether the problematic strategy items were still problematic after some refinements and improvement were made. The same criterion as in the first validation was applied in terms of considering an item to be problematic. The result revealed that all of the responses suggested by the researcher were consistent with over 95 per cent of the responses provided by the respondents. This was considered satisfactory. Subsequently, some wordings were further refined.

After the two validations of the strategy inventory were carried out, the next stage was to use it to create the language learning strategy questionnaire which was used as the main instrument for the second phase of data collection. The strategy questionnaire will be discussed later in Section 4.6.

4.5. The Language Learning Strategy Inventory

The language learning strategy inventory for the present investigation emerged from the interview data obtained in the first phase of data collection. The researcher analysed the data and classified the reported strategies according to *their being used in order to*

achieve particular language learning purposes, either classroom-related or classroom-independent.

Following are the results of the student oral interviews regarding the language learning strategies employed by students. As mentioned earlier, the name of each interviewee is included in the interview for the purpose of creating trust and friendliness between the interviewer and the interviewee. However, each student as an informant is labelled as a code according to the type of institution at which he or she is studying. For example, **SRUI 1** means that the interviewee is studying at a state-run university, and he or she is the first student who was interviewed. **PRUI** and **RITI** are used to label those studying at a private-run university and Rajamangala Institute of Technology respectively.

4.5.1. Language Learning Strategies in the Classroom-Related Category (CR)

The language learning strategies under this main category are the learning strategies which were reported to be employed by 39 engineering students in order to enhance their language learning in the classroom setting with the teacher. Some strategies may be reported to be employed before class; some while studying in class; and others after class. This depends in part upon what purpose students are trying to achieve. The seven classroom-related purposes (CRP) in this main category which students reported trying to achieve include:

- **CRP 1** : To be well-prepared for the lessons
- **CRP 2**: To keep up with the teacher in the classroom
- **CRP 3**: To get the teacher's attention in the classroom
- **CRP 4**: To learn new vocabulary in the classroom lessons
- **CRP 5**: To avoid being distracted while studying
- **CRP 6**: To solve the problems encountered in the classroom lessons
- **CRP 7**: To pass the English tests

4.5.1.1. CRP 1: To be well-prepared for the lessons

Many students reported that they found it very helpful to be well-prepared when coming to the classroom. They hope that being well-prepared when coming to class may help them to understand better in classroom learning with the teacher. They also reported that they believed they at least had some background about what was going to be taught or they were ready for the next lessons. Four individual strategies which students reported employing in order to achieve this classroom-related purpose include:

- **SCRP 1.1 Study the lessons beforehand (such as the subject content or the objective of each lesson)**

As mentioned above, some students reported that it is very important for them to go to class well-prepared. Different students reported different ways of achieving this classroom learning purpose. Studying the subject content or learning objectives beforehand may be helpful for them. Different students reported employing this learning strategy as follows :

SRUI 1: ... I have to read [textbooks] beforehand as it helps me to be well-prepared for the classroom lessons,

SRUI 10:....I study vocabulary beforehand because I will understand if the teacher happens to use these vocabulary items during the class....

RITI 1:I will study the topic beforehand. I will also study about tenses and then vocabulary before I go to the next class....

PRUI 5: I'll read what I'm going to study beforehand and I want to know if I have enough background about the topic to study. I also want to know if I can answer the questions when asked by the teacher in the next class.

RITI 2:.....before coming to class, I'll look at the learning objectives of each lesson-- what I am supposed to be able to do after having studied each lesson

- **SCRP 1.2 Try some exercises in advance**

Besides reading or studying the subject content, or learning objectives in advance, some students reported trying some exercises in order to be well-prepared for the classroom lessons as follows:

SRUI 2:...before coming to class, I like to try new exercises. This can help me understand better when studying with the teacher in class....

SRUI 13:...before attending the next class, I try to do some exercises beforehand if I can...

RITI 7:...if I have some free time, I will try some exercises in the book with a pencil in advance. This can help me understand the next lesson better.

PRUI 1:...before going to the next class, I will try to do exercises in the last part of each lesson beforehand.

PRUI 3:...I may do some exercises in advance. If I don't do in advance, I can't catch up with the teacher as the teacher just goes on and on....

- **SCRP 1.3 Prepare oneself physically**

Some students reported that they find it useful if they feel fresh and strong before starting the lessons. This helps them to be well-prepared for the classroom lessons:

SRUI 2:....If I feel exhausted or I don't feel fresh, I can't concentrate on the lesson. If I want to learn..... I have to prepare myself physically as well...

PRUI 9:.....I don't like English...I also feel bad when I have to study English. Sometimes I feign to have a headache or stomach ache. I try to improve myself by not pretending to have a headache or stomach ache. I know I have to prepare myself physically before studying English.

- **SCRP 1.4 Do revision of the previous lessons**

Some students feel that revision of the previous lessons may be helpful for them to be well-prepared for their classroom lessons:

SRUI 3:....after class....I do the revision of the previous lessons. I'll look at the notes I took in class and summarise them again. This makes me feel that I am well-prepared for the next lessons.

SRUI 11:....after class I do the revision where I cannot answer in class and see why I make mistakes for some questions, as well as the new lessons. This can help me understand the lessons better.

SRUI 13:....after class, I do the revision but not very often. I'll do the revision on what the teacher has just taught. This helps me to be well-prepared for the next class.

SRUI 16:...after class, I'll do the revision. That makes me understand the previous lessons better. It also helps me to be well-prepared for the next lessons.

4.5.1.2. CRP 2: To keep up with the teacher while studying in the classroom

While studying in the classroom, some students reported that it is important for them to pay close attention to the teacher and to the lesson in order to keep up with their teacher. Attending the class regularly, or thinking along the line outlined by the teacher while studying privately may also be useful for the students. The strategies which students reported employing in order to achieve this classroom-related purpose include:

- **SCRP 2.1 Listen to the teacher attentively**

In order to achieve the purpose of keeping up with the teacher while studying in class, some students reported paying attention to the teacher, or listening to the teacher attentively :

SRUI 6:...I have to pay attention to the teacher seriously while studying in class so that I can keep up with him or her...

SRUI 19:...when in class, I have to listen to the teacher attentively. I pay attention and follow the teacher on and on. This can help me keep up with the teacher.

RITI 3:....I must pay attention to the teacher the whole period. I mustn't be absent-minded, as I can't catch up with the teacher if I happen to stop for a while. So I must pay attention all the time...

- **SCRP 2.2 Attend the class regularly**

Besides paying attention to the teacher, or listening to the teacher attentively, some students also reported that attending the class regularly may help them to keep up with the teacher while studying in the classroom :

SRUI 9:...if I like the subject, I study and I know that I can't miss the class, like English....This helps me to keep up with the teacher....

SRUI 16:....I have to attend the class regularly. I have never missed a single class so far. If I miss the class, I cannot keep up with the teacher in the next class.

SRUI 19:...I have to attend the class every time in order to keep up with the teacher.

PRUI 9:...I don't like English...still I have to attend the class regularly. If not, I won't keep up with the teacher in class.

- **SCRP 2.3 Take notes while studying in class with the teacher**

Some students reported that taking notes may help them to keep up with the teacher while studying in class.

SRUI 1:...when there is new vocabulary, I always take notes. The teacher sometimes translates from English into Thai for us. I will write what the teacher says in both Thai and English. This can help me understand and keep up with the teacher.

SRUI 10:...I take notes of what the teacher says is important. This can help me keep up with the teacher in class.

RITI 8:...while studying in class, I like to take notes as well...I like to take notes of what I don't understand. When I understand the lesson, I can easily keep up with the teacher.

PRUI 5:....while studying I like to jot down something apart from the lessons. I mean when the teacher tells us something outside the lesson, I will take notes if I find it interesting...

- **SCRP 2.4 Think to oneself along with the teacher while studying in class**

Aside from listening to the teacher attentively, attending class regularly, and taking note, some students reported that thinking to themselves along with the teacher may also be helpful in terms of keeping up with the teacher while studying in class. This means that students listen to what the teacher is teaching and think whether he or she understands the points being taught or not. Apart from this, the student may anticipate what should be asked or what should be done in order to keep up with the teacher :

SRUI 1:....I also think along with the teacher when the teacher is teaching. I think to myself about exercises....I think about the questions that may be asked by the teacher....

SRUI 17:....I try to answer the questions silently to myself and....I compare [my answers] with those given by the teacher...

RITI 9:....in general when the teacher teaches, I try to think along—what the teacher is teaching. This will help me visualise what the teacher is teaching...

4.5.1.3. CRP 3: To get the teacher's attention in the classroom

While studying in class, some students reported that they found it very important that they get personal attention from their teacher. Getting the teacher's attention means a lot to some students and this may make some students feel they can learn or not. Some students reported trying different ways in order to get the teacher's attention. The strategies which were reported by students in order to achieve this classroom-related purpose include:

- **SCRP 3.1 Try to have an interaction with the teacher by asking or answering questions while studying in class**

A few students reported that they could get the teacher's personal attention in the classroom by answering the questions :

SRUI 6:....I try to be the first student to answer the question. I don't mind if my answer to the question is right or wrong. If it is wrong, the teacher will correct it. The teacher tends to pay more attention to me.

SRUI 7:...I try to raise my hand to answer...I also volunteer to answer and the teacher pays attention to me....

SRUI 8:....whatever the teacher asks, I always try to answer the questions. If I cannot answer, the teacher tends to give me another chance to think and come back to me again...

RITI 1:...I sit in the front row...the teacher likes to use me as the example the first thing. I feel I have a better relationship with the teacher than my friends do. The teacher likes to ask me and get me to do things....

PRUI 4:...I try to answer whenever the teacher asks....when the teacher knows that I always answer the questions, he tends to pay more attention to me....I try to get the teacher's attention by asking questions so that the teacher pays attention to me.

- **SCRP 3.2 Take part in classroom activities other than asking or answering questions**

Apart from answering the questions in order to get the teacher's personal attention, a few students reported that taking part in classroom activities other than asking or

answering questions may also help them to get the teacher's attention while studying in class:

SRUI 6:.. I try to take part in the classroom activities. If there is an activity like speaking in the lesson, I will speak first...By doing this, the teacher can remember me....

SRUI 8:...I try to participate in classroom activities. The teacher tends to pay attention to me when there is an activity in the classroom.

SRUI 9:...I try to participate in classroom activities. I am happy to take part in any classroom activities and the teacher can remember me.

RITI 3:...while studying in class, I have to be confident to perform. When speaking English, I speak whether it is correct or not because the teacher will correct me if I make some mistakes. I don't think that the teacher will know if I don't speak and I cannot give the correct answer to myself, either.

- **SCRP 3.3 Try to have an interaction with the teacher outside the class time**

A few students reported that trying to have an interaction with the teacher outside class time may be helpful in that the teacher will pay attention to him or her in the class :

PRUI 6:....I often go to see the teacher. I try to find an opportunity to talk with the teacher after classes. I try to ask for some advice from the teacher....when in class, believe me, the teacher tends to look at me the first thing and also keeps asking me if I understand or not or if I have any questions....

4.5.1.4. CRP 4: To learn new vocabulary in the classroom lessons

According to the information obtained through the student interviews, vocabulary learning seems to be given as the priority for engineering students in learning English because many of them reported that they believed that their English would be better if they knew or could remember significant amounts of vocabulary. Engineering students reported different ways of dealing with new vocabulary items in classroom lessons. These reported strategies which students employed in order to achieve this classroom-related purpose include:

- **SCRP 4.1 Memorise new words (with or without vocabulary lists)**

Memorising new vocabulary items is one way of learning reported by some students even though not all students have the same memorising techniques. It was reported that students may memorise new vocabulary items with or without a vocabulary list :

SRUI 1:.....I memorise vocabulary items. This is very helpful for me as I can remember a lot of vocabulary. It's also useful for me when I see them in passages and I can understand them...

SRUI 8:....I don't know many vocabulary items. I memorise them. I try to remember how they are spelt....I write new words on a piece of paper and stick it on the wall in my bedroom....I can see those words very often...

SRUI 15:...I think vocabulary is the heart of language learning. If I don't know vocabulary, I can't do anything...I write them down on a piece of paper and then memorise them...

RITI 4:...I have a problem about vocabulary. I try to memorise new words...I'm not diligent. I think if I memorise more often, I can remember them by heart...

RITI 5:...if there are new words, I write those words on a piece of paper and stick it on the wall in my bedroom....I'll see them whenever I go into my bedroom. When I'm in my bedroom, I'll see them and this helps me remember better....

RITI 8:...sometimes I have to memorise a lot of vocabulary items....I have to memorise them. This helps me better because I tend not to remember even the words I have seen before. I have to memorise and recall them later on...

PRUI 9:....I don't know many vocabulary items. This affects my reading comprehension. I memorise five words a day...

- **SCRP 4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English**

Some students reported that using a dictionary to check the meaning of a new vocabulary item may be very helpful for them to learn new vocabulary items in classroom lessons :

SRUI 2:...I study beforehand and look up the meaning of new words which are listed at the end of each unit or lesson. I find the meaning of new words in a dictionary...

SRUI 9:... I like to use a dictionary...I'm not lazy when I have to use a dictionary.

SRUI 14:...if I happen to have a problem with a vocabulary item, I use a dictionary to look up the meaning...

SRUI 17:...I spend a long time reading one passage. I look up the meaning of new words in a dictionary...

RITI 2:...if I have a problem about vocabulary, I will look the words up in a dictionary. It's a dictionary for technical English...I need to have a dictionary with me all the time...

RITI 6:...when I have a problem about vocabulary, sometimes I use a dictionary.....

PRUI 2:...I don't know many vocabulary items. It will be better if I know more vocabulary...I look the words up in a dictionary...

- **SCRP 4.3 Guess the meaning of a new vocabulary item from the context**

Guessing the meaning of a new vocabulary item from the context was reported to enable some students to learn new vocabulary in their classroom lessons :

SRUI 9:....I have a problem about vocabulary, I'll try to look for the meaning from the context...

SRUI 11:....I have a problem about vocabulary, I look at the contextual clues as there may be parentheses which contain an explanation of a new word, or I may look at the punctuation marks....

SRUI 14:....if I have a problem about vocabulary, I guess it from the context, looking at the sentence that comes before and the one that comes after...I put them together and guess the meaning as a whole...

SRUI 16:....I get the meaning of difficult words by looking at the whole sentence and then try to get the meaning from that....

PRUI 1:....Some technical terms in engineering that we study are difficult to understand. I cannot check their meanings in a dictionary....I just guess from the context and I try to translate by looking at the context...

- **SCRP 4.4 Look at the root or the form of a new vocabulary item**

Apart from memorising, using a dictionary, and guessing the meaning of a new vocabulary item from the context, looking at the root or the form of a new vocabulary item was reported to be helpful for some students in learning new vocabulary in the classroom lessons:

SRUI 5:.....I also guess the meaning of a word by looking at the root of a word...

SRUI 14:....the words I rarely see, I have to look at their roots..

RITI 3:....I try to remember the forms of words, or the word formation...

RITI 4:...if I don't memorise words, I try to look at their spellings...

- **SCRP 4.5 Group new vocabulary items according to their similarity in meanings or spellings**

Grouping new vocabulary items according to their similarity in meanings or spellings was also reported to be used by students to help them learn new vocabulary in the classroom lessons :

PRUI 3:....I learn to group vocabulary items by myself. I will look at the words which are of the same or similar meanings and then those with similar spellings.....

- **SCRP 4.6 Use new vocabulary items to converse with peers**

A few students reported that one way of learning new vocabulary items for the classroom lessons is to use these new vocabulary items to converse with peers :

SRUI 8:....when I talk with my friends in English, we try to use new words and exchange new words with each other. This may help me learn the words we have just studied in class.

RITI 1: I will talk to my friends about the vocabulary items. This helps me remember those new words, too. We try to practise by using those new words in our conversations....

4.5.1.5. CRP 5: To avoid being distracted while studying

It was reported by some students through the interview data that they may need to concentrate significantly harder than others in order to understand the lessons better while studying. They need to deal with or avoid distraction caused by either their classmates or created when the students themselves do not understand what the teacher is teaching. The learning strategies reported being employed by students in order to achieve this CRP include:

- **SCRP 5.1 Try to get a seat in the front row**

It was reported by some students that distraction while studying in class may be a barrier for them in learning. Some students' concentration can be improved by their choice of position or seating in class :

SRUI 10:....I try to sit in the front row. If I sit at the back of the classroom, my friends tend to keep me talking with them. I need concentration while studying.

PRUI 10:...I have to sit in the front row, the real front so that I won't see any students in front of me. If in the middle, I still see some students.....At the front I can see the board and the teacher clearly. I have more concentration..

- **SCRP 5.2 Try not to talk with other students while studying**

Apart from the seating position, some students reported that trying not to talk with other students while studying helps them to avoid being distracted while studying :

SRUI 15:....I try to listen to the teacher attentively. If someone sitting beside me keeps talking, I'll move away to another seat. I have to pay close attention to what I'm listening to....

SRUI 16:...while studying in class, I don't talk with friends. I need concentration while studying.

RITI 2:....while doing exercises in class, I don't talk with anybody. I have to pay attention to what I am doing. If I talk, I cannot concentrate on what I am doing.

- **SCRP 5.3 Sit next to a bright or quiet student**

Some students reported that they believe that sitting next to a bright or quiet student is also a way to avoid being distracted while studying :

RITI 8:.....I choose to sit near a student who doesn't talk much and also close to the teacher. I have more concentration while studying.

PRUI 6:...I have to find a friend who is good at English... and I try to sit near a good student. This may help me concentrate on what I am studying.

- **SCRP 5.4 Try not to pay attention to what other students are doing while studying**

A few students reported that trying not to pay attention to what other students are doing while studying may be helpful for them to avoid being distracted :

SRUI 10:...While studying in class, I pay no attention to other students [behind me]. Whatever they do, I don't care. I can concentrate more on the lesson.

4.5.1.6. CRP 6: To solve the problems encountered in the classroom lessons

Some students reported that very often when studying in class, they fail to understand what the teacher is teaching. They themselves have to find one way or another to cope with the problems they experience in the classroom. This may be either in the class time or outside the class time. The strategies reported being employed by students in order to achieve this classroom-related purpose include:

- **SCRP 6.1 Ask the teacher in class either immediately or when appropriate**

Asking the teacher in class was reported to be used by some students as a way to solve the problems they encountered while studying in class :

SRUI 3:...if I have any questions about the lesson, I'll ask the teacher immediately if my friends cannot help me...

SRUI 7:....sometimes I ask the teacher a question about the lesson that I do not understand but very rarely. I like to ask the teacher just before the class finishes.....

SRUI 10:....if I have a question about the lesson , I can ask the teacher immediately. I don't need to raise my hand and stand up....

SRUI 16:....while doing revision, if I don't understand, I'll keep the problem to ask the teacher just before the following class begins.....

RITI 4:...when the teacher gives us an assignment and we don't understand exactly what the teacher wants us to do, I will ask the teacher immediately...

PRUI 6:...I only let the teacher know where I don't understand. Most of the time, I prefer to ask the teacher rather than ask my friends...

- **SCRP 6.2 Ask the teacher after class**

Some students reported feeling embarrassed to ask the teacher in class for whatever reasons. Therefore, they find that asking the teacher after class is another way of solving the problems which he or she has experienced in the classroom :

SRUI 1:....when I don't understand the lesson, I ask the teacher after class.....I put a tick where I don't understand. If I ask the teacher immediately, I feel that I bother my classmates.....

SRUI 6:....if I have a problem about words or sentences which I have never seen before, I'll ask the teacher after class...

SRUI 8:....I also ask the teacher when I have a question about the lesson. I ask the teacher when the class finishes because during the class the teacher always gets us to do exercises....

RITI 1:....when I have a problem about my lesson, I ask the teacher after class or during the lunch break...

PRUI 6:...I prefer to ask the teacher about the lesson outside the class. I find this a lot better than doing so in class...if in class, many students may not be very happy because they may think it's a waste of time....

- **SCRP 6.3 Ask a classmate or classmates either in class or outside class**

Some students reported that they may not feel comfortable asking their teacher to help solve the problems which they experience in the classroom. They prefer to ask a classmate or classmates either in class or outside class :

SRUI 3:....if I have any questions about the lesson, I'll put a mark on it and I'll ask my friends....

PRUI 7:....I tend to ask a friend who is sitting next to me when I have a question about the lesson....

SRUI 14:....I spend most of the time listening to the teacher and trying to understand what the teacher is talking about. If I don't understand, I'll ask my friends....

SRUI 15:....if I don't understand anything about the lesson, I'll ask a friend who's sitting next to me....if that friend cannot help, I'll keep asking one after another until I get the answer....

SRUI 18:....while in class, if I don't understand what the teacher is teaching, I'll ask my friends...

RITI 1:....if I can't remember what the teacher has taught, I ask my friends....if the teacher does not allow us to ask in class, I'll take notes of the points I still don't understand and then I'll ask my friends....

RITI 5:....when I have a problem about the lesson, I'll ask my friends. Once I asked the teacher and the teacher asked me why I didn't ask a friend. So, the teacher is the last person for me to ask...

PRUI 5:...I ask my friends when I don't understand the lesson. I find that my friends can explain better than the teacher...

PRUI 8:...If I do not understand the lesson, I'll ask my friend the first thing. I dare not ask the teacher.....

- **SCRP 6.4 Ask other people than one's regular teacher or classmates**

Some students reported that they may have an opportunity to deal with other people who know English and can help them out with the problems they experience in class.

Consequently, asking people other than their regular teacher or classmates may be helpful in terms of solving the problems experienced in the classroom :

SRUI 2:...I can ask someone who knows English to teach me... This will help me understand better....

SRUI 7:....sometimes I ask a member of staff at the English Centre about my lesson....

SRUI 10:...when I don't understand my lessons, I'll ask my father. He's very good at English and he wants me to be good at English like himself....

SRUI 12:... When I don't understand the lesson, I'll ask my friend. If my friend cannot help, I will ask the teaching assistant [who helps the teacher with our lessons in class]....

RITI 1:...If I have a problem about my lessons, most of the time I ask my seniors who are very good at English. If I still don't understand, I'll ask a foreigner at the church.....

RITI 2:....I'll bring my book which I study at the Institute with me to AUA [the private language school] and I can ask the teacher there if I have a question about the lesson.... I sometimes ask my father....

PRUI 6:....when I have a problem about the lesson, I will ask anyone that I think knows English....

4.5.1.7. CRP 7: To pass the English examinations

Generally, tests are seen as the key indicator of whether students can go on to a new English module as required by the Institution's curriculum, or whether they have to repeat the same module. As a result, engineering students need to pass the achievement tests for their classroom learning. Students reported that they would try different

strategies in order to pass such tests. The strategies which students reported employing in order to achieve this classroom-related purpose include:

- **SCRP 7.1 Do the revision of lessons only for the examination**

Some students reported that they try to do revision of lessons but only for the purpose of passing the examination :

SRUI 9:...I just come in and sit in the class. I will do some revision before the examination....

SRUI 17:...I only study before the examination. If no exam, no study. After the examination, I forget it all again...

RITI 1:...I don't do anything after class. I'll do the revision again before the examination...

RITI 3:....I didn't pay much attention before this....I always do the revision when the examination is drawing near.....

PRUI 4:....I will leave it [classroom lesson] and will look at it again before the examination...

PRUI 6:...after class I don't do anything. I don't do the revision until before the exams...

PRUI 10:...I study before the examination....

- **SCRP 7.2 Practise tests from different sources**

Some students reported that they may find some time to practise tests from different sources in order to enable them to pass the English tests :

SRUI 1:....I read a magazine like the 'Nation Junior'....and there are sample tests for examination. There are also grammar exercises. I try those exercises and I believe they help me when I do the test.

PRUI 1:...I've learned a lot from the newspapers. I practise exercises in the newspapers. They are very helpful for me particularly when I do the tests.

- **SCRP 7.3 Join a tutoring group**

Some students reported that joining a tutoring group may be another way for them to pass the English tests :

RITI 1:.... After the teacher leaves the class, my friends and I will talk about the previous lessons again. We exchange our ideas about the lessons. This will make me know more than just study from the teacher...I'm also a group tutor when we prepare ourselves for the examination....

RITI 6:....At the Institute, I'm a group tutor especially when we have to take an examination....

PRUI 8:....my friends and I will hold a group tutoring before the examination. This is very helpful because we can exchange our knowledge. I may understand some points that my friends don't, and vice versa....

- **SCRIP 7.4 Attend extra classes at a private school**

Apart from doing revision, joining a tutoring group and practising tests from different sources, a few students reported that they may find that attending extra classes may help them to pass the English tests :

SRUI 3:....I attend extra classes....I learn there in order to take the examination...

SRUI 16:...I attend extra classes at a cram school. I study grammar with the Thai teacher. I can't do the grammar well in the test....

PRUI 7:....I attend extra classes at a private language school. I learn reading, grammar, and listening. This can help me a lot because there are also former tests for the past few years which we have to practise. I find it helpful for me when I do the tests.

4.5.2. Strategies in the Classroom-Independent Category (CI)

Language learning strategies in this main category were those which engineering students reported employing to enhance their language skills improvement in general. This may also indirectly be supportive to their English knowledge for their classroom learning to some extent. That is to say, students may be able to learn English in class with their teacher better when they have an opportunity to deal with English outside their classroom lessons. This may help them to expand their knowledge of English in different aspects such as vocabulary and expressions. As mentioned earlier in this chapter, the individual learning strategies in this category, and thereafter, are referred to as

'out-of-class or classroom-independent strategies'. The purposes in this category which students reported trying to achieve are:

- CIP 1: To expand their knowledge of English vocabulary and expressions
- CIP 2: To improve their listening skill
- CIP 3: To improve their speaking skill
- CIP 4: To improve their writing skill
- CIP 5: To acquire general knowledge in English

4.5.2.1. CIP 1: To expand their knowledge of English vocabulary and expressions

As reported in the interviews, some engineering students believe that vocabulary is at the heart of language learning. They believe that the more vocabulary they learn and know, the better their literacy in English will become. Engineering students have reported several ways to expand their knowledge of vocabulary and expressions aside from those they learn in class. The strategies which students reported employing in order to achieve this classroom-independent purpose include:

- **SCIP 1.1 Read printed materials in English such as billboards, leaflets, newspapers and magazines**

By exposing themselves to different sources of printed materials, students reported that they may be able to expand their knowledge of vocabulary and useful English expressions :

SRUI 2:....I try to read any English sentences outside the classroom and try to understand them. If I'm not familiar with them [words], I will remember them.....I like to guess the meaning of new words on the billboards. I can learn more vocabulary by doing this.

SRUI 12:...I read advertisements and billboards [in English]. I can learn new words from reading those materials....

SRUI 7:...I will read whatever I see. I also like to read novels. I can learn new vocabulary and ...get pleasure out of it....

SRUI 15:....I read 'Student Weekly' because I can learn about vocabulary from this newspaper. I used to try 'The Nation', but it's too difficult...

PRUI 4:....I can think of one thing, a billboard. Whenever I see a billboard in English, I'll read and read and try to translate the statements I see. If I don't understand

them, I'll look up the meaning in a dictionary later and I'll go back to see them again. I want to know if my translation is correct or not. This enables me to expand my knowledge of new vocabulary and expressions.

PRUI 5:...I like to look at new words in a magazine, and I can learn new phrases or sentences from what I read in a magazine...

PRUI 6:...I read a magazine. I can learn a lot of new words and how to use them... when I see a new logo of a video or cassette tape, I'll check the meaning in a dictionary. If I haven't got a dictionary, I'll jot them down on a piece of paper and check their meaning later.....

PRUI 8:...I like to know contemporary vocabulary items rather than the old ones. I learn these words from the newspapers...

RITI 5:...I read an easy English newspaper 'Student Weekly'. This can help me a lot....there are some difficult words and I translate them in small blocks...

- **SCIP 1.2 Play games in English such as crosswords and computer games**

Apart from reading different kinds of printed materials, a few students reported that playing games in English such as crosswords and computer games may enable them to expand their knowledge of English vocabulary and expressions :

SRUI 4:...I also play scrabble games. I can learn a lot of new words from this game...

SRUI 7:...I play computer games. They are adventurous games....I can learn new vocabulary from playing the computer games. I have to force myself not to look up the words in a dictionary.....

SRUI 10:...I play computer games. I have to read and understand the text....If I don't understand, I can't play the games or follow the instructions....

SRUI 12:...I play games in English and I have to use those words. That means I can learn new words from those games.

SRUI 19:...I play crosswords....scrabble games with friends....I have to practise more vocabulary in order to win.....

PRUI 8:...I like to play games in English like crosswords. I have to know enough vocabulary to play the games. I can learn from my friends too when they use the words I don't know.

RITI 9:.....I use a computer to play games. I think I have learned English from the computer games. When I play a game, I have to understand how to play. If I don't understand, I have to study about it. I use a dictionary to help me. ...

- **SCIP 1.3 Watch an English-speaking film**

Some students reported that they find that watching an English-speaking film may also help them to expand their knowledge of English vocabulary and expressions :

SRUI 7:...I try to see an English-speaking film without looking at the Thai subtitles.....besides I can learn new expressions....

SRUI 9:...The films with English subtitles are useful in that I can look at the words when they are pronounced and if with the Thai subtitles, I can compare the meaning...

SRUI 10:...I see an English-speaking film with the Thai subtitles and I can learn the meaning of words from the subtitles as there are many different meanings....

SRUI 13:...I like seeing English-speaking films.....I can learn new words. I can learn how to use new words about travelling, communications.....

PRUI 4:....I know when I see an American film or an English film.....I try to look at the subtitles.....sometimes I use words or expressions I learn from the films with my friends, particularly swearing words.....

- **SCIP 1.4 Listen to English songs**

English songs have become very popular among Thai teenagers recently. Some students reported that listening to English songs for pleasure can also help them to expand their knowledge of English vocabulary and expressions :

SRUI 4:...I like to listen to English songs. I can learn new vocabulary and how to use words.

SRUI 6:...I listen to English songs. I can learn a lot from songs particularly sayings and interesting expressions.....

SRUI 12:....I like old songs because I can understand better. I can get to the content....I can learn vocabulary.....

SRUI 16:....I listen to English songs. I look at the song scripts and sing along....I learn more about vocabulary.....

PRUI 8:...I think I have learned a lot from the songs....I also learn about new words...

4.5.2.2. CIP 2: To improve one's listening skill

Listening is one of the language skills which Thai engineering students may have to acquire. It was reported by students that very often they felt they were not provided with

enough listening practice in class. Hence, some students attempted to find ways to improve their listening skill by themselves. The strategies which students reported employing to achieve this classroom-independent purpose include:

- **SCIP 2.1 Watch an English-speaking film**

Watching an English-speaking film was reported to be helpful for some students in improving their listening skill :

SRUI 6:....I like to see English-speaking films to practise my listening. I feel that my listening skill improves. .

SRUI 7:....I try to see an English-speaking film without the Thai subtitles.....This helps me improve my listening skill...

SRUI 8:...I like watching a video in English. I try not to look at the subtitles..... I want to practise listening....

RITI 3:.....I see an English-speaking film.....I can listen to their accent and short sentences....I can learn a lot about the accent...

RITI 5:....I sometimes go to an English-speaking film with my friends.I can learn about listening. I understand when they speak sentence by sentence, but not long sentences. I also learn about the accent, tone of voice, and intonations....

PRUI 3:...when I go to see an English-speaking film, I try to listen to the English first and then look at the subtitles.....I try not to look at the subtitles, still not very successful in terms of comprehension....

PRUI 8:...I have a problem about listening and I solve this problem by going to the movies...

- **SCIP 2.2 Listen to English songs or cassette tapes of English conversations**

Besides watching an English-speaking film, listening to English songs or cassette tapes of English conversations was also reported to be helpful for some students in improving their listening skill :

SRUI 3:....I like to listen to English songs...I also listen to English cassette tapes. This can help me to improve my listening skill....

SRUI 8:...I also listen to English songs. This helps me in listening....

SRUI 14:....I listen to English songs to improve my listening skill. Most of the time I listen to slow songs and then look at the song scripts to check if it is what I understand...

RITI 5:....I like to listen to English songs. I don't understand when I listen to it for the first time, but I like the music. I listen to it more often and then my listening skill improves.

RITI 7:....I don't understand when a native speaker speaks because of the accent. I can understand some when I listen to the Thai teacher. When I listen to the cassette tape [in English] and I have to answer the questions I cannot do much because I cannot get what the conversation is about....I listen to the cassette tape on and on. This will help me understand the English accent better....

RITI 8:....I cannot understand the accent of a native speaker in the cassette tape. My cousin suggested that I should listen to English songs. I start to listen to English songs and I feel my listening skill improves though not very much...

PRUI 8:.....I like listening to English songs....if there are some words I don't understand, I'll listen again and again....I have learned about the accent of the singer. I can understand more when I listen to English....I also practise listening from tapes borrowed from the British Council....

- **SCIP 2.3 Listen to a radio programme in English**

Some students reported that listening to a radio programme in English may be helpful for them to improve their listening skill :

PRUI 3:.....when at home, I listen to the radio programme in English. I can practise listening whenever I listen to the radio programme in English.

RITI 3:....I listen to the news programme in English from the short-wave radio. I can practise listening from the news programme.

PRUI 1:....I sometimes listen to the radio [in English] and I feel my listening skill improves a little.

PRUI 8:....I try to listen to a short-wave radio programme in English to improve my listening skill.....

- **SCIP 2.4 Watch television programmes in English**

Watching television programmes in English was also reported to be used by a few students as a way of improving their listening skill :

SRUI 4:....I watch TV programmes in English to improve my listening.....

RITI 6:....I have a cable television at home, so I can watch television programmes in English. There are some words that I know and this helps me understand some English from television when I watch them [television programmes]....

PRUI 5:...I listen to the conversations from IBC [a cable TV] and I watch a television programme in English from CNN. I can understand some....I can improve my listening skill.

PRUI 7:....I watch IBC TV in English to improve my listening skill. I watch the news programme. There is a choice whether all English or with the Thai subtitles....

PRUI 8:....I watch an English programme on television.....

4.5.2.3. CIP 3: To improve one's speaking skill

Though English is not a medium of instruction for engineering in most of the institutions in Thailand, some engineering students reported that they need to communicate verbally in English from time to time. This could be with foreign visitors who they came across, their peers, or even their family members. The strategies reported being employed by students in order to achieve this purpose include:

- **SCIP 3.1 Talk to oneself**

Talking to themselves was reported to be one of the strategies employed by some students to improve their speaking skill :

SRUI 6:..I can remember sentences from the films and then speak those sentences to myself...

PRUI 4:....I try to listen to a native speaker in a film. I listen and think to myself what they mean when they use such expressions. I then speak to myself. I keep speaking to myself without anybody listening to me. When I get stuck, I just tell myself to stop and start again some other time....

- **SCIP 3.2 Try to imitate a native speaker from media such as films or cassette tapes**

A few students reported that they try to imitate a native speaker from media such as films or cassette tapes helpful in improving their speaking skill :

SRUI 16:....while listening to the song, I sing along. I look at the song script. I know how each word is pronounced and then I imitate. It helps improve my speaking

RITI 5:....most of the time I pay attention to the accent, how each word is pronounced. This can build my confidence when I speak English with the teacher in class....

RITI 6:.....when listening to the tape, I try to practise speaking after the tape.....

- **SCIP 3.3 Converse in English with peers, siblings or foreigners**

Some students reported that conversing in English with peers, siblings or foreigners is another way to help them to improve their speaking skill.

SRUI 4:...if I happen to know a foreigner, I try to speak with him or her....sometimes when I am in the room with my room-mates, I like to ask them to speak English with me. This can help me to improve my speaking skill.

SRUI 5:....I try to speak English with my classmate who is sitting next to me....I also like to speak English with a foreigner in order to improve my speaking skill...

SRUI 6:....I sometimes helped foreigners with directions when they got lost. I asked if they needed help. I sometimes talked with them....I have to force myself to use English, particularly when I have to study some subjects other than English with a foreign teacher....

RITI 1:....I spend two days speaking English with foreigners to improve my speaking skill. I like to speak English with friends....

RITI 4:...I like speaking English with friends....I also practise speaking....

PRUI 7:...I ask my sister to speak English with me at home, but we don't have much time. So I ask my friend who has been abroad before to speak English with me. This can help me improve my speaking skill.

- **SCIP 3.4 Use a computer programme like a 'chat' programme**

The Internet has become part of some students' daily life either at home or at their institution. Some students reported using a computer software like a 'chat' programme in order to improve their speaking skill :

SRUI 5:...I use the Internet to chat with a foreigner. I can practise speaking through using the chat programme.

SRUI 6:...I use the Internet programme called 'Pirch 32' to chat with foreigners...though I don't speak, I can practise conversations.....

- **SCIP 3.5 Go to a private language school**

Going to a language school was also reported to be helpful for a few students to help improve their speaking skill :

RITI 7:...I attend an extra class at a language school in order to learn to speak English...

RITI 8:...I attend an extra class at a private language school when I have some free time...I like to learn to speak there.

RITI 9:....I practise speaking at a language school, AUA [American University Alumni - a language school]....

PRUI 3:....I go to a language school to learn conversations because I have a problem about this....

4.5.2.4. CIP 4: To improve one's writing skill

Reading in English was generally reported to be the dominant skill required by Thai engineering students. This means that writing is not the main focus of teaching and learning. Still, students have to improve their writing skill to some extent. The strategies reported being employed by students in order to achieve this purpose include:

- **SCIP 4.1. Correspond in English by electronic mail (e-mail) or by a letter**

Some students reported that corresponding in English by electronic mail (e-mail) or by a letter may enable them to improve their writing skill :

SRUI 8:....I use an e-mail to you (the researcher) and a few friends. I have to send messages in English...when you reply to my message, I remember the expressions you use and how to use some words. I can improve my writing skill. [This student was one of the researcher's former students].

SRUI 10:. ...I use an e-mail and I have to type in English. I can practise how to use words and sentence arrangement. My writing skill can improve by doing this.

RITI 4:....there are foreigners coming to my school to do some activities...I keep writing to them. That's when I started to like English and I feel I can improve my writing skill through the correspondence with them.....

PRUI 7:....I write a letter to a friend of mine who is studying in the U.S. and I have to write in English. This can help me to improve my writing skill.

- **SCIP 4.2. Practise writing sentences or essays in English**

A few students reported that practising writing sentences or essays in English is also helpful for them to improve their writing skill :

SRUI 2:...I practise writing.....I try to use a word that has a similar meaning if I do not know that precise word.....

SRUI 4:....I try to write my favourite phrases or sentences in English. This is how I practise writing.

SRUI 7:...I have to write in English more because I think the more I write, the better I can remember...I have to write an assignment in English. I try to write first and then the teacher will correct it for me....

SRUI 19:...I like to practise writing essays in English....

- **SCIP 4.3. Practise translating from Thai into English**

Practising translating from Thai into English is also reported to be a strategy employed by some students in order to improve their writing skill :

SRUI 11:....When I practise writing, I use wrong punctuation marks or wrong sentence patterns. I write in Thai first and then translate it into English...

4.5.2.5. CIP 5: To acquire general knowledge in English

Students recognise that English is an international language and has an influence on the daily life of people in many parts of the world including Thailand, even though in this particular country, it is not widely used. They also have to recognise its influence and find an opportunity to enhance their knowledge of the English language. In order to acquire general knowledge in English, some engineering students reported using different strategies. The strategies reported being employed by students in order to achieve this purpose include:

- **SCIP 5.1. Seek an opportunity to be exposed to English**

Some students reported that taking opportunities to expose themselves to English may help them to acquire general knowledge of the language :

SRUI 4:....I sometimes try to ask students who have been abroad before....I sometimes try to speak with students who work as a member of staff at the English Language Resource Unit....I really want to talk with someone who knows English very well. I can learn about new things from them about English.

SRUI 7:...I work part-time as a member of staff in the English Centre... I have to spend most of the time here at the counter giving service to students who come to the centre. This can help me to improve my general knowledge of English, too.

SRUI 11:....there are a lot of foreign tourists from different countries....I really want to talk to them and sometimes I go and talk with them. I can learn a lot from them about different things.

SRUI 15:....there are not many people in Thailand who are good at English. I'm really interested in anyone who is very good at English. I just want to mix with them...I mix with students whose major is English. I can learn about English from them.

RITI 2:...I go to see the exhibition at Khon Kaen University's Faculty of Humanities....there is an exhibition. There are some posters and leaflets in English. I like to look at them. I know more about different things on display.

PRUI 3:...when I had an apprenticeship at Thai Oil, I listened to foreign engineers from different countries who work there. There were also some graduate students from other universities there, too. They can speak English. I like to listen to them when they talk with each other in English. Sometimes I listen to their presentation at the company in English...

- **SCIP 5.2. Go to a private language school**

Some students reported that going to a language school may also help to acquire general knowledge of English.

RIT1:...I also attend extra classes at 'Serm Laksutr' Language School to acquire general knowledge of English...

RITI 2:...My brother wants me to be as good at English as he is. He encourages me to go to AUA [American University Alumni: a language school] and I start my extra classes there....

PRUI 2:....I go to a language school near my house. I prepare myself for the TOEFL....

- **SCIP 5.3. Read printed materials such as books, textbooks or magazines in English**

Reading printed materials such as books, textbooks or magazines in English was reported to be helpful for some students in acquiring general knowledge of English :

SRUI 1:... I also read books which are not used in class like 'How to Learn English by Yourself' to learn more about English....

SRUI 2:...I try to read books as suggested by the teacher to improve my knowledge about English in general....

SRUI 6:....I haven't got much time for English. Still I have to read something other than the course book. I read a magazine 'National Geographic', I also read a novel

SRUI 8:...I always read for my knowledge of the world....I go to the library to read English newspapers and magazines....I read textbooks for my major field of study. I also read biology....

SRUI 9:....I read [other] books in English and textbooks in English for my field of study, chemical engineering...

SRUI 15:....if I read a book on engineering [in English], I can kill two birds with one stone, I know the subject matter and also English...

PRUI 1:...I read English novels. From this, I can learn about ways of life of people in foreign countries and how they lead their life....I also read textbooks for my major field of study, chemical engineering.....

- **SCIP 5.4. Surf the Internet**

The computer has become part of some students' daily activities. Surfing the Internet was reported to be used by some students in order to acquire general knowledge of English :

SRUI 9:....I also surf the net [Internet] to acquire knowledge of English, and I think my English improves too....

SRUI 10:...I try to surf the Internet and it helps me with my English...

RITI 5:...I surf the Internet and I have to use English. This helps me improve my English, too.

PRUI 4:....I like to use the Internet...I think it is useful because I have to use English.....

In summary, the language learning strategy inventory for the present investigation was based on the data obtained through the student oral interviews which were provided by 39 engineering students studying at three types of institution offering a degree in engineering in Thailand. Forty-nine individual learning strategies emerged from the

interview data. These forty-nine language learning strategies have been classified according to the purpose which students reported trying to achieve. The purposes to be achieved were grouped into two main categories, i.e. classroom-related and classroom-independent. These language learning strategies, both classroom-related and out-of-class or classroom-independent strategies, were eventually used to generate the strategy questionnaire which was used to elicit information about the frequency of language learning strategy use by engineering students. The detailed discussion of the strategy questionnaire follows in the next section.

4.6. Language Learning Strategy Questionnaire

As mentioned earlier in Chapter 3, the main instrument for the second phase of data collection was the language learning strategy questionnaire. The strategy questionnaire for the present investigation was generated after the language learning strategy inventory had been validated. The researcher has made every attempt to make the questionnaire valid and reliable. The strategy questionnaire was in English and in Thai. The English version was used for discussion purposes for the research, and the Thai version was used for the purpose of data collection with Thai students (See Appendix 6 for the full English versions of the strategy questionnaire).

The language learning strategy questionnaire has been designed to elicit the frequency of students' language learning strategy use. A student background questionnaire was also used to provide the researcher with useful information about each student's institution, gender, and perception of their class size. The Thai version of the strategy questionnaire was actually used as the instrument, as this helped maximise ease of administration and ensured greater accuracy of results, especially with the lower-ability students. The translation of the strategy questionnaire from English into Thai was initially done by the researcher. It was then checked for the correct usage by four of the

researcher's colleagues who are native speakers of the Thai language, teaching English at Suranaree University of Technology in Thailand. Some item refinements were recommended by colleagues of the researcher.

The strategy questionnaire has been divided into twelve sections according to the purpose to be achieved as mentioned earlier in this chapter. Each section of the strategy questionnaire started with an introductory question asking whether students tried to achieve the stated purpose when learning English. If the response was 'no', the student was requested to move to the next section. On the other hand, if the response was 'yes', the student was requested to look at the strategies which he or she had employed and then to choose the appropriate frequency of strategy use from the range 'never', 'sometimes', 'often', or 'always or almost always'. The researcher recognised that the language learning strategy inventory for the present investigation which was based on the student oral interview data may not have been comprehensive. Some students in this data collection stage may report employing another strategy other than the strategy items provided in the questionnaire in order to achieve the stated purpose of each section. Thus an open-ended choice was provided at the end of each section in the form of 'other (please specify)'. This form of questionnaire served the purpose of the present investigation, revealing the frequency of actually 'self-reported strategy use' by allowing each student to express their own judgement. The researcher did not presume that every student would employ every language learning strategy listed in the questionnaire. Rather, students had the freedom to indicate whether or not they actually employed any of those strategies in order to achieve each purpose. It was also possible that some students did not employ any language learning strategies at all. The advantages of this type of instrument include the fact that it can easily be administered to a large group of

students, scoring and data compilation are relatively simple and, more importantly, precise quantitative measures can be derived (Bialystok, 1981).

The strategy questionnaire was developed after the interview data had been analysed, and was not used in the piloting scheme. However, Alpha Coefficient (α) or Cronbach alpha was used to check the internal consistency of the strategy questionnaire. This coefficient (α) was appropriate for calculating the reliability of items that were not scored right versus wrong (Fraenkel and Wallen, 1993). The reliability estimate based on a 570-student sample is demonstrated in Table 4.1 below.

Table 4.1 : Reliability Estimate of the Strategy Questionnaire as a Whole and the Two Main Categories (CR and CI):

Language Learning Strategy Category	Strategy Questionnaire as a Whole	Classroom-related Category (CR)	Classroom-independent Category (CI)
Reliability Estimate (Alpha Coefficient α)	.93	.89	.91

Table 4.1 shows that the reliability estimates are high when compared with the acceptable reliability coefficients of .70, which is a useful rule of thumb for research purposes (Fraenkel and Wallen, 1993). Embi (1996) reported the reliability index of his Strategy Questionnaire for an investigation carried out in Malaysia at .93. Oxford and Burry-Stock (1995) reported the reliability coefficients of different SILL versions as a whole ranging from .85 to .95. Figure 4.3. demonstrates a sample of the questionnaire used as the instrument to elicit students' frequency of use of language learning strategies.

Figure 4.3. : A Sample of the Language Learning Strategy Questionnaire

1. Do you try to prepare yourself for the lessons?
 Yes No
 If 'No', proceed to 2. If 'Yes', how often do you?

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
1A) study the lessons beforehand such as the content or the objective of each lesson	-----	-----	-----	-----
1B) try some exercises in advance	-----	-----	-----	-----
1C) prepare yourself physically	-----	-----	-----	-----
1D) do the revision of the lessons	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

4.7. Summary

The proposed language learning strategy inventory for the present investigation resulted from the student oral interviews comprises two main categories, i.e. classroom-related and classroom-independent. The classroom-related category consists of seven purposes, and the classroom-independent category comprises five purposes. The classroom-related category consists of a total of twenty-nine individual strategies, and the classroom-independent category twenty out-of-class individual strategies. It is worth noting that the researcher has always recognised that the language learning strategy inventory for the present investigation is not comprehensive. However, the proposed language learning strategy inventory for the present investigation may be considered to be representative of the strategies employed by Thai engineering students on a broad spectrum of learning situations at the tertiary level.

As seen in Chapter 2, different researchers had different ways of categorising language learning strategies, depending on their own research, other researchers' work, or their review of literature in related areas. Though categorisation systems differed,

some common features do exist. In other words, some language learning strategies appeared in many researchers' strategy categories even though they were referred to by different names. This is also the categorisation system for the present investigation. Although it is different from the other researchers' categorisation systems, some reported strategies appear in common with other researchers' categorisation. As an example, SCRP 1.1 'Study the lesson beforehand such as the subject content or the objective of each lesson in order to be well-prepared for the classroom lessons' may be equivalent to one of Coleman's strategies 'Prepare the lesson before coming to class', and to Ellis and Sinclair's 'Advance preparation'. Again, SCRP 4.3 'Guess the meaning of a new vocabulary item from the context' may be equivalent to one of Oxford's compensation strategies 'Guess intelligently such as using linguistic clues or other clues'.

The language learning strategy inventory was then generated a strategy questionnaire which was used to elicit students' frequency of use of language learning strategies. The strategy questionnaire used to collect the data was in Thai in order to obtain the maximal results of students' frequency of strategy use, as it is the main purpose of the present investigation. Information from the background questionnaire completed while administering the strategy questionnaire provided the researcher with four independent variables, namely: 'type of institution'; 'gender'; 'perceived class size'; and 'location of institution'. The only variable for the present investigation which could not be obtained through the use of the background questionnaire is 'language proficiency levels'. To determine students' levels of language proficiency, the researcher-constructed Proficiency Test in English for Science and Technology (PTEST) was used. Chapter 5 will deal exclusively with details of the construction and validation of the test, as well as the results of students' language proficiency levels for the present investigation.

CHAPTER 5

PROFICIENCY TEST IN ENGLISH FOR SCIENCE AND TECHNOLOGY FOR THE PRESENT INVESTIGATION

CHAPTER FIVE

PROFICIENCY TEST IN ENGLISH FOR SCIENCE AND TECHNOLOGY FOR THE PRESENT INVESTIGATION

5.1. Introduction and Purpose of the Chapter

The purpose of this chapter is to present the process of constructing the test used to determine students' levels of language proficiency. This test is referred to as 'Proficiency Test in English for Science and Technology' or PTEST. The test is not related to or designed for any particular course of study of any students who are the subjects of the study. Apart from the theoretical background for test construction, reports on the pre-piloting, piloting, and post-piloting stages are presented. The scores of those tested in the main scheme of data collection and their levels of language proficiency are included.

To determine students' level of language proficiency or ability, there may be more than one way to do so. For example, a researcher may base his or her determination on students' own perceptions, or make use of students' previous records of their language learning. The researcher for the present investigation was left with the question of how to obtain students' proficiency levels in a reliable method. Hill (1995) suggests that:

"....The question of determining what the students' true ability is remains problematic. It could be argued that the teacher's estimates, which are based on face-to-face interaction, reflect true abilities. On the other hand, those students who have followed a 'traditional' learning pattern could be said to have that ability in its latent form. Therefore, the higher test score would be a more realistic reflection of ability," (R.A. Hill, 1995: 243)

Referring to Hill's statements above, the researcher realises that teachers' estimates of students' abilities based on face-to-face interaction are not generally reliable. This may be true in the Thai tertiary classroom context in the present situation. As reported in Debhasadin na Ayudhya (1987), one of the characteristics of university lecturers which may obstruct teaching and learning is lack of attention and understanding of students. They are not devoted to their students. Similar comment was also reported in the study

of Karnchanaporn (1992). Therefore, asking each lecturer to identify each of their students' levels of language proficiency or ability could perhaps produce unreliable results. By comparison, the test scores may be a more reliable reflection of students' abilities. The challenge is to devise a test which would be effective and serve the purpose of the present investigation, where the level of language proficiency of students is one of the independent variables.

Alderson et al (1987) state that testing plays a major and sometimes dominant role in language teaching. Tests are capable of eliciting the specific kinds of behaviour that the test user can interpret as evidence of the attributes or abilities which are of interest (Bachman, 1990). Tests can be used for different purposes and administered at different periods of time. For example, tests can be used at the beginning of instruction to determine students' readiness, during instruction to determine students' progress and at the end of instruction to determine its effectiveness. Tests may also be used for research or diagnosis purposes.

Theoretically, there are various kinds of tests. The test classifications typically emphasise differences among the various kinds of educational decisions which test scores play a role (Millman and Greene, 1993). In the context of language testing, tests may be classified according to purposes. For example, they may be classified as:

- Placement test
- Achievement test
- Progress test
- Diagnostic test
- Proficiency test

A placement test is designed to assess students' levels of language ability so that they can be placed in the appropriate class or course (Alderson et al, 1995) or to place the students on a scale in relation to other students so that they can be given appropriate teaching (Harrison, 1983).

An achievement test is used for measuring a student's success in learning some specific instructional content and is given after the instruction has taken place (Carroll and West, 1989) or at the end of the course (Alderson et al, 1995). It should be firmly rooted in previous classroom experiences in terms of activity practised, language used, and criteria of assessment employed (Weir, 1993).

A progress test is given at various stages throughout a language course to see what the students have learnt (Alderson et al, 1995).

A diagnostic test measures specific aspects of second language ability usually for the purposes of determining what a student knows and needs to learn or seeks to identify the areas in which students may need further help (Carroll and West, 1989; and Alderson et al, 1995).

A proficiency test is used to measure a student's overall ability in English along a broad scale. It is not based on a particular programme. It is designed to test students with different language training background and will provide information on a candidate's ability to perform in a future specified target situation (Alderson et al, 1995; Weir, 1993; and Hughes, 1989). According to Harris (1969), a general proficiency test indicates what an individual is capable of doing now as the result of his or her accumulative learning experiences.

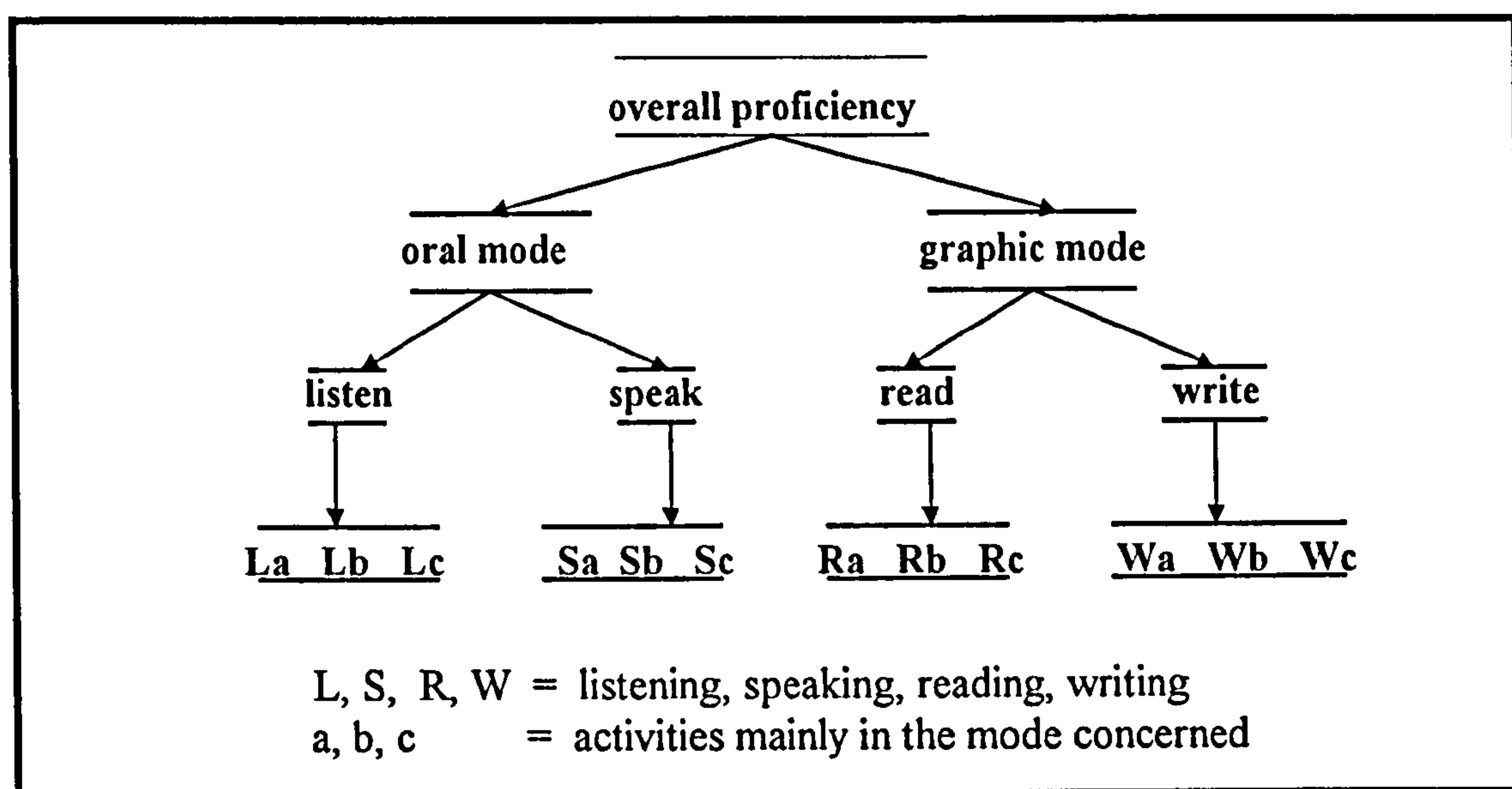
Having considered the purposes of each of the five different types of test mentioned above, the researcher found that a proficiency test is likely to be most suitable for the present investigation because it is designed to measure the overall ability or proficiency

in English of students who are the subjects of the study. Additionally, it is not based on any particular English programmes on offer at any institution involved.

5.2. What can the Proficiency Test Measure?

In order to construct a valid proficiency test for this particular investigation, the framework model proposed by Carroll and West (1989) is adapted. Figure 5.1. demonstrates the framework model of the test.

Figure 5.1 : The Framework Model of the Test



(Carroll and West, 1989:11)

The framework in Figure 5.1 demonstrates that all language tests, whatever their nature or their specific purpose, are intended to measure the test taker's overall proficiency in using language. The overall proficiency is then divided into two modes: oral and graphic interaction, which make a broad distinction between spoken and written communication. The oral mode is further subdivided into listening and speaking while the graphic mode is subdivided into reading and writing. Each of these four traditional skills encompasses real-life operational tasks such as listening to lectures, speaking on the telephone, reading a textbook or writing a job application letter.

When looking at the single modes level, one significant point about this fourfold division should be noted: it is that no examination should focus exclusively on one skill. However, in practice, a decision on which of these skills being tested is needed and whatever skill is going to be tested, it should be the dominant one (Carroll and West, 1989).

In the Thai educational context, engineering students studying English which is English for Science and Technology have to deal with reading more than any other skill involved. In other words, English for Science and Technology is content-oriented in nature and the acquisition of knowledge through reading practice is the main goal of classroom activities (Wright, 1987). Further, most Thai engineering students do not often have to listen to lectures in English or communicate with their lecturers or peers in English except when in English language classes. Rather, they have to read textbooks or articles related to their subject areas in English. So in this case, the researcher considers that reading comprehension will be the most suitable measure of students' levels of language proficiency, and that as suggested by Clapham (1993), tertiary level students studying English for specific purposes should be given reading comprehension tests in their own academic area. In addition, reading comprehension tests have advantages over other modes because tests of language production i.e. listening and speaking, are reported to be difficult to construct and to use (Davies, 1984).

5.3. The PTEST to Serve the Purpose of the Present Investigation

The primary purpose of this reading proficiency test is to measure the levels of language proficiency of the Thai engineering students who are the subjects for the present investigation. Specifically, it is designed to test students' ability in reading comprehension, since reading is the dominant skill of their language learning, as well as in their field of study (Ongsakul, 1984). The proficiency test is not intended to test

subject knowledge or text content knowledge, nor to see whether these engineering students have acquired enough English to study in an educational institution in the United Kingdom or other English speaking countries. To be purposeful and effective in meeting the needs of the present investigation, the proficiency test must have firm theoretical foundations and it should also be carefully piloted and revised if necessary (Skehan, 1984).

In respect of the construct of the proficiency test in reading comprehension, i.e. set of abilities that will be reflected in test performance, or what is being measured by the test (Davies et al, 1999; and McNamara, 2000), it is, theoretically, impossible to base the test on current theories of language proficiency. This is evidenced in Alderson and Clapham (1992) insofar as they asked applied linguists for advice on current theories of language proficiency on which they might base the IELTS test battery. They point out that:

“...The result is far from being a theoretically pure model of language proficiency, and perhaps the most that we can claim for our underlying construct is that it does not appear to contradict or conflict in any serious way with what theorists and empirical research have revealed as to the nature of language proficiency”.

(Alderson and Clapham, 1992:164)

The theoretical foundations on which the PTEST are based, are those of Clapham (1993), as well as those of other researchers. The foundations on which the researcher based as a guide in test construction, include:

1. The PTEST for the present investigation is intended to sample the student's ability to perform a string of tasks for academic purposes. Coleman (1991c) suggests that the tasks should be as authentic as possible and the marking of the test items should be reasonably straightforward. To demonstrate their levels of language proficiency, specifically in reading comprehension, Clapham (1993) proposes that students should be able to perform tasks which include:

- Identifying structure, content, sequence of events and procedures
- Following instruction
- Finding main ideas or identifying the underlying theme or concept
- Identifying ideas in the text, and relationships between them e.g. probability, solution, cause, effect
- Identifying, distinguishing and comparing facts, evidence, opinions, implications, definitions and hypotheses
- Evaluating and challenging evidence
- Formulating hypotheses from underlying themes, concepts and evidences
- Reaching a conclusion by relating supporting evidence to the main idea
- Drawing logical inferences

2. Academic students would give the best evidence of their academic reading ability if they were given the reading tests in their own broad subject area, i.e. science and technology for engineering students for the present investigation. In this respect, students reading texts in familiar areas would find them easier than tests based on unfamiliar areas, even though the tests are not intended to test subject knowledge or text content knowledge (Alderson, 1988a; and Mackay, 1981).

3. The reading passages are intended to be authentic texts for students in the relevant academic discipline. Gower et al (1995) note that authenticity refers to the degree to which materials have the qualities of natural speech and writing. They should be taken from authentic sources, but they could be modified to remove ambiguities or grammatical errors. The authentic sources can be scientific magazines, books, academic papers or newspaper articles relating to science and technology (Raatz, 1985). In using authentic materials, Mackay (1981) supports that this will allow researchers to identify the organisational characteristics of texts dealing with science and technology, as well as the formal characteristics in terms of sentence structure and specialised vocabulary. Texts must be chosen carefully. Alderson and Urquhart, (1985) comment that it is advisable not to use texts from fairly common textbooks containing information that the students probably may have learned already. This is because students with prior

knowledge of the content of the text may have an advantage over those without such prior knowledge when doing the test.

In choosing reading passages, the researcher made rough estimates of length and level of difficulty based largely on his intuition and his own experience as a teacher teaching English for Science and Technology (EST), as well as some guidelines from the work of Clapham (1993). Reading passages to be used in the test should be presented in different styles of writing and at least one of the passages should contain some non-verbal materials such as diagrams or graphs. Students should not require knowledge in any specialist knowledge or vocabulary of science and engineering in understanding the text. The reading passages which have been selected for the proficiency test for the present investigation are: *Engineering* (Barker, 1992 : 387-388); *Information Technology and Industry* (Davidson and Cooper, 1987 : 2-4); *The Rocky Flats Story* (Valenti et al., 1998 : 183-184); and *The Steam Power Plant* (Bartolic, 1981: 194-195).

4. The reading comprehension test should contain enough items to allow students to demonstrate their English proficiency within a limited time and it must be reliable (Bensoussan, 1984).

5. Reliability of the test alone does not create sufficient grounds for confidence in using it as an indicator of reading ability, validity of the test should also be taken into consideration (Vincent, 1985; and Davies, 1984). Messick (1989) describes validity as the degree to which theoretical rationale and empirical evidence support the interpretation and use of test scores. Of all common types of validity, i.e. face validity; construct validity; content validity; and predictive validity, content validity is possibly the most important concept and is widely viewed to be essential for the language test (Raatz, 1985; and Bachman et al, 1996). In this regard, as suggested by Bachman et al (1996), evidence of content validity in terms of content relevance and coverage provides

an important component in the validation of score interpretations. In order to validate the test in all aspects except predictive validity, the questionnaires adapted from Clapham (1993), and Alderson (1988b) have been given to language teachers, subject specialists, and a pilot sample of engineering students who are to be tested.

6. Apart from reliability and validity of the test, level of difficulty and power of discrimination of the test must be taken into consideration as the basis of test item selection (Mehrens and Lehmann, 1978).

5.4. Does the Testing Method Make a Difference?

It is important for the researcher to take the testing method into consideration in order to get the most valid and reliable results of the test scores of the students. According to Shohamy (1984), there are many methods and procedures to assess knowledge such as speaking or reading comprehension. Different methods have differing effects on how knowledge is measured and consequently on the scores that students obtain as a result of the test. For example, such differences may be a result of the student's familiarity with a specific testing method.

In respect of reading comprehension which is an unobservable skill, the testing method is especially important, since the steps that students take to arrive at answers to questions are not known or understood (Shohamy, 1984). This is because the tester does not have an actual language sample to analyse and work with. Thus, reading comprehension can only be evaluated indirectly when certain testing methods such as multiple-choice, open-ended, cloze, etc., which are believed to tap such ability, are imposed by the tester. It is also important to understand that there is no one 'best method' in testing reading (Alderson, 2000).

This leaves an important issue in testing a student's ability in reading comprehension for the researcher, as a tester: how can this ability be assessed with minimal effect being

caused by the testing method? The safest way is to use multiple approaches for testing reading comprehension and not to rely solely on one method. This approach would enable the researcher to tap the students' abilities in reading comprehension and also minimise the discrimination against individual students (Shohamy, 1984). As a result, the students would be able to demonstrate their measurable ability in reading comprehension through this proficiency test.

Due to some constraints such as time, or the number of test items, it is impossible for the researcher to measure every aspect as shown earlier in Section 5.3 (1). Consequently, the construct that the proficiency test in reading comprehension for the present investigation intends to measure is proficiency in English for science and technology. This construct has been defined in the present investigation as the ability of students to perform the following types of task:

1. Choosing appropriate words, phrases, etc. from the text
2. Labelling or completing diagrams, tables, charts, graphs or illustrations
3. Listing items or ideas from the text relevant to a given topic or concern
4. Matching
5. Short-answer questions, up to three words only
6. Sorting events in order
7. True/False or Yes/No (Dichotomous items)

5.5. What does the PTEST consist of?

The Proficiency Test in English for Science and Technology (see Appendix 7 for the full version) was designed to determine the levels of language proficiency of Thai engineering students in Thailand who were the subjects for the present investigation. The test has been designated to tap or encapsulate students' ability in reading comprehension. It consists of four reading passages as shown in Section 5.3 (3). There are altogether 40 question items. The types of task for those question items are indicated in Section 5.4. What follow are the breakdowns of the test specifications for each reading passage after

the piloting stages and an item analysis had been carried out. The piloting stages will be discussed in Section 5.6. and the item analysis in Section 5.7 respectively.

- **Reading Passage 1: Engineering**

This reading passage includes 14 question items (Numbers 1-14) and the response to Number 10 has been provided. The suggested time on task for this passage is 25 minutes. To demonstrate their language proficiency, students are expected to perform the following types of task for this passage:

- Numbers 1-2 : Choosing appropriate words, phrases, etc. from the text
- Numbers 3-7 : True/False (Dichotomous items)
- Numbers 8-9 : Listing items or ideas from the text relevant to a given topic or concern
- Numbers 10-14 : Matching

- **Reading Passage 2: Information Technology and Industry**

This reading passage includes 8 question items (Numbers 15-23) and the suggested time on task for this passage is 25 minutes. In order to demonstrate their language proficiency, students are expected to perform the following types of task for this passage:

- Numbers 15-18 : Short-answer questions, up to three words only
- Numbers 19-23 : Yes/No (Dichotomous items)

- **Reading Passage 3: The Rocky Flats Story**

This reading passage includes 8 question items (Numbers 24-34) and the response to Number 26 has been provided. The suggested time on task for this passage is 20 minutes. In order to demonstrate their language proficiency, students are expected to perform the following types of task for this passage:

- Numbers 24-28 : Sorting events in order
- Numbers 29-34 : Listing items or ideas from the text relevant to a given topic or concern

• **Reading Passage 4: The Steam Power Plant**

This reading passage includes 10 question items (Numbers 35-44) and the responses to Numbers 35 and 39 have been provided. The suggested time on task for this passage is 15 minutes. To demonstrate their language proficiency, students are expected to be able to label or complete diagrams.

To sum up, the PTEST comprises 44 question items, and types of task vary for each reading passage in accordance with the construct of the reading comprehension proficiency test for this particular investigation. The responses to 4 question items have been provided. The total suggested time on task is 1.25 hours.

5.6. The Piloting of the PTEST

Drafts of test items were prepared following the theoretical guidelines mentioned earlier and the researcher asked two native speakers of English who are professional for their feedback. Changes were made where necessary, especially in terms of language usage and appropriateness. The next process was to check different aspects of the test including reliability, validity, and item analysis. In doing so, three different stages were involved, i.e. pre-piloting, piloting, and post-piloting, each stage having a different purpose. Table 5.1. summarises the purpose of and results of each piloting stage.

Table 5.1 : The Stages of the Test Trial

Pre-Piloting Stage	Piloting Stage	Post-Piloting Stage
Purpose: To identify major problems or gross errors within the test.	Purpose: To analyse the test items to seek test reliability, validity, and item analysis	Purpose: To check some problematic test items
Subjects: 8 Thai students studying at the University of Leeds	Subjects: 164 engineering students studying at the tertiary level in Thailand	Subjects: 8 Thai students studying at the University of Leeds
Result: The researcher was provided with some useful implications for the test improvement before the piloting took place in Thailand	Result: Substantial data for the researcher to conduct item analysis and also test refinement for the second phase of data collection. The test validation was also carried out.	Result: Check of the refined problematic test items and conclusion of the final version of the test.

5.6.1. The Pre-Piloting Stage

In the pre-piloting stage, the test was given to 8 Thai students studying at the University of Leeds. These students are all science-oriented (2 studying Food Science, 2 Textiles, 1 Colour Chemistry, 1 Engineering, and 2 Material Sciences). The main purpose of this pre-piloting was to identify major problems or gross errors within the test such as the test contents, time allocations, instructions and the layout of the test so that any defects could be corrected before the piloting stage took place in Thailand. The piloting stage took place in July, 1998. Each of the eight students was also asked to complete the questionnaire giving feedback on the test. At this stage, the researcher was provided with some significant information obtained from the feedback questionnaire, some of which led to changes and improvements of the test. It should be noted that level of difficulty and power of discrimination of the test were not taken into consideration as the reasons stated above.

What follows is a summary of results obtained through the questionnaire about the PTEST.

In respect of an overall level of difficulty of the texts used for the test, most students found them easy or just about right. That is to say, the texts were neither very easy nor very difficult. The scores obtained through the test had a positive correlation with the perception of the text difficulty. In other words, the students who found the test easy or just about right got higher scores than those who found the test difficult or very difficult. However, this is only the preliminary information obtained through a very small number of students. The item analysis to check the level of difficulty and power of discrimination of the test items was yet to be performed. This would be carried out after the piloting stage which was carried out with the students in Thailand. Though the test had been pre-piloted with a small number of students in this stage, the results obtained provided

the researcher with some valuable insights for the piloting stage. These are discussed in the next section.

- **Some Implications for the Piloting Stage**

The results from the pre-piloting stage provided the researcher with some implications for the pilot work as follows:

1. **Time allocation**

The test takers felt that the overall time recommended for each part of the test was rather short. They could finish the test about ten to fifteen minutes after the time recommended, i.e. approximately one hour and twenty minutes. So, in the piloting stage, the time allocated would be about one and a half hours including test administration and another ten minutes for the questionnaire which the test takers would complete right after they have finished the test. These time allocations would be explained to the students at the very beginning before they took the test.

2. **Test instructions**

Referring to the result of the test, it was revealed that one of the test takers misunderstood the instructions for whatever reasons. To ensure that all students would understand the test instructions clearly, they should be translated into Thai. This could maximise the students' understanding in what they were supposed to do.

3. **Ambiguous or unsatisfactory Questions**

Some changes were needed in order to get rid of ambiguities and to improve some of the questions. The test was intended to allow for only one correct answer to each question. Marking then could be maximally objective, since the answers given were clearly either right or wrong. The feedback given by students involved in the pre-pilot was very useful in helping the researcher to take this aspect into consideration.

5.6.2. The Piloting Stage

Following the pre-piloting stage in May 1998, some aspects of the test were refined and the pilot study then took place in Thailand from July to August 1998. In the piloting stage, the test was administered to 164 engineering students studying in three different types of institution. These students were selected by their teachers for the researcher on the basis of convenience and availability. Besides undertaking the test, these students were asked to complete the feedback questionnaire about the test which was previously used in the pre-piloting stage. Before the students started the test, they were informed that they also needed to fill in the feedback questionnaire. To make it easier, the researcher handed out the questionnaire alongside the test and also ensured that the students did not fill in the questionnaire before they finished the test. It was important that the questionnaire should be completed immediately after the test because it included questions about the reading passages and these needed to be fresh in the students' minds. The researcher was always on hand to explain the questionnaire to any students but on the whole students found it easy to answer.

In marking the test items, the correct answer is given '1' and the incorrect or unanswered item is given '0'. When marking the test, the researcher found that there were some unanswered items. It may have been that the test items were too difficult or the time given was not enough. This would be evidenced in the item analysis (Section 5.7). The test for the present investigation was specifically designed to force students to read quickly, and in some cases to skim and scan which were considered essential skills in reading for academic purposes (Clapham, 1993). Therefore, students with higher scores would have demonstrated their ability by getting through the texts more quickly. Allowing for the different levels in reading skills, it is not surprising that many students did not finish the test.

5.7. Item Analysis

The students' test scores obtained through the piloting stage were used for 'item analysis' in order to see the quality of each item, and whether it could be changed or improved. According to Mehrens and Lehmann (1978), item analysis is the process of examining the students' responses to each test item to judge the quality of the item. Additionally, Hughes (1989) makes a comment about the importance of an item analysis:

“Even individual items make their own contribution to the total test. Some contribute more than others, and it is the purpose of item analysis to identify those that need to be changed or replaced”, (Hughes, 1989:160)

Traditionally, there are two measures which are calculated for each objective test item, i.e. the facility value (the percentage of students to answer an item correctly), and the discrimination index, that is, how well an item distinguishes between students at different levels of ability (Alderson et al, 1995). The former measures the level of difficulty of an item, and the latter measures the extent to which the results of an individual item correlate with results from the whole test. There are a variety of different item-analysis procedures. For the present investigation, the 'Third Technique' was employed in carrying out the item analysis. With this technique, the students' scores were grouped into the top scoring third, middle third and the bottom third. For each item, a table was constructed showing how many students in the top and bottom scoring thirds got the answer correct. These top and bottom scoring thirds were chosen to be used with the statistical method in order to calculate the level of difficulty and power of discrimination of each test item. Mehrens and Lehmann (1978) suggest that this technique is suitable when the number of subjects taking the test is over one hundred (in this case one hundred and sixty-four).

For each item, the researcher computes the item Facility Value or level of difficulty by using the following formula

$$Difficulty = \frac{R}{T} \times 100$$

where R = number of students who answered item correctly

T = total number of students in the two groups (high and low)

(Mehrens and Lehmann, 1978: 326)

For the item discrimination index or power of discrimination for each item, it is performed by subtracting the number of students in the low group who answered item correctly (R_L) from the number in the high group who got the item right (R_H), and dividing by the number of students in either group. This can be represented thus:

$$Discrimination = \frac{R_H - R_L}{(1/2) T}$$

What is the ideal power of discrimination and the level of difficulty? Mehrens and Lehmann (1978) state that the higher the power discrimination, the better, and that the level of difficulty is dependent upon many factors, the most important ones being the purpose of the test and the type of objective items used. Ideally, for the present investigation, any test items with the value of .20-.80 for the level of difficulty and .20-1.00 for the power of discrimination are considered acceptable and no change or improvement is needed as suggested in Garrett (1966, cf. Castillo, 1990). As the test for the present investigation is examined as a whole rather than as individual parts, it should also comprise both very easy and very difficult items for motivational purposes. The results of the item analysis provided the researcher with many valuable insights for the test evaluation, for example, they helped the researcher judge the worth or quality of the test; they were of help in subsequent test revision; and they provided a basis for discussing test results.

Initially, in selecting the acceptable or good test items, the researcher took into consideration the level of difficulty and power of discrimination as a result of item analysis. For those items which did not meet the set acceptable criteria as previously mentioned, it is important that the researcher recognise that careful inspection of the item itself was needed before making any changes (Mehrens and Lehmann, 1978). What follow are the results of the item analysis of the four reading passages (Tables 5.2-5.5). The number of students in high and low groups who got the item correct are shown, as well as the values of level of difficulty and power of discrimination of each item. The remark is given to indicate any test item which is acceptable, needs improvement, or any item considered very poor and discarded.

Table 5.2 : Results of Item Analysis of 'Engineering'

Item Number		High (N=55)	Low (N=55)	Level of Difficulty	Power of discrimination	Remark
Pilot	Final					
1	1	36	12	.43	.44	acceptable
2	2	33	12	.41	.38	acceptable
3	---	3	0	.03	.05	*discarded
4	3	34	20	.49	.25	acceptable
5	4	42	19	.55	.42	acceptable
6	5	50	33	.75	.30	acceptable
7	6	16	6	.20	.18	*improved
8	7	42	29	.64	.24	acceptable
9	8	45	10	.50	.64	acceptable
10	9	44	10	.49	.62	acceptable
11-14	10-14	15	8	.21	.13	*improved

Table 5.2. reveals that eight items are acceptable as good test items because they met the acceptable criteria for both the level of difficulty and the power of discrimination (numbers 1,2,4,5,6,8,9, and 10). One item (number 3) was discarded as it was extremely difficult and the power of discrimination is extremely low. Further, two items needed improvement because they did not meet the criterion for the power of discrimination, but they met the level of difficulty (numbers 7, and 11-14). It is noted that for the purpose of the analysis, the test takers were awarded one score if they got two or more correct

answers in the section of numbers 11-14. This is because the answers of this section are dependent on one another. This scoring system also applied to the item analysis for numbers 25-29 and numbers 37-45 in the same test.

Table 5.3. : Results of Item Analysis of ‘Information Technology and Industry’

Item Number		High (N=55)	Low (N=55)	Level of Difficulty	Power of discrimination	Remark
Pilot	Final					
15	15	24	6	.27	.33	acceptable
16	--	2	0	.02	.04	*discarded
17	16	41	5	.41	.65	acceptable
18	17	41	2	.39	.71	acceptable
19	18	28	3	.28	.45	acceptable
20	19	20	11	.28	.16	*improved
21	20	34	12	.41	.40	acceptable
22	21	42	13	.50	.53	acceptable
23	22	21	10	.28	.20	*improved
24	23	38	22	.54	.30	acceptable

Table 5.3. demonstrates that two items of this reading passage needed improvement (number 20 and 23) because of their low power of discrimination though the acceptable criterion for the level of difficulty was met. Further, the researcher decided to discard one item (number 16) because of its extremely low level of difficulty and discrimination power values.

Table 5.4. : Results of Item Analysis of ‘The Rocky Flats Story’

Item Number		High (N=55)	Low (N=55)	Level of Difficulty	Power of discrimination	Remark
Pilot	Final					
25-29	24-28	13	5	.16	.15	*improved
30	29	14	0	.13	.25	*improved
31	30	12	0	.11	.22	*improved
32	31	14	7	.19	.14	*improved
33	32	10	2	.11	.15	*improved
34	33	8	0	.07	.15	*improved
35	34	14	0	.13	.25	*improved

Table 5.4 reveals that the items for this reading passage were too difficult (the level of difficulty value is lower than .20), and some of them did not discriminate amongst the good and poor test takers. However, the researcher took into consideration the

suggestion by Mehrens and Lehmann (1978) that the test items are still worth including as long as the power of discrimination is positive. In other words, as long as more good students get the item correct than poor students, the test item is still acceptable. Also the researcher could make the items less difficult. As previously mentioned, for the purpose of the analysis, the test takers were awarded one score if they got three or more correct answers for numbers 25-29 and zero if two or fewer correct answers.

Table 5.5. : Results of Item Analysis of ‘The Steam Power Plant’

Item Number		High (N=55)	Low (N=55)	Level of Difficulty	Power of discrimination	Remark
Pilot	Final					
37-45	35-44	25	10	.32	.25	acceptable

Table 5.5. reveals that the test items for this reading passage are acceptable as good items because they met the acceptable criteria for both the level of difficulty and the power of discrimination.

In conclusion, the results of the item analysis reveal that out of 29 test items, 16 items were good items; 2 items were discarded; and the others needed refinement or improvement.

Following are examples of the suggested solutions to some test items which remained problematic, since none of them met the power of discrimination criterion, and were still positive (see Appendix 8 for full details of item refinement and improvement).

- **Reading Passage One: ‘Engineering’**

Number 7: Some engineers have to educate other people about the environment. (IE)
Note: This item is rather difficult (.20) and has low power of discrimination (.18), so the researcher decided to change it to:

The management engineer came into being as the result of the involvement of people and money in engineering. (T)

- **Reading Passage Two: ‘Information Technology and Industry’**

Number 20: The majority of women in the United Kingdom work in the information processing industry. (No)

Note: This item is rather difficult (.28) and has low power of discrimination (.16), so the researcher decided to improve it as:

The majority of working women in the United Kingdom work in the information processing industry. (Yes)

- **Reading Passage Three ‘The Rocky Flats Story’**

Numbers 25-29:

Note: This section is rather difficult (.16) and the power discrimination is rather low, still it is positive (.15). One way to improve it is to provide the answer for one of the items.

To sum up, as mentioned earlier the item analysis provided the researcher with good insights for the test revision and discussion of the results. Following the revision, as it was not possible for the researcher to return to Thailand to try it out again with Thai students, the researcher tried it with the same group of eight Thai students studying at the University of Leeds to check some problematic items. These students’ scores were higher than their previous ones. They were asked to give feedback about the test. They felt that the revised version of the PTEST was better in terms of clarity and they also reported that the test was easier than the first time they did. The final version of the PTEST, following refinement, comprised 40 items and was considered sufficient to tap the students’ ability in reading comprehension.

5.8. Test Reliability and Validity

Besides the power of discrimination, and level of difficulty of test items, test reliability and validity must be taken into consideration so that the scores of the test takers are sufficiently reliable for the researcher to determine their levels of proficiency.

What follow are how the reliability and validity of the test for the present investigation were carried out.

5.8.1. Test Reliability

The reliability of the test is defined by Brown (1988) as the extent to which the results can be considered consistent or stable. A reliable test produces essentially the

same results consistently on different occasions when the conditions of the test remain the same (Madsen, 1983). There are two ways of estimating test reliability: equivalent-forms method, and internal-consistency methods (Fraenkel and Wallen, 1993; Frankfort-Nachmias and Nachmias, 1996; and Davies et al, 1999). The equivalent-forms method needs two different but equivalent forms of the test administered to the same group of individuals during the same time period. Alternatively, the same test can be administered to the same group of subjects on two occasions (test-retest). The time between administrations is normally limited to no more than two weeks in order to minimise the effect of learning upon subjects' true scores (Davies et al, 1999). On the other hand, the internal-consistency method or the split-half method, where reliability is established by comparing scores on the component parts of the test, requires only a single administration of an instrument. This method provides a measure of adequacy of item sampling. Davies et al (1999) note that it is important that the two halves are comparable with regards to equivalent difficulty. It is a widespread approach to the assessment of reliability (Phillips, 1971).

The researcher adopted the internal-consistency methods of estimating reliability of the test. This method was found appropriate since the test was administered to the subjects only once. For the present investigation, the split-half procedure was employed with the assistance of the SPSS programme. The reliability of this test was .73 which was considered acceptable and was above the acceptable criterion of .70 as suggested in Fraenkel and Wallen (1993).

5.8.2. Test Validity

Validity has been defined as referring to 'the appropriateness, meaningfulness, and usefulness of the specific inferences researchers make based on the data they collect'. Validation of an instrument is "the process of collecting evidence to support such

inference” (Fraenkel and Wallen, 1993: 139). Further, validity is the most important idea to consider when preparing or selecting an instrument for use. There are a few types of validity concerned. Mehrens and Lehmann (1978) and Raatz (1985) suggest that content validity is of most concern to the test constructor. For the present investigation, the researcher validated the test by giving the questionnaires to students as the test takers, to engineering teachers as subject specialists, and to language teachers. What follow are the results of the questionnaires responded to by these groups of respondents as face and content validity.

Castillo (1990) points out that usually the first approach to establishing the validity of a test is through getting ‘experts’, in this case language teachers and subject specialists, to judge whether the test consists of questions covering the areas being measured, and whether the test appears to measure what it purports to measure. For the present investigation, to validate the test contents and types of task in the test, two sets of questionnaires were given to two different groups of respondents, i.e. 1) to language teachers who teach English to engineering students, and 2) to subject specialists who are engineers and also teach engineering subjects to engineering students. The results of these questionnaires are presented as follows.

The questionnaire for subject specialists is designed to validate the test in respect of the texts used (see Section 5.3). The texts are validated in terms of appropriacy, familiarity, and degree of specialisation. The data obtained from the questionnaire should answer the following questions:

- 1) Whether or not the texts used in the test are appropriate for engineering students;
- 2) Whether or not engineering students would be familiar with the texts used in the test;
- 3) Whether or not the topics of the texts used in the test are specialised.

The data obtained through the questionnaires given by 16 respondents are presented in Tables 5.6-5.8 as follows:

1. Whether the texts used in the test are appropriate for engineering students

Table 5.6. : Appropriacy of Text

Reading Passage	Appropriate	Not at all appropriate
Reading Passage 1	16 (100%)	0 (0%)
Reading Passage 2	13 (81.25%)	3 (18.75%)
Reading Passage 3	13 (81.25%)	3 (18.75%)
Reading Passage 4	14 (87.5%)	2 (12.5%)

Of the four reading passages, the most appropriate reading passage is Passage One 'Engineering', followed by Passage Four 'The Steam Power Plant', Passage Two 'Information Technology' and Passage Three 'The Rocky Flats Story' respectively. The results revealed that all of the four reading passages used in the test were appropriate for engineering students.

2. Whether or not engineering students would be familiar with the texts used in the test

Table 5.7. : Familiarity of Text

Reading Passage	Familiar	Not at all familiar
Reading Passage 1	16 (100%)	0 (0%)
Reading Passage 2	11 (68.75%)	5 (31.25%)
Reading Passage 3	9 (56.25%)	7 (43.75%)
Reading Passage 4	16 (100%)	0 (0%)

Of the four passages, Passages One and Four were reported to be the most familiar reading texts amongst engineering students, followed by Passages Two and Three respectively. The result of this questionnaire was consistent with that of the students

(see Table 5.10 below). That is, Passage Four was reported by students as the most familiar reading text and Passage Three as the least familiar.

3. Whether or not the topics of the texts used in the test are specialised

Table 5.8. : Specialisation of Topic

Reading Passage	Specialised	Not Specialised
Reading Passage 1	7 (43.75%)	9 (56.25%)
Reading Passage 2	11 (68.75%)	5 (31.25%)
Reading Passage 3	13 (81.25%)	3 (18.75%)
Reading Passage 4	16 (100%)	0 (0%)

Of the four reading passages, Passage Four was reported to be the most specialised for engineering students. This is consistent with it being found to be the most familiar reading text for engineering students. That means, engineering students tended to be familiar with the text in their area of study. This is followed by Passages Three, Two and One respectively.

In conclusion, all of the four reading passages used in the test were found to be suitable for the engineering students who are the subjects of the present investigation. The reading passages were familiar to the students and also specific to the area of study to some extent. The researcher believes that the four reading passages were considered to be appropriate to determine the levels of language proficiency since they had been validated by the subject specialists.

The questionnaire for language teachers was designed to validate the texts and types of tasks used in the test. Questionnaires were completed by eight language teachers who teach English to engineering students at the three different types of institution. The results revealed that the texts used for the test items were the sorts of texts engineering students had to read in their subject area. Further, the respondents found that of the four

reading passages, the most suitable text for engineering students was Passage Four. This is consistent with the subject specialists. Followed by this passage were Passages One, Two and Three respectively. All of the respondents found that the tasks used in the test were the types of task their engineering students had to do in their subject area. However, three of the respondents were afraid that their students would be disadvantaged if they were to do the tasks in this test due to inadequate practice in different types of task. They also found the reading passages to be too long for their students.

Apart from the subject specialists and language teachers, to validate the test, students as the testees were also asked to complete a questionnaire giving feedback about the test. The questionnaire for the feedback of the test comprised three short questions. The first question was designed to elicit what the students think about the test in terms of difficulty. They were to indicate by choosing numbers 1 to 5 (1: very easy and 5: very difficult). The second question was designed to elicit their familiarity with the text. They were to indicate by choosing 'yes': familiar; or 'no' not familiar. The third question was designed for those who were familiar with the text to see if they felt that the familiarity with the text was advantageous for them in answering questions for each passage. If it was, they were to answer 'yes'. If not, they were to answer 'no'. The students who took the test were asked to complete the questionnaire assessing the test in terms of difficulty and familiarity. The questionnaire was completed by 164 engineering students studying at three different types of institution (see Section 1.2 for type of institution). The results obtained through the questionnaire for students revealed that in respect of difficulty, of the four reading passages, Passage Three was reported to be the most difficult and Passage Four the least difficult. Passages One and Two were reported to be moderately

difficult. Tables 5.9-5.11 show the results obtained through the questionnaire for students.

Table 5.9. : Test Difficulty (N = 164)

Reading Passage	Easy	Neither easy nor difficult	Difficult
Passage One	6 (3.65%)	39 (23.78%)	119 (72.67%)
Passage Two	9 (5.49%)	37 (22.56%)	118 (71.95%)
Passage Three	24 (14.64%)	22 (13.41%)	118 (71.95%)
Passage Four	38 (23.17%)	41 (25%)	85 (51.83%)

In respect of familiarity, the respondents reported that the most familiar text for them was Passage Four and the least familiar Passage Three. This showed that the perceived level of difficulty is consistent with the degree of familiarity. In other words, the respondents reported finding the reading passage they were familiar with to be easier than the one they were not.

Table 5.10. : Text Familiarity (N=164)

Reading Passage	Familiar	Not Familiar
Reading Passage 1	62 (37.80%)	102 (62.20%)
Reading Passage 2	47 (28.66%)	117 (71.34%)
Reading Passage 3	46 (28.05%)	118 (71.95%)
Reading Passage 4	79 (48.17%)	85 (51.83%)

The background knowledge helped them to comprehend what they read. This means that the familiarity with reading texts could help them gain improved test results. Of the four reading passages, Passage Four was reported to be the most familiar text and Passage Three the least familiar for the respondents.

Table 5.11. : Advantage of Text Familiarity in Answering Questions

Reading Passage	Number of students familiar with the texts	Yes (Advantageous)	No (Not advantageous)
Reading Passage 1	62	45 (72.58%)	17 (27.42%)
Reading Passage 2	47	34 (72.34%)	13 (27.66%)
Reading Passage 3	46	34 (73.91%)	12 (26.09%)
Reading Passage 4	79	69 (87.34%)	10 (12.66%)

In respect of an advantage of the text familiarity in helping them to answer questions, more than three quarters of the students who were familiar with the texts reported that the text familiarity was advantageous for them to understand the texts and enabled them to do the test.

In conclusion, the researcher considered that the four passages were acceptable as the reading texts for the test. This view is supported by the results of the questionnaires for both language teachers and subject specialists. The first priority should be 'types of task', as well as the 'appropriacy of the texts' because this would result in the scores of the students who took the test. The other two features of the test which should be taken into consideration holistically rather than discretely are 'familiarity of the reading texts' and 'the degree of the specialisation of the reading texts'. A wide range of reading texts in relation to the latter two features would constitute a good test, i.e. the test should consist of both familiar and unfamiliar texts, and also both specialised and less specialised texts. This would be fair for students who took the tests because some students may be able to do better in a more general text and others may be better in a more specialised one. The results obtained through the questionnaire for students, apart from their test scores, provided the researcher with insights into how to refine the test items in terms of item difficulty. In this test, all of the four reading texts met these criteria and the Proficiency Test in English for Science and Technology should therefore

be considered to be valid as the instrument to determine students' levels of language proficiency for the present investigation.

5.9. Students' Levels of Language Proficiency

In judging the students' levels of language proficiency, the 'third' technique was employed. That is, the scores of each student obtained through the test would be grouped as the top third scoring, middle third, and the bottom third scoring. Any students whose scores fall in the top third would be considered as 'high-proficiency', middle third as 'moderate-proficiency' and the bottom third 'low-proficiency'. This could ascertain an individual student's level of proficiency with respect to a well-defined behavioural domain, or skill and content which he or she displayed when called on to do so in a testing situation (Hudson and Lynch, 1984).

Table 5.12 below demonstrate the students' scores and their levels of language proficiency for the present investigation.

Table 5.12. : Summary of the test scores and levels of language proficiency of the subjects for the present investigation

Language Proficiency Level	Mean Score	Number of Students	Std. Deviation	Minimum Score	Maximum Score
Low	7.27	195	2.19	0	10
Moderate	13.36	184	1.73	11	16
High	22.60	191	4.56	17	38
Total	14.37	570	7.06	0	38

N.B. The highest possible score was 40.

5.10. Summary

The Proficiency Test in English for Science and Technology, was designed to determine the levels of language proficiency of engineering students who were the subjects of the present investigation. In order to make the test as valid and reliable as

possible, the researcher carried out three trials with different groups of students. The results of the first trial or pre-piloting provided the researcher with some valuable insights and an opportunity to improve the test items before the second trial or the piloting stage took place in Thailand. This piloting stage involved 164 engineering students studying at the tertiary level in three different types of institution. The results of this trial provided substantial data for the researcher to perform the item analysis to determine the suitability or workability of each test item. As a result, some test items needed refining or improving in order to meet the acceptable criteria of the level of difficulty and power of discrimination.

At this stage, the researcher used his judgement to find the best way to refine or improve some problematic test items. To validate the refined version of the test, the researcher carried out the third trial or post-piloting with the eight Thai students, who were also the subjects used for the pre-piloting stage. The result of this trial enabled the researcher to consider that the test was valid and appropriate for the present investigation. The refinements made to the problematic test items would facilitate students undertaking the test resulting in an increase in the overall scores. Special attention was paid to Reading Passages Three and Four which had a high degree of difficulty. Refinement of these test items by providing more clues and answers allowed the students to do better. Apart from the discrimination power, and level of difficulty values, the test validity and reliability were also conducted as part of the test construction procedures. The outcome of the trials was a refined version of the test to be used in the second phase of data collection based. Eventually, the students' levels of language proficiency based on the scores obtained through the test could then be determined.

CHAPTER 6

DATA ANALYSIS FOR LANGUAGE LEARNING STRATEGY USE I

CHAPTER SIX

DATA ANALYSIS FOR LANGUAGE LEARNING STRATEGY USE I

6.1. Introduction and Purpose of the Chapter

The purpose of this chapter is to describe and discuss the research findings of the present investigation at different levels of data analysis. In this chapter, significant variations in frequency of students' reported use of learning strategies are not taken into consideration. Instead, comparisons of frequency of use of learning strategies by 570 students based on the holistic mean scores obtained through the strategy questionnaire are determined.

Language learning strategies have been defined, specifically for this investigation, as any set of techniques or learning behaviours, whether observable or unobservable, which engineering students reported employing for the purpose of enhancing their language learning either in the classroom setting, or outside the classroom setting, including improving their language skills in general.

As evidenced in the review of literature in Chapter 2, there are many variables affecting the use of language learning strategies by language learners. These variables include language proficiency, gender of students, motivation, previous language learning experience, and course status. In addition to these variables, Cortazzi and Jin (1996) suggest that 'a culture of learning' can also affect learners' use of strategies. The relationship of language learning strategy use to variables such as gender of students, levels of language proficiency, and students' perception of their class sizes, has been one of the focuses of research on language learning strategies. Examples are Politzer and McGroarty (1985), Pearson (1988), Ehrman and Oxford (1989), Mebo (1995), and Embi (1996). Oxford and Green (1995) make an interesting and relevant comment that most

of the quantitative research on the comparison of use of language learning strategies by different groups of students tends to pay more attention to students' overall strategy use or to the use of broad categories of strategy rather than to differences in the use of individual language learning strategies. Furthermore, as evidenced in the literature review in chapter 2, in terms of variation in students' use of learning strategy in relation to an independent variable, students' language proficiency levels have tended to be the focal point of research more often than other variables such as the gender of students or students' foreign language learning experiences.

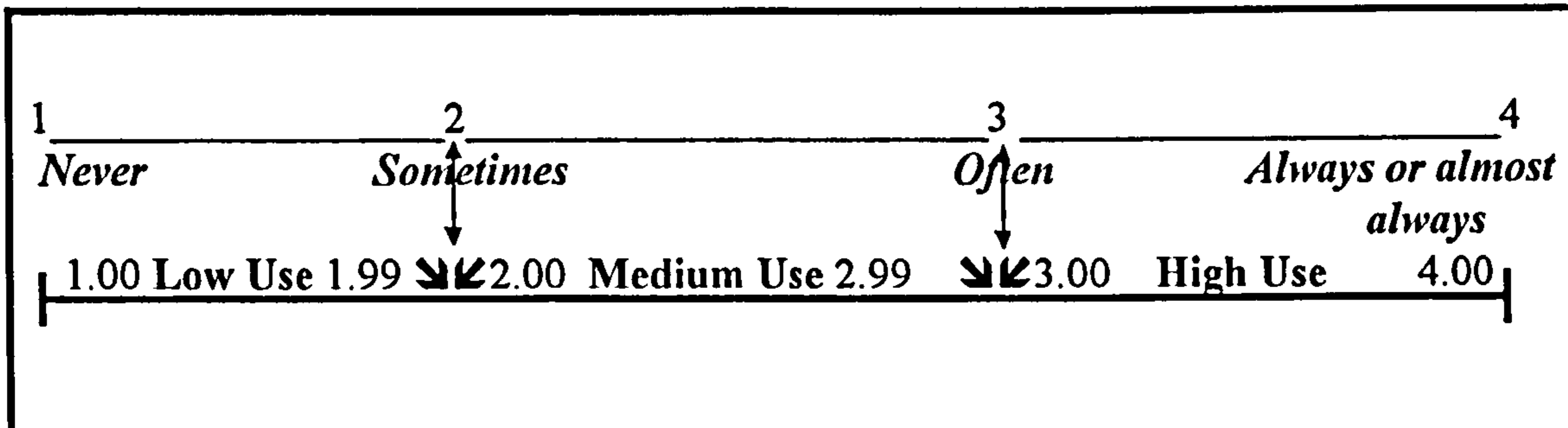
In this chapter, different levels of strategy use are taken into account in order to examine strategy use by the research population in a more detailed manner. Firstly, the frequency of overall strategy use reported by 570 engineering students will be explored. Then, we will look into the frequency of use of learning strategies in the two main categories, which are Classroom-Related (CR), and Classroom-Independent (CI). This is followed by a more detailed analysis of frequency of use of strategies to achieve a range of classroom-related purposes (CRP) ,and classroom-independent purposes (CIP). It is worth noting that each of the twelve purposes of strategy use, as we saw in Chapter 4, consists of between three to six individual learning strategies. Finally, we will explore students' reported frequency of use of the 49 individual learning strategies (SCR1.1-SCR7.4 and SCIP1.1-SCIP5.4)

6.2. Learning Strategy Use Reported by 570 Engineering Students Learning English at the Tertiary Level in Thailand

As mentioned in the introductory section, simple statistical methods are employed in analysing the data in this chapter though no significant variation patterns are described or discussed at this stage. Rather, the comparisons of students' reported frequency of strategy use in different layers are the focal point of description and discussion.

The frequency of students' strategy use has been categorised as 'high', 'medium', and 'low'. This is determined by responses to the strategy questionnaire, where frequency of strategy use is indicated on a four-point rating scale, ranging from 'never' which is valued as 1, 'sometimes' valued as 2, 'often' valued as 3, and 'always or almost always' which is valued as 4. Therefore, the average value of frequency of strategy use can be valued from 1.00 to 4.00, with 2.50 being the mid-point of the minimum and maximum values. The mean frequency score of strategy use of any categories or items valued from 1.00 to 1.99 is considered 'low use', from 2.00 to 2.99 is considered 'medium use', and from 3.00 to 4.00 'high use'. It is noted that this measure of strategy use frequency is applied to every layer of strategy use throughout the chapter. Figure 6.1 below demonstrates the applied measure.

Figure 6.1 : The Measure of High, Medium, and Low Frequency of Strategy Use



6.2.1. Frequency of Students' Overall Strategy Use

The result of the holistic mean frequency score across the learning strategy questionnaire responded to by 570 engineering students learning English at the tertiary level in Thailand is presented in Table 6.1 below.

Table 6.1: Frequency of Students' Reported Overall Strategy Use

	Number of Students	Mean Frequency Score (Mean)	Standard Deviation (S.D.)	Frequency Category
Students' Reported Overall Strategy Use	570	2.14	.39	Medium use

The mean frequency score of 2.14 in Table 6.1 indicates that as a whole, these engineering students reported using learning strategies with moderate frequency when they have to deal with language learning. However, as will be discovered later in this chapter, there are certain learning strategies which were also reported by these students to fall into the 'high use' or 'low use' categories.

6.2.2. Frequency of Use of Strategies in the CR and CI Categories

For the present investigation, the learning strategies have been grouped into two main categories as previously shown in Chapter 4. They are under the classroom-related category (CR) and classroom-independent category (CI). Table 6.2 demonstrates frequency of use of strategies in both categories, together with standard deviation and frequency category.

Table 6.2. : Frequency of Use of Strategies in the CR and CI Categories

Strategy Main Category	Number of Students	Mean Frequency Score (Mean)	Standard Deviation (S.D.)	Frequency Category
CR Category	570	2.21	.41	Medium use
CI Category	570	2.05	.49	Medium use

Table 6.2 demonstrates that Thai engineering students involved in the present investigation reported medium frequency of use of strategies in both categories, with students' use of strategies in the classroom-related category being reported somewhat more frequently than those in the classroom-independent category. The mean frequency scores illustrate that Thai engineering students reported slightly more frequent use of strategies for their language learning in class with their teachers rather than out-of-class or classroom-independent strategies, e.g. watching English-speaking films or listening to a radio programme in English to improve their listening skill. Among the classroom-related strategies, students also reported using certain strategies to achieve certain purposes more than others. These differences in use of strategies to achieve both

classroom-related and classroom-independent purposes will be discussed in the next section (Section 6.2.3).

6.2.3. Frequency of Use of Strategies to Achieve the Classroom-Related and Classroom-Independent Purposes (CRP and CIP)

The frequency of strategy use shown in the preceding section gives us an overall picture of students' use of strategies in both the classroom-related and classroom-independent categories. This section will offer information on students' reported strategy use in a more detailed manner, which is also based on how the learning strategies have been classified as shown in the language strategy inventory for this investigation in Chapter 4. Twelve purposes for using learning strategies were defined in that chapter. Seven of these are for classroom-related purposes and are referred to as CRP 1-7. Five are classroom-independent purposes and are referred to as CIP 1-5. The twelve purposes of strategy use are:

CRP 1 : To be well-prepared for the lessons;

CRP 2: To keep up with the teacher while studying in the classroom;

CRP 3: To get the teacher's attention in the classroom;

CRP 4: To learn new vocabulary in the classroom lessons;

CRP 5: To avoid being distracted while studying;

CRP 6: To solve the problems encountered in the classroom lessons;

CRP 7: To pass the English tests;

CIP 1: To expand one's knowledge of English vocabulary and expressions;

CIP 2: To improve one's listening skill;

CIP 3: To improve one's speaking skill;

CIP 4: To improve one's writing skill; and

CIP 5: To acquire general knowledge in English

The frequency of use of strategies to achieve classroom-related, as well as classroom-independent purposes shows that students reported slightly more frequent use of strategies to achieve classroom-related purposes than to achieve their classroom-

independent purposes. Tables 6.3 and 6.4 below present mean frequency score, standard deviation, and frequency category for each purpose which students reported employing strategies to achieve. Table 6.3 presents the classroom-related purposes (CRP), and Table 6.4 presents the classroom-independent purposes (CIP).

Table 6.3. : Frequency of Use of Strategies to Achieve Classroom-Related Purposes (CRP)

Classroom-Related Purpose	Mean Frequency Score (N=570)	Standard Deviation (S.D.)	Frequency Category
CRP 1	1.76	.69	Low use
CRP 2	3.25	.69	High use
CRP 3	1.54	.71	Low use
CRP 4	2.10	.51	Medium use
CRP 5	2.39	.79	Medium use
CRP 6	2.27	.58	Medium use
CRP 7	2.15	.42	Medium use

Table 6.3. presents a clear picture of students' reported use of strategies to achieve classroom-related purposes. In this respect, of the seven classroom-related purposes, it appears that students reported high frequency of use of strategies in order to keep up with the teacher while studying in class (CRP2). A closer look at students' reported use of strategies to achieve other classroom-related purposes such as to learn new vocabulary in classroom lessons, to try to avoid being distracted, or to prepare themselves for the examination, reveals that students reported medium frequency of use of strategies to achieve these purposes. However, these students did not seem to be active in preparing themselves in advance or getting the teacher's attention in class, as this can be seen from their reporting low frequency of use of strategies to achieve such purposes (CRP 1 and CRP 3).

Table 6.4 : Frequency of Use of out-of-class Strategies to Achieve Classroom-Independent Purposes (CIP)

Classroom-Independent Purpose	Mean Frequency Score (N=570)	Standard Deviation (S.D.)	Frequency Category
CIP 1	2.50	.75	Medium use
CIP 2	2.26	.63	Medium use
CIP 3	1.73	.51	Low use
CIP 4	1.74	.60	Low use
CIP 5	2.01	.58	Medium use

In terms of using out-of-class strategies to achieve classroom-independent purposes as shown in Table 6.4 above, engineering students reported employing strategies to help to expand their knowledge of English vocabulary and expressions (CIP1) more frequently than the other purposes in the CI category. Apart from this, students reported medium frequency of use of strategies to improve their listening skill (CIP2) and to acquire general knowledge in English (CIP5), while they reported low frequency of use of strategies to improve their writing (CIP4) or speaking skills (CIP3) respectively. In this respect, more investigation may be needed to find out why engineering students did not pay so much attention to improving their productive skills, i.e. speaking and writing, as they did to improving their receptive skills, i.e. listening and reading. The next section will help us explore in detail which individual learning strategies have been reported more frequently than others by these engineering students.

6.2.4. Frequency of Use of Individual Learning Strategies

Sections 6.2.2. and 6.2.3 above showed the use of strategies in the two main categories (CR and CI), and also demonstrated the use of strategies to achieve the range of classroom-related and classroom-independent purposes. In this section, we will explore further and examine the individual learning strategies which students reported

employing in order to enhance their classroom learning and their language improvement in general. The results for individual language learning strategies are detailed below in Tables 6.5. and 6.6. Table 6.5 presents the 29 individual classroom-related strategies which students reported employing to achieve the classroom-related purposes, and Table 6.6 presents the 20 out-of-class strategies to achieve the classroom-independent purposes. To make it easier to see the whole picture of students' reported frequency of use of each individual strategy, these learning strategies are presented in order of their mean frequency scores, ranging from the highest to the lowest. This will create a clearer picture of the strategies which have been reported most and least frequently. The bigger mean frequency score of a strategy use implies that students claimed to employ that strategy more frequently. Apart from the mean frequency score, the standard deviation, together with the frequency category for each individual strategy is presented.

Table 6.5 : Individual Classroom-Related Strategies and Frequency of Use

Individual Strategy for Classroom-Related Purpose (SCRP)	Mean	S.D.	Frequency Category
1: SCR 2.2 Attend the class regularly in order to keep up with the teacher while studying in the classroom	3.65	.75	High Use
2: SCR 2.1 Listen to the teacher attentively in order to keep up with the teacher while studying in the classroom	3.26	.79	High Use
3: SCR 2.3 Take notes while studying in class in order to keep up with the teacher	3.07	.89	High Use
4: SCR 7.1 Doing the revision of the lessons only for the examination	3.06	.78	High Use
5: SCR 2.4 Think to oneself along with the teacher while studying in class in order to keep up with the teacher	2.99	.82	Medium Use
6: SCR 6.3 Ask a classmate or classmates either in class or outside class in order to solve the problems which one experiences in classroom lessons	2.82	.85	Medium Use
7: SCR 4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English	2.69	.84	Medium Use
8: SCR 5.2 Try not to talk with other students in order to avoid being distracted while studying	2.58	.97	Medium Use
9: SCR 4.3 Guess the meaning of a new vocabulary item from the context	2.38	.79	Medium Use

Table 6.5 (contd): Individual Classroom-Related Strategies and Frequency of Use

Individual Strategy for Classroom-Related Purpose (SCRP)	Mean	S.D.	Frequency Category
10: SCR 5.4 Try not to pay attention to what other students are doing in order to avoid being distracted while studying	2.36	.91	Medium Use
11: SCR 5.1 Try to get a seat in the front row in order to avoid being distracted while studying	2.33	1.0	Medium Use
12: SCR 5.3 Sit next to a bright or quiet student in order to avoid being distracted while studying	2.26	.94	Medium Use
13: SCR 7.3 Join a tutoring group in order to pass the English test	2.24	.81	Medium Use
14: SCR 6.1 Ask the teacher in class either immediately or when appropriate in order to solve the problems which one experiences in classroom lessons	2.13	.80	Medium Use
15: SCR 6.4 Ask people other than his/her regular teacher or classmates in order to solve the problems which one experiences in classroom lessons	2.12	.85	Medium Use
15: SCR 4.1 Memorise new vocabulary items with or without vocabulary lists	2.12	.66	Medium Use
17: SCR 4.4 Look at the root or the form of a new vocabulary item	2.08	.74	Medium Use
18: SCR 6.2 Ask the teacher after class in order to solve the problems which one experiences in classroom lessons	1.99	.74	Low Use
19: SCR 1.3 Prepare oneself physically in order to be well-prepared for the lessons	1.96	1.05	Low Use
20: SCR 7.2 Practise tests from different sources in order to enable one to pass the English test	1.92	.71	Low Use
21: SCR 1.4 Do the revision of the previous lessons in order to well-prepared for the lessons	1.87	.85	Low Use
22: SCR 4.5 Group new vocabulary items according to their similarity in meanings or spellings	1.70	.72	Low Use
23: SCR 1.1 Study the lessons beforehand such as the subject content or the objective of each lesson in order to be well-prepared for the lessons	1.68	.69	Low Use
24: SCR 4.6 Use new vocabulary items to converse with peers	1.63	.68	Low Use
25: SCR 3.1 Try to have an interaction with the teacher by asking or answering questions while studying in class in order to get the teacher's attention	1.62	.85	Low Use
26: SCR 3.2 Take part in classroom activities other than asking or answering questions in order to get the teacher's attention in the classroom	1.61	.85	Low Use

Table 6.5 (contd): Individual Classroom-Related Strategies and Frequency of Use

Individual Strategy for Classroom-Related Purpose (SCRCP)	Mean	S.D.	Frequency Category
27: SCLP 1.2 Try some exercises in advance in order to be well-prepared for the lessons	1.54	.64	Low Use
28: SCLP 3.3 Try to have an interaction with the teacher outside the class time so that the teacher will pay attention to him/her in the class	1.37	.62	Low Use
29: SCLP 7.4 Attend extra-classes in order to enable one to pass the English test	1.36	.63	Low Use

Table 6.5 shows that students reported employing 4 classroom-related strategies at the high frequency level. These strategies are those for keeping up with the teacher while studying in class. The use of these strategies is also consistent with students' reported strategy use presented in Section 6.3 above, in which students reported high frequency of use of these strategies to achieve the classroom-related purpose of keeping up with the teacher while studying in class (CRP2). To be more specific, students reported attending the class regularly more frequently than any other classroom-related strategy. This is followed by paying attention to their teacher or listening attentively, and doing some note-taking. The other strategy for which students reported a high frequency of use is do the revision of the lessons only for the examination. As mentioned in Chapter 1, English is a required subject for engineering students to satisfy their minimum requirement for graduation. It would be interesting to examine whether or not the status of the English course affects the reported high frequency of use of such classroom learning strategies.

When considering the reported frequency of use of the other classroom-related strategies, we can see that almost the same number of strategies have been reported between 'medium use' and 'low use'. As a whole, the strategies which appear to be reported 'medium use' are mainly those dealing with students managing themselves while studying in class, i.e. avoiding being distracted (e.g. try to sit in the front row, or choose

to sit near a bright or quiet student), those for learning new vocabulary items in classroom lessons (e.g. guess the meaning of a word from the context, or memorise words with or without a list), as well as those for solving problems which they experience in class (e.g. ask teacher immediately or when appropriate, or ask friends either in class or outside class). However, a closer look at the strategies which students reported employing to learn new vocabulary items, and to solve classroom lesson problems reveals that students reported low frequency of use of grouping vocabulary according to the similarities in roots or meanings of words, or using new vocabulary items to converse with friends in order to learn them. In the latter case, as discovered in the last section (Section 6.2), students also reported low frequency of use of strategies for improving their speaking skill. Hence, the use of this individual strategy may reflect how much interest students showed in speaking English. Similarly, in terms of solving classroom lesson problems, students reported asking their teacher in class either immediately or when appropriate slightly more frequently than seeing their teacher after class in order to ask for help. It would be interesting to find out about why students did not see their teacher after class when they needed help, especially in terms of out-of-class relationships between teachers and students. Lastly, other classroom-related strategies which were reported in the 'low use' category are mainly those dealing with preparing themselves for classroom lessons in advance (e.g. study the lessons beforehand, or try some exercises in advance), or getting the teacher's attention in class (e.g. try to have an interaction with the teacher by asking or answering questions while studying in class, or take part in classroom activities other than asking or answering questions). The strategy which was found to be reported least frequently is attending extra-classes to prepare themselves for the examination.

Table 6.6: Individual Classroom-Independent Strategies and Frequency of Use

Individual Strategy for Classroom-Independent Purpose (SCIP)	Mean	S.D.	Frequency Category
1: SCIP 2.1 Watch an English-speaking film in order to improve one's listening skill	2.73	.88	Medium Use
2: SCIP 1.4 Listen to English songs in order to expand the knowledge of English vocabulary and expressions	2.65	.95	Medium Use
3: SCIP 1.3 Watch an English-speaking film in order to expand the knowledge of English vocabulary and expressions	2.63	.96	Medium Use
4: SCIP 2.2 Listen to English songs or cassette tapes of English conversations in order to improve one's listening skill	2.54	.88	Medium Use
5: SCIP 1.1 Read printed materials in English such as billboards, leaflets, newspapers and magazines in order to expand the knowledge of English vocabulary and expressions	2.42	.89	Medium Use
6: SCIP 1.2 Play games in English such as crosswords and computer games in order to expand the knowledge of English vocabulary and expressions	2.30	.95	Medium Use
7: SCIP 5.3 Read printed materials such as books, textbooks or magazines in English in order to acquire one's general knowledge	2.24	.81	Medium Use
8: SCIP 5.1 Seek an opportunity to be exposed to English in order to acquire one's general knowledge in English	2.23	.76	Medium Use
9: SCIP 5.4 Surf the Internet in order to acquire one's general knowledge in English	2.21	.94	Medium Use
10: SCIP 3.2 Try to imitate a native speaker from media such as films or cassette tapes in order to improve one's speaking skill	2.15	.86	Medium Use
11: SCIP 4.3 Practise translating from Thai into English in order to improve one's writing skill	1.93	.82	Low Use
12: SCIP 2.4 Watch TV programmes in English in order to improve one's listening skill	1.92	.74	Low Use
13: SCIP 3.1 Talk to oneself in order to improve one's speaking skill	1.91	.75	Low Use
14: SCIP 2.3 Listen to a radio programme in English in order to improve one's listening skill	1.84	.77	Low Use
15: SCIP 3.3 Converse in English with your peers, siblings, or foreigners in order to improve one's speaking skill	1.71	.67	Low Use
16: SCIP 4.2 Practise writing sentences or essays in English in order to improve one's writing skill	1.67	.69	Low Use
17: SCIP 3.4 Use a computer programme like a 'chat' programme in order to improve one's speaking skill	1.63	.83	Low Use
18: SCIP 4.1 Correspond in English by electronic mail (e-mail) or a letter in order to improve one's writing skill	1.60	.77	Low Use
19: SCIP 5.2 Go to a language school in order to acquire one's general knowledge in English	1.34	.58	Low Use
20: SCIP 3.5 Go to a language school in order to improve one's speaking skill	1.26	.53	Low Use

The frequency of use of 20 individual out-of-class or classroom-independent strategies in Table 6.6 reveals that half of them were reported at a 'medium use' level, while the other half were reported at a 'low use' level. None of the out-of class or classroom-independent strategies were reported at a 'high use' level. In terms of employing these strategies, students reported making use of mass media in English, such as films, printed materials, or even computer programmes slightly more frequently than the other out-of-class or classroom-independent strategies. Students also reported seeking an opportunity to be exposed to English as a way of acquiring their general knowledge in English. As shown in the previous section (Section 6.2.3), it was discovered that students reported low frequency of use of out-of-class or classroom-independent strategies to improve their speaking and writing skills. At this level of strategy use, we can see that students reported employing strategies to improve such skills less frequently than improving other skill areas. As mentioned in Chapter 4, classroom-related strategies are those which were reported employing by students before they came to class, while they were studying in class, or after class. In other words, classroom-related strategies could be somewhat employed outside the class time.

The out-of-class or classroom-independent strategies which students reported least frequently were attending extra-classes at a private language school or other private language institutes to improve their language speaking skill or to acquire their general knowledge in English. The use of this strategy was also reported least frequently among the classroom-related strategies. That is, students reported going to a private language school less frequently than the other out-of-class or classroom-independent strategies, whether they are for classroom-related or classroom-independent purposes.

As reported in the interview conducted in the first phase of data collection, some students reported feeling that they did not have enough time for English, apart from their

class time. Thus, students' time allocation for English, especially outside classroom setting would be another interesting point which could be examined in future research.

6.3. Summary

The description of reported frequency of students' strategy use at different levels in this chapter has provided us with an overall picture of strategy use, reported by 570 students. What follows is a summary of the highlights of the findings of the present investigation.

- Engineering students reported medium frequency of use of learning strategies in dealing with language learning either in class or out of class.
- Students reported employing strategies related to their classroom learning slightly more frequently than those related to out-of-class learning.
- In terms of using strategies in order to achieve classroom-related purposes, students reported employing strategies to achieve CRP2, which is to keep up with the teacher in the classroom, more frequently than to achieve any other CRP, and the least frequently reported were those to achieve CRP3, which is to get the teacher's attention in the classroom.
- In terms of using out-of-class or classroom-independent strategies to achieve classroom-independent purposes, students reported employing strategies to achieve CIP1, which is to expand their knowledge of English vocabulary and expressions more frequently than to achieve any other CIP, and the least frequently reported used were those to achieve CIP3, which is to improve their speaking skill.
- When looking at classroom-related strategies at the individual strategy level, we can see that students reported attending the class regularly, listening to teachers attentively, and taking notes while studying more frequently than the other strategies in the CR category. Another strategy for which students reported high frequency of

use is doing the revision especially for examinations. On the other hand, students did not seem to put emphasis on preparing themselves for their classroom lessons in advance, or trying to get their teacher's attention while studying in class.

- In terms of using individual out-of-class or classroom-independent strategies, students reported employing strategies which deal with making use of mass media in enhancing their language skills more frequently than other out-of-class or classroom-independent strategies.
- Students reported improving their productive skills, i.e. speaking and writing, less frequently than improving their receptive skills, i.e. reading and listening.

In this chapter, students' reported use of learning strategies as a whole, regardless of their gender, their institution, or their language proficiency levels, has been described. Chapter 7 will present another perspective on the data dealing with the use of language learning strategies in relation to the five independent variables in this investigation, namely, type of institution, gender of students, 'perceived' class size, location of institution, and language proficiency levels. Lastly, a factor analysis has been conducted to seek underlying relationships among the individual learning strategies in the strategy inventory for the present investigation, as well as their strong relationships to the five variables; this is also discussed in the next chapter.

CHAPTER 7

DATA ANALYSIS FOR LANGUAGE LEARNING STRATEGY USE II

CHAPTER SEVEN

DATA ANALYSIS FOR LANGUAGE LEARNING STRATEGY USE II

7.1. Introduction and Purpose of the Chapter

As seen in Chapter 6, the use of language learning strategies is divided into four different levels: overall strategy use; use of two main strategy categories (CR and CI); use of strategies to achieve classroom-related and classroom-independent purposes; and use of the forty-nine individual strategies. In this chapter, significant variation and patterns of variation in frequency of use of language learning strategies at each of these levels, analysed in terms of the five independent variables, are examined. Finally, the results of a factor analysis are presented.

The primary purposes of this chapter are thus to examine the relationship between the language learning strategy use of 570 engineering students and five variables, namely:

1. Type of institution (state-run universities-SRU, private-run universities-PRU, and Rajamangala Institutes of Technology-RIT),
2. The gender of students (male and female),
3. The students' perception of English class size (large, optimum, and small),
4. The location of the institution (Metro-Bangkok and regional), and
5. The students' language proficiency levels (high; moderate; low)

In presenting the results of data analysis in this chapter, a top-down manner has been adopted. That is, variations in frequency of students' overall reported strategy use according to the five variables as mentioned above will be explored first. Then, variations in frequency of use of learning strategies in the classroom-related category (CR) and out-of-class strategies in the classroom-independent category (CI) will be presented. This is followed by use of both classroom-related and out-of-class or classroom-independent

strategies which students reported employing to achieve classroom-related and classroom-independent purposes. Finally, use of individual learning strategies, i.e. classroom-related strategies and out-of-class or classroom-independent strategies, by the five variables are examined. The main data analyses carried out for this chapter are an analysis of variance (ANOVA), and chi-square tests:

1. Analysis of variance (ANOVA). This statistical method was undertaken to determine patterns of variation in students' overall reported strategy use, use of strategies in the two main categories, and use of strategies to achieve classroom learning and language improvement purposes, in terms of the five variables. If there is a significant overall difference occurring, as the result of ANOVA, among type of institution, 'perceived' class size, and students' language proficiency levels, the Scheffe Test is used to help to pinpoint which of the differences between particular pairs of means are contributing to this overall difference.
2. Chi-square tests. These tests were employed to determine significant variations in frequency of students' reported use of the 49 individual strategies.

The researcher adopted a level of significance of .05. This means that the chances are 5 in 100, or less, that an observed difference could result when a variable is actually having no effect (Ferguson, 1976). Figure 7.1 below illustrates the levels of data analysis for this chapter.

Figure 7.1 : Analysis of Variations in Frequency of Different Levels of Strategy Use

Level 1:	Overall Reported Strategy Use
Level 2:	Use of Strategies in the Two Main Categories (CR and CI)
Level 3:	Use of Strategies to Achieve both CR and CI Purposes
Level 4:	Use of Individual Learning Strategies

7.2. Variation in Students' Overall Reported Strategy Use

In the first level of the analysis of variance, students' overall reported strategy use shows significant variation according to type of institution and their levels of language proficiency, but not according to their gender, perception of class size or location of institution. The ANOVA results are summarised in Table 7.1. below. Each table consists of the variable, mean frequency score of strategy use (Mean), standard deviation (S.D.), Significance Level, and Pattern of Variation in frequency of strategy use (if a significant variation exists).

Table 7.1 : A Summary of Variation in Frequency of Students' Overall Reported Strategy Use

Type of Institution	SRU (n = 231)		PRU (n = 201)		RIT (n = 138)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
Overall Strategy Use	2.06	.40	2.18	.38	2.19	.35	p<.001	PRU>SRU RIT>SRU
Gender	Female (n = 64)		Male (n = 506)		Comments			
	Mean	S.D.	Mean	S.D.	Significance level		Pattern of Variation	
Overall Strategy Use	2.21	.35	2.13	.39	N.S.		—	
Perceived Class Size	Small (n = 47)		Optimum (n = 414)		Large (n = 109)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
Overall Strategy Use	2.10	.39	2.15	.39	2.11	.40	N.S.	—
Location of Institution	MetroBangkok (n = 271)		Regional (n = 299)		Comments			
	Mean	S.D.	Mean	S.D.	Significance level		Pattern of Variation	
Overall Strategy Use	2.16	.40	2.11	.39	N.S.		—	
Proficiency Level	Low (n = 195)		Moderate (n = 184)		High (n = 191)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
Overall Strategy Use	2.09	.39	2.15	.35	2.21	.41	p < .05	High>Low High>Mod

According to Table 7.1., the ANOVA results show that the frequency of students' overall strategy use varied significantly according to type of institution ($p < .001$), and students' language proficiency levels ($p < .05$)

In respect of type of institution, the post-hoc Scheffe Test shows significant differences between private universities and state universities. The mean frequency scores were 2.18 and 2.06 respectively. Significant differences are also found between Rajamangala Institutes of Technology and state universities. The mean frequency scores were 2.19 and 2.06 respectively. This shows that students studying at private universities and Rajamangala Institutes of Technology reported employing overall language learning strategies significantly more frequently than those studying at state-run universities. No significant difference for overall strategy use has been found between private universities and Rajamangala Institutes of Technology. Private university and RIT students reported employing learning strategies almost at the same level of frequency. The mean frequency scores were 2.19 and 2.18 respectively. As previously mentioned, for the present investigation, students studying at each of the institutions may be in their first, second, third or fourth year. That is, the students are considered heterogeneous in terms of years of study at their institutions.

In terms of students' language proficiency levels for the present investigation, as mentioned in Chapter 5, their language proficiency levels were determined according to their scores obtained through the test in English for Science and Technology (PTEST) which was constructed by the researcher. As shown in Chapters 3 (Section 3.9) and 5 (Section 5.8), the distribution of language proficiency levels of 570 students for the present investigation was well-balanced. That is, the 'high-proficiency' students, representing 33.5 per cent of the sample, are the students whose test scores were in the top third scoring category (a score of 18 or more out of a possible maximum of 40). The

'moderate-proficiency' students, representing 32.3 per cent of the sample, are those whose test scores were in the middle third (a score of 11 to 17); the 'low-proficiency' students are those whose scores were in the bottom third (a score of 10 or lower).

Significant variations in the overall strategy use occur between high-proficiency and moderate-proficiency students (mean frequency scores were 2.21 and 2.15 respectively), and have also been found between high-proficiency and low-proficiency students (mean frequency scores were 2.21 and 2.09 respectively). These figures indicate that the high-proficiency students reported greater overall strategy use than either moderate- or low-proficiency students. In this case, no significant variations in students' overall strategy use are found between the moderate- and low-proficiency students. A similar pattern of variation in frequency of overall strategy use has been reported by other researchers, as was seen in the literature review in Chapter 2. Examples are Oxford and Nyikos (1989), Mullins (1992), Oxford and Green (1995), and Embi (1996). Oxford and Green (1995) concluded from the studies of a number of researchers using the Strategy Inventory for Language Learning (SILL) that more successful or higher-proficiency students reported greater use of language learning strategies. However, it is important to remember that researchers have employed different measures to determine students' language proficiency levels. Examples include: proficiency as designated by teachers (Chamot, 1987), course levels, i.e. pre-basic, basic, and intermediate (Oxford and Green, 1995), language proficiency and TOEFL scores (Phillips, 1991 cf. Oxford and Burry-Stock, 1995), and language proficiency and students' English results obtained through the national standard examination (Embi, 1996).

As mentioned earlier, the frequency of students' overall strategy use did not vary according to their gender, perception of their English class size, or location of institution. However, as will be discovered in the following sections (Sections 7.3, 7.4. and 7.5),

some significant variation patterns in frequency of strategy use according to these latter three variables have been found. What follow are the ANOVA results for the use of strategies in the two main categories.

7.3. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories

As seen in Chapter 4, the language learning strategies for the present investigation have been grouped into two main categories, i.e. Classroom-Related Category (CR), and Classroom-Independent Category (CI). The ANOVA results demonstrate that the frequency of students' use of strategies in the CR category varied significantly according to type of institution, but did not vary according to their gender, perception of their English class size, location of institution, or their language proficiency levels. Significant variations in frequency of use of out-of-class strategies in the CI category are found in relation to location of institution, and language proficiency levels. This did not vary according to type of institution, gender, or 'perceived' class size. The ANOVA results showing variations in frequency of students use of strategies in the two categories according to each of the five variables are presented in Tables 7.2.-7.6. below.

7.3.1. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to Type of Institution

Table 7.2. below shows that frequency of students' use of strategies in the CR category varied significantly according to type of institution, but the frequency of use of out-of-class strategies in the CI category did not. Students studying at the different types of institution reported employing learning strategies when learning English in the classroom differently, with students studying at private universities and Rajamangala Institutes of Technology reporting greater use of these classroom-related strategies than those studying at state universities. However, a closer look at the CI category, strategies which students reported employing outside their class time, reveals that students

studying at these types of institution did not report employing strategies in this category with significantly different frequencies. Taken together, these findings suggest that there may be some factors associated with how English is taught in different types of institution which may affect students' use of classroom-related strategies in the CR category. Though significant differences in frequencies of use were reported for these classroom-related strategies, the frequencies were all categorised as 'medium use' according to the criteria mentioned in Chapter 6.

Table 7.2. : Variation in Frequency of Use of Strategies in the Classroom-Related and Classroom Independent Categories According to Type of Institution

Strategy Category	SRU (n = 231)		PRU (n = 201)		RIT (n = 138)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CR Category	2.07	.41	2.30	.40	2.29	.35	p<.001	PRU>SRU RIT>SRU
CI Category	2.05	.52	2.02	.48	2.07	.47	N.S.	—

7.3.2. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to the Gender of Students

The results of ANOVA in Table 7.3. below show no significant variations in frequency of students' use of strategies in either the CR category or the CI category. Even though the use of strategies in these two categories did not vary significantly according to the gender of students, female students happened to report slightly greater use of both strategy categories than their male counterparts. However, in this investigation, both female and male students shared the same trend of strategy use in that they reported employing the classroom-related strategies slightly more frequently than those for their out-of-class or classroom-independent strategies. The mean frequency scores for the CR category were 2.26 and 2.20, and those for CI were 2.13 and 2.03 respectively, all of which are considered 'medium' frequency of use. A similar pattern of

strategy use between female and male learners was reported by Politzer (1983) who found that there was a minor but significant difference in the use of strategies between female and male learners, with females using slightly more than males.

The research findings of the present investigation show no strong significant differences in either frequency of students' overall strategy use, or in frequency of use of strategies in the CR and CI categories according to the gender of students. As will be reported later in this chapter, however, significant differences in use of individual strategies was found to be related to this variable, with female students reporting employing a few strategies more frequently than did male students.

Table 7.3. : Variation in Frequency of Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to the Gender of Students

Strategy Category	Female (n = 64)		Male (n = 506)		Comments	
	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CR Category	2.26	.36	2.20	.41	N.S.	--
CI Category	2.13	.49	2.03	.49	N.S.	--

7.3.3. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to 'Perceived' Class Size

The ANOVA results shown in Table 7.4. below demonstrate that students perceiving their class size as large, optimum, or small did not report employing strategies in either the CR or CI category differently. However, at the individual strategy level, as will be discovered later in this chapter, students perceiving their class size as optimum reported employing a certain strategy significantly more frequently than those perceiving their class sizes as either large, or small. Similarly, the students perceiving their class size as small, reported employing certain strategies significantly more frequently than those perceiving their class sizes as either large, or optimum. The results of this investigation

did not seem to be consistent with the previous research carried out by Sarwar (1992), or Mebo (1995), but they were consistent with that of Embi (1996). The research findings of the former two researchers revealed that the students who perceived their class size as larger were likely to report greater strategy use than those who perceived their class size as smaller, but in the study by Embi, the students who perceived their class size as smaller were found to report greater strategy use than those who perceived their class size as larger. Though no significant differences in such use of strategies has been found in this investigation, students perceiving their class sizes differently reported a medium frequency of use of strategies in both categories, with classroom-related strategies in the CR category slightly higher than out-of-class strategies in the CI category.

Table 7.4. : Variation in Frequency of Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to 'Perceived' Class Size

Strategy Category	Small (n = 47)		Optimum (n = 414)		Large (n = 109)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CR Category	2.16	.42	2.22	.40	2.21	.44	N.S.	--
CI Category	2.04	.51	2.05	.49	2.03	.49	N.S.	--

7.3.4. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to Location of Institution

The results of ANOVA in Table 7.5. below show significant variation in the frequency of students' use of out-of-class strategies in the CI category according to location of institution, indicating that students studying at the institutions located in Bangkok and the metropolitan areas reported more frequent use of strategies in the classroom-independent category, which are considered out-of-class strategies, than those studying at the institution located outside Bangkok and the metropolitan areas (regional) did. However, the students studying at the institutions in both locations did not differ in

terms of their employment of classroom-related strategies. When determining the level of frequency of strategy use, it appears that students studying at institutions in both locations reported medium frequency of use of strategies in both CR and CI categories. Though the ANOVA results show no significant variation in use of classroom-related strategies, students studying at the institutions in both locations reported employing these strategies slightly more frequently than out-of-class or classroom-independent strategies.

Table 7.5. : Variation in Frequency of Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to Location of Institution

Strategy Category	Metro-Bangkok (n = 271)		Regional (n = 299)		Comments	
	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CR Category	2.22	.41	2.19	.41	N.S.	--
CI Category	2.09	.50	2.01	.48	p < .05	MetroBKK>Regional

7.3.5. Variation in Frequency of Students' Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to Language Proficiency Levels

The ANOVA results shown in Table 7.6 below demonstrate that significant variations in use of out-of-class strategies in the CI category have been found according to students' language proficiency levels, with high-proficiency students reporting more frequent use of these strategies than those with lower language proficiency levels. In terms of their employment of classroom-related strategies, no significant variations were found according to this variable. As will be discovered later, however, in the use of strategies to achieve classroom-related purposes, and in the use of some individual classroom-related strategies, high-proficiency students reported significantly more frequent use than either moderate- or low-proficiency students did. It can also be seen that students at the three levels of language proficiency reported employing classroom-related strategies more frequently than out-of-class or classroom independent strategies.

Table 7.6. : Variation in Frequency of Use of Strategies in the Classroom-Related and Classroom-Independent Categories According to Language Proficiency Levels

Strategy Category	Low (n = 195)		Moderate (n = 184)		High (n = 191)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CR Category	2.20	.41	2.19	.40	2.23	.43	N.S.	—
CI Category	1.94	.47	2.01	.46	2.19	.52	p <.000	High>Low High>Mod

In summary, when looking at the use of strategies in the CR and CI categories based on the results of ANOVA, a clearer picture of students' strategy use in this level has been formed. In terms of classroom-related strategies, female and male students reported employing these strategies more or less at the same level, though female students reported slightly higher use. The perceptions of class sizes did not seem to have much relationship with students' choices of classroom-related strategies. Furthermore, no matter where in the country the students studied, they reported employing strategies when dealing with language learning in the classroom in more or less the same way. This is reflected in a lack of significant variation in use of classroom-related strategies between students studying in Bangkok and those studying outside Bangkok. A similar lack of significant variations in strategy use is shown for students with different language proficiency levels.

In terms of using out-of-class or classroom-independent strategies, unlike classroom-related strategies, the location of their institutions and the language proficiency levels of students seemed to have a relationship with students' choices of strategy employment. As shown in the framework of the present investigation in Chapter 3, the relationship between students' use of strategies and their levels of language proficiency is still complex. It could be that students' employment of a wide range of learning strategies enables them to become good language learners, or that

students are good language learners, so they are able to employ a wide range of learning strategies. The implications of the research findings need to be considered cautiously as suggested by MacIntyre (1994:188) that "...this might be interpreted to mean that either proficiency influences the choice of strategies or that strategy choice is simply a sign of proficiency level". Lastly, the type of institution lends to significant differences in terms of students' employment of classroom-related strategies. Tables 7.7. below summarises significant variations in frequency of use of strategies in the CR and CI categories according to the five variables.

Table 7.7.: Summary of Significant Variations in Frequency of Use of Strategies in the Classroom-Related and Classroom-Independent According to the Five Variables

Strategy Category	Type of Institution	Gender	'Perceived' Class Size	Location of Institution	Language Proficiency Levels
CR Category	YES	N.S.	N.S.	N.S.	N.S.
CI Category	N.S.	N.S.	N.S.	YES	YES

7.4. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes

As shown in Chapter 4, the strategy inventory for the present investigation has been classified according to the students' reported employment of strategies to achieve language learning purposes. There are twelve purposes classified under two main categories, i.e. CR and CI (see Chapter 6, Section 6.2.3 for detail of the purposes). Seven purposes were classified as classroom-related purposes (CRP), and five were classified as classroom-independent purposes (CIP).

In this section, the ANOVA results for use of classroom-related strategies to achieve the classroom-related purposes, together with those for use of out-of-class strategies to achieve the classroom-independent purposes by the five independent variables are presented in Tables 7.8-7.12.

7.4.1. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Type of Institution

The ANOVA results in Tables 7.8. below show significant variations by type of institution in frequency of use of strategies to achieve 6 classroom-related purposes (CRP). Private university students reported use of classroom-related strategies to achieve four classroom-related purposes significantly more frequently than did state university students. The only classroom-related purpose which was not reported to have a significantly higher frequency of use by private university students was CRP 3: to get the teacher's attention in the class, while RIT students reported employing strategies to achieve this purpose significantly more frequently than did state university students.

Table 7.8.: Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Type of Institution

Purpose to be Achieved	SRU (n = 231)		PRU (n = 201)		RIT (n = 138)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 1	1.63	.69	1.88	.69	1.80	.67	p <.001	PRU>SRU
CRP 2	3.01	.80	3.42	.55	3.38	.55	p <.000	PRU>SRU RIT>SRU
CRP 3	1.43	.64	1.53	.68	1.70	.79	p <.001	RIT>SRU
CRP 4	2.08	.54	2.07	.51	2.17	.46	N.S.	--
CRP 5	2.07	.77	2.68	.71	2.48	.72	p <.000	PRU>RIT> SRU
CRP 6	2.18	.57	2.31	.59	2.33	.53	p <.05	RIT>SRU
CRP 7	2.08	.40	2.23	.47	2.15	.35	p <.001	PRU>SRU
CIP 1	2.49	.77	2.50	.71	2.52	.75	N.S.	--
CIP 2	2.27	.67	2.23	.61	2.27	.63	N.S.	--
CIP 3	1.72	.55	1.72	.48	1.77	.49	N.S.	
CIP 4	1.74	.63	1.73	.60	1.73	.56	N.S.	--
CIP 5	2.04	.59	1.95	.57	2.05	.56	N.S.	--

As shown in the previous section (Section 7.3: Table 7.2), students studying at private universities and Rajamangala Institutes of Technology reported employing classroom-related strategies significantly more frequently than SRU students did. The findings shown in Table 7.8. appear to confirm such a strategy use in a more specific manner, i.e. in terms of purposes that these students reported trying to achieve while studying in the classroom. This strategy use analysis also confirms that these students were not different in their employment of out-of-class strategies to achieve any of the classroom-independent purposes. However, in terms of using out-of-class strategies for their classroom-independent purposes, students studying at different types of institution reported more frequent use of strategies to expand their knowledge of English vocabulary and expressions (CIP 1) rather than to improve their productive skills, i.e. speaking or writing (CIP 3 and CIP 4). In an overall picture, students studying at all three types of institution reported high frequency of use of classroom-related strategies in order to keep up with the teacher while studying in class. Based on the findings of the reported strategy use, of the three types of institution, the private university students appeared to be the most active strategy users for their classroom learning, followed by RIT students, and state university students appeared to be the least active strategy users.

7.4.2. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to the Gender of Students

The ANOVA results in Table 7.9 below show that only the frequency with which students use out-of-class strategies aimed at improving their writing skill (CIP 4) shows significant variation. In this case, female students reported greater use of the strategies to achieve this purpose than their male counterparts. Though there is a significant variation, the ANOVA results show that both female and male students reported low frequency of use of such strategies (mean frequency scores were 1.89 and 1.71 respectively).

Table 7.9.: Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to the Gender of Students

Purpose to be Achieved	Female (n = 64)		Male (n = 506)		Comments	
	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 1	1.77	.72	1.76	.69	N.S.	--
CRP 2	3.37	.45	3.23	.71	N.S.	--
CRP 3	1.59	.71	1.52	.70	N.S.	--
CRP 4	2.16	.46	2.09	.52	N.S.	--
CRP 5	2.35	.81	2.39	.78	N.S.	--
CRP 6	2.38	.51	2.25	.58	N.S.	--
CRP 7	2.19	.38	2.14	.43	N.S.	--
CIP 1	2.60	.70	2.49	.75	N.S.	--
CIP 2	2.34	.66	2.25	.63	N.S.	--
CIP 3	1.78	.51	1.73	.51	N.S.	--
CIP 4	1.89	.65	1.71	.60	$p < .05$	Females > Males
CIP 5	2.07	.55	2.00	.58	N.S.	--

An overall picture of students' reported strategy use in order to achieve both classroom-related and classroom-independent purposes reveals that both female and male students appeared to report a similar level of frequency of strategy use, i.e. high, medium, or low. Taking a closer look at the mean frequency scores of use of these strategies, we can see that female students reported slightly more frequent use of strategies in order to achieve almost every purpose except to avoid being distracted while studying in class, where male students reported slightly higher use of the strategies in order to achieve this purpose (mean frequency scores were 2.39 and 2.34 respectively).

7.4.3. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to 'Perceived' Class Size

The results of ANOVA in Table 7.10. below show that there were no significant variations in use of the strategies in order to achieve any of the twelve purposes according to 'perceived' class size. This means that students' perceptions of their class sizes did not seem to have much relationship with their employment of strategies to achieve either classroom-related or classroom-independent purposes. However, as mentioned earlier, this variable will be found to be related to students' use of individual strategies, where the chi-square tests reveal such results.

Table 7.10: Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to 'Perceived' Class Size

Purpose to be Achieved	Small (n = 47)		Optimum (n = 414)		Large (n = 109)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 1	1.76	.61	1.78	.71	1.70	.68	N.S.	--
CRP 2	3.15	.79	3.26	.68	3.24	.69	N.S.	--
CRP 3	1.48	.73	1.52	.69	1.61	.72	N.S.	--
CRP 4	2.05	.55	2.12	.51	2.06	.50	N.S.	--
CRP 5	2.35	.78	2.41	.76	2.29	.87	N.S.	--
CRP 6	2.28	.66	2.28	.56	2.18	.59	N.S.	--
CRP 7	2.05	.46	2.16	.42	2.16	.40	N.S.	--
CIP 1	2.44	.80	2.52	.74	2.46	.75	N.S.	--
CIP 2	2.32	.71	2.26	.63	2.22	.59	N.S.	--
CIP 3	1.73	.53	1.73	.51	1.72	.51	N.S.	--
CIP 4	1.65	.54	1.75	.61	1.71	.61	N.S.	--
CIP 5	2.05	.50	2.00	.59	2.02	.57	N.S.	--

7.4.4. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Location of Institution

The data shown in Table 7.11 below provide an overall picture of how students studying in Bangkok, and those studying outside Bangkok deal with English language learning. Students studying in Bangkok and the regions seemed to differ slightly in terms of their employment of strategies to achieve both classroom-related and classroom-independent purposes. Similar results of frequency of strategy use have also been revealed earlier in use of classroom-related strategies in the CR category, and out-of-class strategies in the CI category (Section 7.3). However, students studying in Bangkok and the regions were similar in that they reported low frequency of use of classroom-related strategies so as to prepare themselves for the lessons in advance (CRP1); to get the teacher's attention in class (CRP3), and use of out-of-class or classroom-independent strategies to improve their productive skills, i.e. speaking and writing (CIP3 and CIP4). On the other hand, they reported higher frequency of use of classroom-related strategies to keep up with the teacher while studying in class (CRP2); to manage themselves in the classroom environment by trying to avoid being distracted (CRP5), and use of out-of-class or classroom-independent strategies to expand their knowledge of vocabulary and expressions in English (CIP1).

Table 7.11: Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Location of Institution

Purpose to be Achieved	Metro-Bangkok (n = 271)		Regional (n = 299)		Comments	
	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 1	1.80	.67	1.73	.71	N.S.	--
CRP 2	3.28	.66	3.22	.71	N.S.	--
CRP 3	1.52	.69	1.54	.71	N.S.	--
CRP 4	2.07	.53	2.12	.48	N.S.	--

Table 7.11 (contd): Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Location of Institution

Purpose to be Achieved	Metro-Bangkok (n = 271)		Regional (n = 299)		Comments	
	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 5	2.44	.79	2.33	.78	N.S.	--
CRP 6	2.27	.54	2.26	.60	N.S.	--
CRP 7	2.19	.43	2.11	.41	p < .05	Metro-Bangkok > Regional
CIP 1	2.59	.77	2.42	.71	p < .05	Metro-Bangkok > Regional
CIP 2	2.39	.65	2.13	.59	p < .000	Metro-Bangkok > Regional
CIP 3	1.73	.51	1.73	.51	N.S.	--
CIP 4	1.73	.61	1.74	.60	N.S.	--
CIP 5	2.00	.60	2.01	.56	N.S.	--

The ANOVA results in Table 7.11 show that significant variations in frequency of use of both classroom-related and out-of-class or classroom-independent strategies to achieve three purposes were found according to location of institution, with students studying at the institutions in Bangkok and the metropolitan areas reporting more frequent use of these strategies than those studying elsewhere. The three purposes for which students in Bangkok and the metropolitan areas reported using strategies more frequently, and significantly so, are 'to pass the English tests' (CRP7); 'to expand their knowledge of English vocabulary and expressions' (CIP1); and 'to improve their listening skill' (CIP2). The results in this section not only confirm but also break down in more detail what has been discovered earlier that students studying in Bangkok and the metropolitan areas reported more frequent use of out-of-class strategies in the CI category. The strategies to achieve these three purposes which varied significantly according to this variable were reported to be used with medium frequency.

A point which may be useful to look at is the strategies which students reported employing to pass the English tests. Looking at type of institution, we can see that students studying at private universities reported more frequent use of these strategies than those studying at state universities. This may reflect the sample distribution which was considered in Chapter 3 (Section 3.6), regarding type of institution in terms of location of institution, showing that the majority of private university students study in Bangkok and the metropolitan areas while the majority of state university students study in the regions outside Bangkok.

7.4.5. Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Language Proficiency Levels

The results of ANOVA in Table 7.12 below reveal significant variations in use of classroom-related strategies to achieve 3 purposes, and out-of-class or classroom-independent strategies to achieve 5 purposes in terms of students' language proficiency levels, with high-proficiency students reporting greater use of strategies to achieve these purposes than either moderate- or low-proficiency students. Though no significant variations in frequency of use of classroom-related strategies in the CR category were found according to this variable (Section 7.3), three purposes in this category were reported to vary significantly at this level.

The purposes which students reported significant frequencies of use of strategies to achieve are: CRP3: 'To get the teacher's attention in the classroom'; CRP 4: 'to learn new vocabulary in the classroom lessons'; CRP 5: 'to avoid being distracted while studying in the classroom'; CIP1: 'to expand their knowledge of English vocabulary and expressions'; CIP 2: 'to improve their listening skill'; CIP 3: 'to improve their speaking skill'; CIP 4: 'to improve their writing skill'; and CIP 5: 'to acquire their general knowledge in English'.

Based on the pattern of significant variations in strategy use, moderate- and low-proficiency may be consolidated into one group as poor language learners, and high-proficiency students as good language learners. This is because significant variations in frequency of strategy use tend to be found between high- and moderate- proficiency students or between high- and low-proficiency students in most cases. On the other hand, no significant variations in frequency of strategy use have been found between moderate- and low-proficiency students in any cases.

In terms of students' employment of strategies to achieve classroom-related purposes, it appears that students, whether they are good or poor language learners, do not differentiate in employing strategies for some classroom-related purposes. What may differentiate good from poor language learners in this case is use of out-of-class or classroom-independent strategies. The findings demonstrate that good language learners tend to spend more time dealing with their language learning outside the classroom setting than do poor language learners. The good language learners reported employing out-of-class or classroom-independent strategies to expand their knowledge of English vocabulary and expressions, to find ways to improve their language skills, i.e. speaking, listening, and writing, as well as to acquire their general knowledge in English significantly more frequently than did poor language learners. However, in this study, poor language learners reported more frequent use of strategies to achieve one of the classroom-related purposes than good language learners did, i.e. to avoid being distracted while studying. As shown in the discussion of variation in frequency of use of strategies to achieve this classroom-related purpose (CRP5) according to type of institution, it appears that students studying at private universities reported more frequent use of these strategies than those studying at state universities. The distribution of the sample in Chapter 3 (see Table 3.2) may be able to explain this phenomenon,

indicating that the majority of private university students fall in this category (moderate and low proficiency, and the majority of high-proficiency students are state university students). Furthermore, a close look at the frequency of strategy use reveals that the strategy use for this purpose is low. However, strategy use could be high even though no significant variations in use of such strategies were found. For instance, both good and poor language learners reported using classroom-related strategies in order to keep up with the teacher while studying in class at a high level of frequency. The mean frequency scores were 3.23, 3.27, and 3.24 respectively. No significant variation in use of classroom learning strategies for this purpose was found. This means that students, irrespective of their language proficiency level, were found to report employing the classroom-related strategies to achieve this purpose at a more or less the same frequency level.

Table 7.12: Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Language Proficiency Levels

Purpose to be Achieved	Low (n = 195)		Moderate (n = 184)		High (n = 191)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CRP 1	1.84	.71	1.70	.67	1.75	.70	N.S.	--
CRP 2	3.23	.71	3.27	.69	3.24	.67	N.S.	--
CRP 3	1.47	.64	1.47	.67	1.65	.78	p < .05	High>Mod High>Low
CRP 4	2.07	.53	2.05	.48	2.17	.51	p < .05	High>Mod
CRP 5	2.42	.76	2.46	.78	2.27	.81	p < .05	Mod>High
CRP 6	2.21	.61	2.27	.55	2.32	.54	N.S.	--
CRP 7	2.14	.45	2.12	.42	2.18	.38	N.S.	--

Table 7.12 (contd): Variation in Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes According to Language Proficiency Levels

Purpose to be Achieved	Low (n = 195)		Moderate (n = 184)		High (n = 191)		Comments	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Significance level	Pattern of Variation
CIP 1	2.36	.72	2.47	.72	2.67	.76	p < .000	High>Mod High>Low
CIP 2	2.10	.57	2.25	.64	2.42	.64	p < .000	High>Mod High>Low
CIP 3	1.70	.47	1.68	.48	1.81	.56	p < .05	High>Mod
CIP 4	1.66	.58	1.66	.57	1.87	.64	p < .000	High>Mod High>Low
CIP 5	1.89	.57	1.98	.52	2.15	.61	P < .000	High>Mod High>Low

In summary, the analysis of variance (ANOVA) at the 'purpose' of strategy use level is very useful in that it presents an overall picture as to how each variable affects or relates to students' use of strategies in order to achieve both classroom-related and classroom-independent purposes. Table 7.13 below summarises students' frequency of strategy use in order to achieve the classroom-related (CR) and classroom-independent (CI) purposes in association with the five variables for the present investigation, i.e. type of institution, the gender of students, 'perceived' class size, location of institution, and levels of language proficiency. It demonstrates that six purposes of strategy use varied significantly with regards to type of institution, one purpose according to gender, three purposes according to location of institution, and eight purposes were found to vary significantly according to students' levels of language proficiency. No significant variations in use of language learning strategies in order to achieve either classroom-related, or classroom-independent purposes were found according to 'perceived' class size.

Table 7.13: Summary of Significant Variations in Use of Strategies to Achieve the Classroom-Related and Classroom-Independent Purposes by the Five Variables

Independent Variable ⇒	Type of Institution	Gender of Students	Perceived 'Class Size'	Location of Institution	Language Proficiency Level
CRP 1	YES	n.s.	n.s.	n.s.	n.s.
CRP 2	YES	n.s.	n.s.	n.s.	n.s.
CRP 3	YES	n.s.	n.s.	n.s.	YES
CRP 4	n.s.	n.s.	n.s.	n.s.	YES
CRP 5	YES	n.s.	n.s.	n.s.	YES
CRP 6	YES	n.s.	n.s.	n.s.	n.s.
CRP 7	YES	n.s.	n.s.	YES	n.s.
CIP 1	n.s.	n.s.	n.s.	YES	YES
CIP 2	n.s.	n.s.	n.s.	YES	YES
CIP 3	n.s.	n.s.	n.s.	n.s.	YES
CIP 4	n.s.	Yes	n.s.	n.s.	YES
CIP 5	n.s.	n.s.	n.s.	n.s.	YES

Note: A significant variation is specified with 'Yes' and non-significant is labelled with N.S.

7.5. Variation in Use of Individual Learning Strategies

Sections 7.2-4 discussed significant variations in frequency of students' overall strategy use across the entire survey, use of strategies in the two main categories, and use of strategies to achieve the CR and CI purposes. What is presented next are the results of chi-square tests which were employed to determine patterns of the significant variations in students' reported strategy use at the individual strategy item level. These chi-square tests were used to check all of the individual strategy items for significant variations by the five independent variables. To demonstrate a significant variation, the percentage of students in terms of each variable reported high strategy use (3 and 4 in the strategy questionnaire), and the observed chi-square (χ^2) value which shows the

strength of variation in use of each individual strategy were identified. The individual strategies are presented in order of the percentage of students reporting high use (3 or 4 in the strategy questionnaire), ranking from highest to lowest. This makes it easier to see an overall picture of the language learning strategies which are reported to be frequently used, analysed in terms of each of the five variables. The pattern(s) of significant variations of the particular strategy item are included in a brief discussion of each variable.

7.5.1. Variation in Students' Reported Use of Individual Learning Strategies According to Type of Institution

As mentioned before in Sections 7.2., 7.3, and 7.4, significant variations in frequency of students' overall strategy use, use of strategies in the CR category, and six CR purposes, varied according to type of institution. Here the individual learning strategies are considered in terms of variations in frequency of use, as well as pattern of variation of use. The results of chi-square tests reveal that almost half of the learning strategies in this strategy inventory (21 out of 49) varied significantly according to type of institution.

Table 7.14 : Individual Strategies Showing Significant Variation According to Type of Institution

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2 P < .05
	SRU	PRU	RIT	
(Used more by PRU students - 11 strategies)				
SCR2.2 Attend the class regularly in order to keep up with the teacher while studying in the classroom	89.2	96.5	96.4	$\chi^2 = 12.01$ p = .00
SCR2.3 Take notes while studying in class in order to keep up with the teacher	60.6	86.1	82.6	$\chi^2 = 42.81$ p = .00
SCR5.2 Try not to talk with other students in order to avoid being distracted while studying	45.0	67.7	60.9	$\chi^2 = 23.66$ p = .00
SCR5.4 Try not to pay attention to what other students are doing in order to avoid being distracted	37.2	58.2	44.9	$\chi^2 = 19.19$ p = .00
SCR5.3 Sit next to a bright or quiet student in order to avoid being distracted while studying	24.7	57.2	45.7	$\chi^2 = 48.43$ p = .00

Table 7.14 (contd): Individual Strategies Showing Significant Variation According to Type of Institution

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2
	SRU	PRU	RIT	
(Used more by PRU students - 11 strategies)				P < .05
SCR5.1 Try to get a seat in the front row in order to avoid being distracted while studying	26.4	54.2	46.4	$\chi^2 = 36.51$ p = .00
SCR7.3 Join a tutoring group in order to enable one to pass the English test	23.4	47.3	33.3	$\chi^2 = 27.31$ p = .00
SCR1.3 Prepare oneself physically in order to be well-prepared for the lessons	27.3	43.3	34.1	$\chi^2 = 12.02$ p = .01
SCR7.2 Practise tests from different sources in order to enable one to pass the English test	10.4	28.5	14.5	$\chi^2 = 25.41$ p = .00
SCR6.2 Ask the teacher after class in order to solve the problem which one experiences in classroom lessons	15.2	25.9	20.3	$\chi^2 = 7.67$ p = .02
SCR1.2 Try some exercises in advance in order to be well-prepared for the lessons	3.5	9.5	7.2	$\chi^2 = 6.52$ p = .038
(Used more by RIT students - 8 strategies)				P < .05
SCR2.1 Listen to the teacher attentively in order to keep up with the teacher while studying in the classroom	79.2	94.0	94.9	$\chi^2 = 30.56$ p = .00
SCR2.4 Think to oneself along with the teacher while studying in class in order to keep up with the teacher	68.8	82.1	84.1	$\chi^2 = 15.60$ p = .00
SCR4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English	55.8	63.2	71.0	$\chi^2 = 8.60$ p = .01
SCI1.1 Read printed materials in English such as billboards, leaflets, newspapers and magazines in order to expand their knowledge of English vocabulary and expressions	35.5	44.8	53.6	$\chi^2 = 11.90$ p = .01
SCR6.1 Ask the teacher in class either immediately or when appropriate in order to solve the problem which one experiences in classroom lessons	19.9	33.3	39.1	$\chi^2 = 17.84$ p = .00
SCR1.4 Do the revision of the previous lessons in order to well-prepared for the lessons	19.0	26.4	31.2	$\chi^2 = 7.39$ p = .03
SCR3.2 Take part in classroom activities other than asking or answering questions in order to get the teacher's attention in the classroom	15.6	14.4	28.3	$\chi^2 = 12.34$ p = .01
SCR4.6 Use new vocabulary items to converse with peers	4.3	9.5	11.6	$\chi^2 = 7.31$ p = .03

Table 7.14 (contd): Individual Strategies Showing Significant Variation According to Type of Institution

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2
	SRU	PRU	RIT	
(Used more by SRU students - 2 strategies)				P < .05
SCIP5.4 Surf the Internet in order to acquire one's general knowledge in English	43.3	31.8	34.1	$\chi^2 = 6.73$ p = .04
SCIP4.1 Correspond in English by electronic mail (e-mail) or a letter in order to improve one's writing skill	16.5	8.5	8.7	$\chi^2 = 8.27$ p = .02

The results of the chi-square tests in Table 7.14 show significant variations in use of individual learning strategies in terms of type of institution, with a greater percentage of private university students than RIT and SRU students reporting high use of 11 classroom-related strategies. A greater percentage of RIT students than SRU and PRU students reported high use of 8 strategies (7 classroom-related, and 1 out-of-class or classroom-independent strategies), and a greater percentage of SRU students than PRU and RIT students reported high use of 2 out-of-class or classroom-independent strategies. In all, of the 21 strategies for which significant differences were found according to this variable, ten had a high reported frequency of use by more than fifty per cent of the students.

An overall picture of significant variations in strategy use at an individual strategy level is shown in Table 7.14. It appears that a greater percentage of the state university students than PRU or RIT students reported making use of computers in order to improve their writing skill or to acquire their general knowledge of English (SCIP4.1 and SCIP5.4). Although there was a significant variation in use of these two strategies, less than half of the students reported employing them, i.e. 16.5 per cent for improving their writing skill, and 43.3 per cent for acquiring their general knowledge in English. More than half of the private university students reported employing strategies to avoid being

distracted while studying in class. About fifty-four per cent reported trying to get a seat in the front row (SCR P 5.1), 67.7 per cent trying not to talk with other students (SCR P5.2), 57.2 per cent sitting next to a bright or quiet student (SCR P5.3), and 58.2 per cent trying not to pay attention to what other students are doing (SCR P5.4). A percentage of 96.5 of PRU students reported employing SCR P2.1: attend the class regularly, which is significantly more frequently than RIT and SRU students did. Also a percentage of 86.1 of PRU students reported employing SCR P2.3: take notes in order to keep up with the teacher while studying with the teacher in the classroom, while 82.6 per cent of RIT students and 60.6 per cent of SRU students reported employing such a strategy. The results of the chi-square tests also show that the strategies which over half of the RIT students reported employing at a high use level vary, with 94.9 per cent reporting employing SCR P2.2: listen to the teacher attentively, 84.1 per cent reporting employing SCR P2.4: think along the line with the teacher to themselves while studying in order to keep up with the teacher, 71 per cent reporting using SCR P4.5: use a dictionary to learn new vocabulary items in their classroom lessons, and 53.6 per cent trying to improve their vocabulary and English expressions by reading materials in English other than their textbooks (SCIP1.1).

7.5.2. Variation in Students' Reported Use of Individual Learning Strategies According to Gender

The results of ANOVA reported in the previous sections show no significant variations in frequency of students' overall strategy use, use of strategies in the two categories, or use of strategies to achieve the CR and CI purposes, according to gender of students. However, the results of chi-square tests show significant variation in use of three individual learning strategies by this variable.

Table 7.15 : Individual Strategies Showing Significant Variation According to Gender

Individual Learning Strategy	% of high use (3 or 4)		Observed χ^2
	Females	Males	P < .05
(Used more by females students - 3 strategies)			
SCR2.2 Attend the class regularly in order to keep up with the teacher while studying in the classroom	100	92.7	$\chi^2 = 5.04$ p = .03
SCR6.3 Ask a classmate or classmates either in class or outside class in order to solve the problem which one experiences in classroom lesson	87.5	70.2	$\chi^2 = 8.49$ p = .01
SCR4.3 Practise translating from Thai into English in order to improve one's writing skill	34.4	23.3	$\chi^2 = 3.74$ p = .05

Table 7.15 shows that female students reported significantly higher use of two classroom-related and one out-of-class or classroom-independent strategies than their male counterparts. The chi-square results reveal that 100 per cent of female students reported attending class regularly, while 92.7 per cent of male students did. Similarly, 87.5 per cent of females reported employing SCR6.3 - ask classmates for help either in class or after class, while 70.2 per cent of their male counterparts reported high frequency of use of such a strategy. The result of their employment of SCR6.3 shows that female students are likely to rely on their friends more than male students do in terms of helping them out with some problems they face while studying or even after the lessons. Based on the findings, male students did not report higher frequency of use of any learning strategies than female students did. As mentioned earlier, there is a minor but significant difference in strategy use between female and male students.

7.5.3. Variation in Students' Reported Use of Individual Learning Strategies According to 'Perceived' Class Size

The ANOVA results from the first three levels of analysis mentioned earlier do not show any significant variations in frequency of any kind in students' use of strategies in relation to 'perceived' class size. However, at the individual learning strategy level, the

chi-square tests show significant variations in use of three out of forty-nine strategies across the strategy questionnaire according to this variable as evidenced in Table 7.16 below.

Table 7.16 : Individual Strategies Showing Significant Variation According to 'Perceived' Class Size

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2
	Small	Optimum	Large	
(Used more by students perceiving their class size as small -2 strategies)				P < .05
SCR6.1 Ask the teacher in class either immediately or when appropriate	46.8	27.8	27.5	$\chi^2 = 7.58$ p = .02
SCIP2.3 Listen to a radio programme in English in order to improve one's listening skill	29.8	14.5	14.7	$\chi^2 = 7.55$ p = .02
(Used more by students perceiving their class size as optimum -1 strategy)	Small	Optimum	Large	P < .05
SCR5.3 Sit next to a bright or quiet student in order to avoid being distracted while studying	29.8	44.2	34.9	$\chi^2 = 5.87$ p = .05

The chi-square results reveal that significant variations in use of three individual strategies are found in terms of students' perceptions of their class sizes. However, the significant differences which occur in these three strategies were reported at a high level of frequency of use by less than half of the students. That is, almost half of the students who perceived their class size as small reported solving their problems about the lessons by asking their teacher in class immediately or when they think appropriate, while 27.8 per cent of students with optimum class size perception, and 27.5 per cent of those with large class size perception reported doing so. Similarly, only 44.2 per cent of students who perceived their class size as optimum reported managing themselves in terms of avoiding being distracted while studying by sitting next to a bright or quiet student at a high frequency level (SCR5.3). The findings may imply that students' perception of their class sizes did not have much relationship to their choices of strategy use, being either classroom-related or classroom-independent strategies. In other words,

engineering students may deal with their language learning in a more or less similar way, either in class or out of class, irrespective of their perceptions of their class sizes.

7.5.4. Variation in Students' Reported Use of Individual Learning Strategies According to Location of Institution

The chi-square results show significant variations in frequency of use of nine learning strategies according to location of institution. The results of ANOVA presented in the previous sections show significant variations in frequency of students' use of out-of-class or classroom-independent strategies were found to be associated with this variable, with students studying in Bangkok and the metropolitan areas reporting more frequent use of these learning strategies than those studying outside Bangkok. Table 7.17 below demonstrates individual strategies which exhibit significant variation in terms of location of institution.

Table 7.17 : Individual Strategies Showing Significant Variation According to Location of Institution

Individual Learning Strategy	% of high use (3 or 4)		Observed χ^2 P < .05
	Metro-BKK	Regional	
(Used more by students studying in Metro-Bangkok - 8 strategies)			
SCR2.3 Take notes while studying in class in order to keep up with the teacher	79.0	71.2	$\chi^2 = 4.52$ p = .03
SCIP2.1 Watch an English-speaking film in order to improve one's listening skill	72.0	46.5	$\chi^2 = 38.00$ p = .00
SCIP1.3 Watch an English-speaking film in order to expand their knowledge of English vocabulary and expressions	66.4	43.5	$\chi^2 = 30.16$ p = .00
SCIP2.2 Listen to English songs or cassette tapes of English conversations in order to improve one's listening skill	52.4	44.1	$\chi^2 = 3.88$ p = .05
SCR5.3 Sit next to a bright or quiet student in order to avoid being distracted while studying	45.8	37.1	$\chi^2 = 4.37$ p = .04
SCR7.3 Join a tutoring group in order to pass the English test	43.5	25.8	$\chi^2 = 19.98$ p = .00
SCIP2.3 Listen to a radio programme in English in order to improve one's listening skill	21.0	11.0	$\chi^2 = 10.68$ p = .00
SCR4.5 Group new vocabulary items according to their similarity in meanings or spellings	16.2	10.0	$\chi^2 = 4.84$ p = .03

Table 7.17 (contd) : Individual Strategies Showing Significant Variation According to Location of Institution

Individual Learning Strategy	% of high use (3 or 4)		Observed χ^2
(Used more by students studying outside Metro-Bangkok - 1 strategy)	Metro-BKK	Regional	P < .05
SCR4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English	56.5	67.2	$\chi^2 = 7.00$ p = .01

The findings presented in Table 7.17 indicate that students studying in Metro-Bangkok differ from those studying elsewhere in the way that they learn English both inside and outside classroom setting including improving their language skills in general. The results of the chi-square tests show that significant variations in use of nine individual strategies were found in relation to this variable, with a greater percentage of students in Metro-Bangkok reporting high frequency of use of eight strategies (4 classroom-related and 4 out-of-class or classroom-independent strategies) than those studying outside Bangkok. In terms of employing classroom-related strategies, slightly more than three quarters of students in Metro-Bangkok, mainly private university students as revealed in Chapter 3 in the subject distribution, reported a high frequency level of use of SCR2.3 - take notes while studying in class. This strategy also varied significantly according to type of institution, with private university students reporting more frequent use than state university students or RIT students. Further, more than half of the students studying in Metro-Bangkok, while less than half of those studying in the other regions, reported high frequency of use of three strategies. These strategies include SCIP2.1: watch an English-speaking film in order to improve one's listening skill; SCIP1.3: watch an English-speaking film in order to expand their knowledge of English vocabulary and expressions; and SCIP2.2: listen to English songs or cassette tapes of English conversations in order to improve one's listening skill. On the other hand, a greater percentage of students outside Bangkok reported high frequency of use of

SCPP4.2: use a dictionary to check the meaning of a new vocabulary item either in Thai or in English in order to learn new vocabulary items in the classroom lessons.

7.5.5. Variation in Students' Reported Use of Individual Learning Strategies According to Language Proficiency Levels

As mentioned before in Sections 5.2-5.4, frequency in students' overall strategy use, use of out-of-class strategies in the CI category, and use of strategies to achieve 3 classroom-related purposes and out-of-class strategies to achieve 5 classroom-independent purposes, varied significantly according to students' language proficiency levels. Students' use of strategy could be further explored in a more detailed manner at the individual strategy level. With this detailed examination, one could discern the variation in students' use of these individual strategies and what pattern of variation emerges. As suggested in Oxford and Green (1995), it may be positive (used more by higher-proficiency students), negative (used more by lower-proficiency students), or mixed. Examples of stacked bar graphs illustrating the classification by stair-step patterns are provided later to give a clearer picture of these patterns of variation. The chi-square tests show that 22 out of 49 learning strategies across the strategy questionnaire varied significantly according to students' language proficiency levels. When compared with the other four variables, this variable seems to have the strongest relationships with students' choices of strategy use, with a larger proportion of significant variations in students' use of individual strategies across the strategy inventory found to be related to their language proficiency levels. Of the 22 individual strategies showing significant variation, 12 are classified as positive, and the others are classified as mixed. In this investigation, no individual strategies demonstrate a negative pattern of variation. However, what makes the patterns of variation 'mixed' is the inconsistency in reported use of strategies between moderate- and low-proficiency, where in most cases, a greater percentage of

low-proficiency than moderate-proficiency students has reported high frequency of use of most strategies. Table 7.18 presents the 22 individual learning strategies which show significant variations according to students' language proficiency levels.

Table 7.18 : Individual Strategies Showing Significant Variation According to Language Proficiency Levels

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2
	High	Moderate	Low	P < .05
(Used more by high>moderate>low-proficiency students - Positive 12 strategies)				
SCR6.3 Ask a classmate or classmates either in class or outside class in order to solve the problem which one experiences in classroom lesson	78.5	70.1	67.7	$\chi^2 = 6.18$ p = .05
SCIP2.1 Watch an English-speaking film in order to improve one's listening skill	67.5	55.4	52.8	$\chi^2 = 9.37$ p = .01
SCIP1.4 Listen to English songs in order to expand the knowledge of English vocabulary and expressions	63.9	54.9	51.3	$\chi^2 = 6.58$ p = .04
SCIP1.3 Watch an English-speaking film in order to expand the knowledge of English vocabulary and expressions	61.8	51.6	49.7	$\chi^2 = 6.47$ p = .04
SCIP2.2 Listen to English songs or cassette tapes of English conversations in order to improve one's listening skill	58.6	48.4	37.4	$\chi^2 = 17.39$ p = .00
SCIP1.2 Play games in English such as crosswords and computer games in order to expand the knowledge of English vocabulary	46.1	34.8	30.8	$\chi^2 = 10.35$ p = .01
SCIP5.4 Surf the Internet in order to acquire one's general knowledge in English	46.1	34.8	30.3	$\chi^2 = 10.94$ p = .01
SCIP5.3 Read printed materials such as books, textbooks or magazines in English in order to acquire one's general knowledge in English	42.4	30.4	28.2	$\chi^2 = 10.00$ p = .01
SCR3.2 Take part in classroom activities other than asking or answering questions in order to get the teacher's attention	23.6	17.4	13.8	$\chi^2 = 6.23$ p = .04
SCIP2.3 Listen to a radio programme in English in order to improve one's listening skill	21.5	16.8	9.2	$\chi^2 = 11.09$ p = .01
SCIP4.1 Correspond in English by electronic mail (e-mail) or a letter in order to improve one's writing skill	18.8	9.2	7.2	$\chi^2 = 14.32$ p = .00
SCIP3.3 Converse in English with your peers, siblings, or foreigners in order to improve one's speaking skill	14.7	9.2	4.6	$\chi^2 = 11.37$ p = .00

Table 7.18 (contd): Individual Strategies Showing Significant Variation According to Language Proficiency Levels

Individual Learning Strategy	% of high use (3 or 4)			Observed χ^2 P < .05
	High	Low	Moderate	
Mixed: Used more by high>low>moderate-proficiency students - 8 strategies				
SCR4.3 Guess the meaning of a new vocabulary item from the contexts	58.1	39.2	37.0	$\chi^2 = 20.75$ p = .00
SCIP5.1 Seek an opportunity to be exposed to English in order to acquire one's general knowledge in English	41.4	33.8	28.3	$\chi^2 = 7.18$ p = .03
SCR4.4 Look at the root or the form of a new vocabulary item	31.4	22.1	20.1	$\chi^2 = 7.47$ p = .02
SCR6.2 Ask the teacher after class in order to solve the problem which one experiences in classroom lessons	26.2	17.9	16.3	$\chi^2 = 6.59$ p = .04
SCR3.1 Try to have an interaction with the teacher by asking or answering questions while studying in class in order to get the teacher's attention	24.1	13.8	13.0	$\chi^2 = 10.20$ p = .01
SCIP4.2 Practise writing sentences or essays in English in order to improve one's writing skill	17.8	10.3	8.2	$\chi^2 = 9.15$ p = .01
SCR7.4 Attend extra-classes in order to enable one to pass the English test	9.9	3.6	2.2	$\chi^2 = 13.02$ p = .00
SCIP3.5 Go to a language school in order to improve one's speaking skill	5.8	2.1	0.5	$\chi^2 = 9.94$ p = .01
Mixed: Used more by moderate>low>high-proficiency students - 1 strategy				
SCR5.3 Sit next to a bright or quiet student in order to avoid being distracted while studying	48.4	43.1	32.5	$\chi^2 = 10.21$ p = .01
Mixed: (Used more by low>high>moderate-proficiency students - 1 strategy				
SCR7.2 Practise tests from different sources in order to enable one to pass the English test	25.1	15.7	12.0	$\chi^2 = 11.93$ p = .01

The individual learning strategies which are presented in Table 7.18, show two main patterns of strategy use, 12 being classified as positive and 10 as mixed. However, in most cases of the mixed pattern of variation, a greater percentage of high-proficiency students than either moderate- or low-proficiency students has been found. This indicates that high-proficiency students reported greater use of strategy than lower-proficiency students. As shown in Table 7.18, the strategies which show a positive pattern of variation are out-of-class or classroom-independent strategies. This implies that good

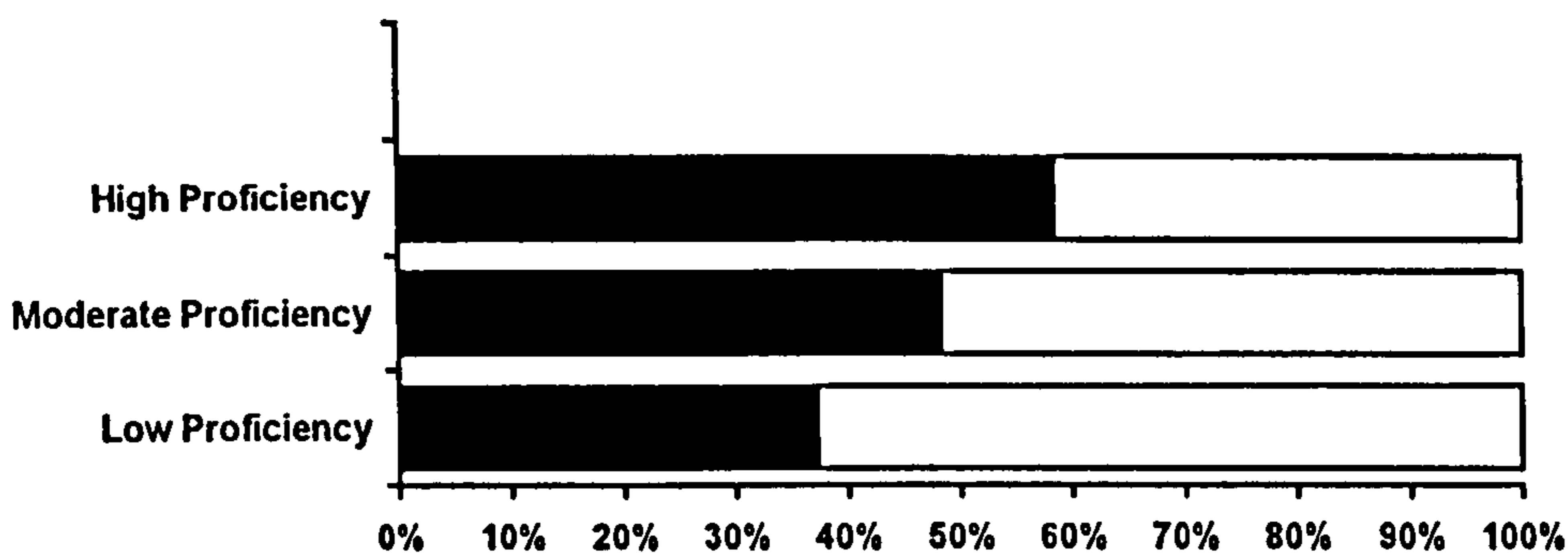
language learners, as high-proficiency students were referred to earlier, reported employing out-of-class or classroom-independent strategies significantly more frequently than did poor language learners. This can be evidenced also in the results of ANOVA which show that students with different language proficiency do show significant differences in frequency of use of out-of-class or classroom-independent strategies. However, high-proficiency students seem to be active and have more confidence while studying in class. This can be evidenced from the strategies they reported employing in participating in classroom activities or when interacting with teachers. When dealing with new vocabulary items, slightly more than half of the high-proficiency students, while about a third of moderate- and low-proficiency students, reported using a context or contextual clue to get the meaning of an unfamiliar word, and about a third of the high-proficiency students, while a fifth of moderate- and low-proficiency students, reported grouping new vocabulary items according to their similarity in meanings or spellings.

If we take a closer look at the employment of out-of-class or classroom-independent strategies, we can see that a greater percentage of good language learners tend to utilise mass media in English than poor language learners do. These mass media include English-speaking films, cassette tapes, radio programmes in English, and television programmes in English. Some good language learners are also keen on using computers (SCIP5.4), and seeking opportunities to expose themselves to English to help improve their language skill (SCIP5.1). When looking at strategies employed among moderate- and low-proficiency students, referred to as poor language learners, we can see that a greater percentage of the moderate-proficiency students reported employing one of the classroom-related strategies significantly more frequently than high- or low-proficiency students in terms of managing themselves in class. They reported trying to avoid being distracted by sitting next to bright or quiet students (SCR5.3). A greater percentage of

the low-proficiency students reported trying to pass the tests by practising tests from different sources significantly more frequently than high- or moderate-proficiency students while some high-proficiency reported attending extra-classes to prepare themselves for the tests. The stacked bar graph in Figure 7.2 demonstrates an example of a positive pattern of variation, and Figures 7.3-7.5 demonstrate examples of a mixed one.

Figure 7.2 : Example of Variation Pattern Classified as Positive (High > Moderate > Low)

SCIP 2.2 Listen to English songs or cassette tapes of English conversations in order to improve one's listening skill



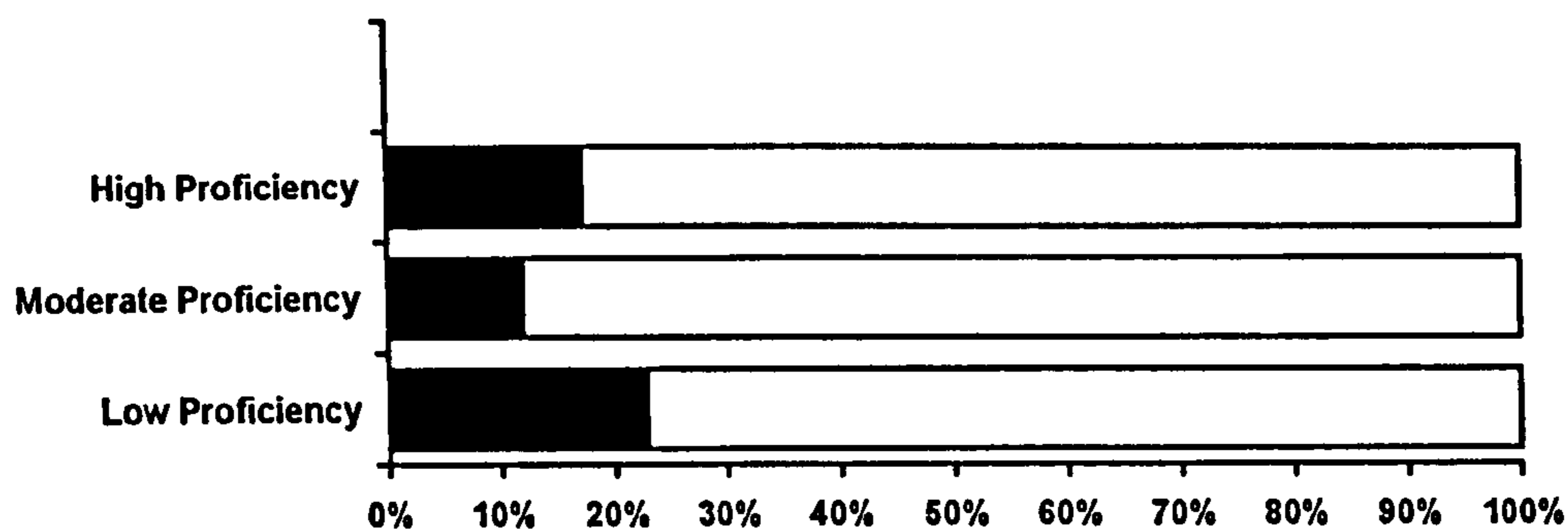
	<u>n</u>	(Darker areas) 'Often' or 'Always or almost always'		(White areas) 'Never' or 'Sometimes'	
		<u>Response</u>	(%)	<u>Response</u>	(%)
High Proficiency	191	112	58.6	79	41.4
Moderate Proficiency	184	89	48.4	95	51.6
Low Proficiency	195	73	37.4	122	62.6

Note: $\chi^2 = 17.39$ (df = 2), $p < .000$

In Figure 7.2. above, 58.6 per cent of high-proficiency students reported high frequency of use of SCIP2.2: listen to English songs or cassette tapes of English conversations in order to improve one's listening skill; whereas, 48.4 and 37.4 per cent of moderate- and low-proficiency students reported high frequency of use of this learning strategy.

Figure 7.3 : Example of Variation Pattern Classified as Mixed (Low > High > Moderate)

SCR7.2 Practise tests from different sources in order to pass the English tests

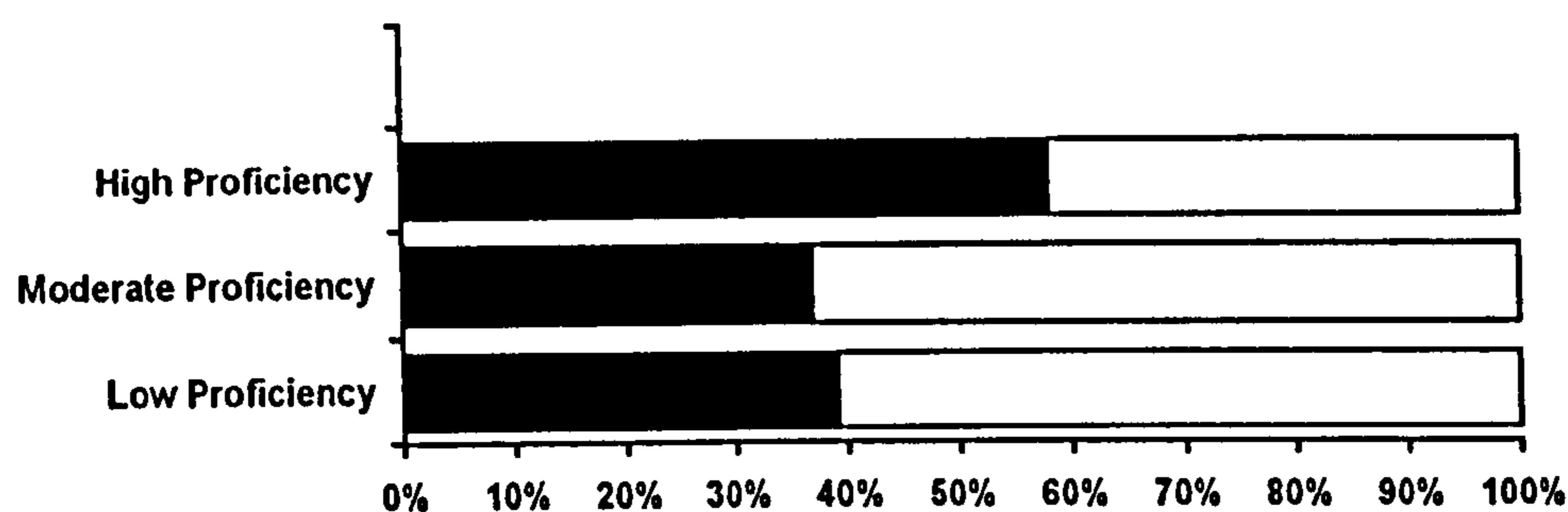


	<u>n</u>	(Darker Areas) 'Often' or 'Always or almost always'		(White areas) 'Never' or 'Sometimes'	
		<u>Response</u>	(%)	<u>Response</u>	(%)
High Proficiency	191	30	15.7	161	84.3
Moderate Proficiency	184	22	12.0	161	88.0
Low Proficiency	195	49	25.1	146	74.9

Note : $\chi^2 = 11.93$ ($df = 2$) $p < .003$

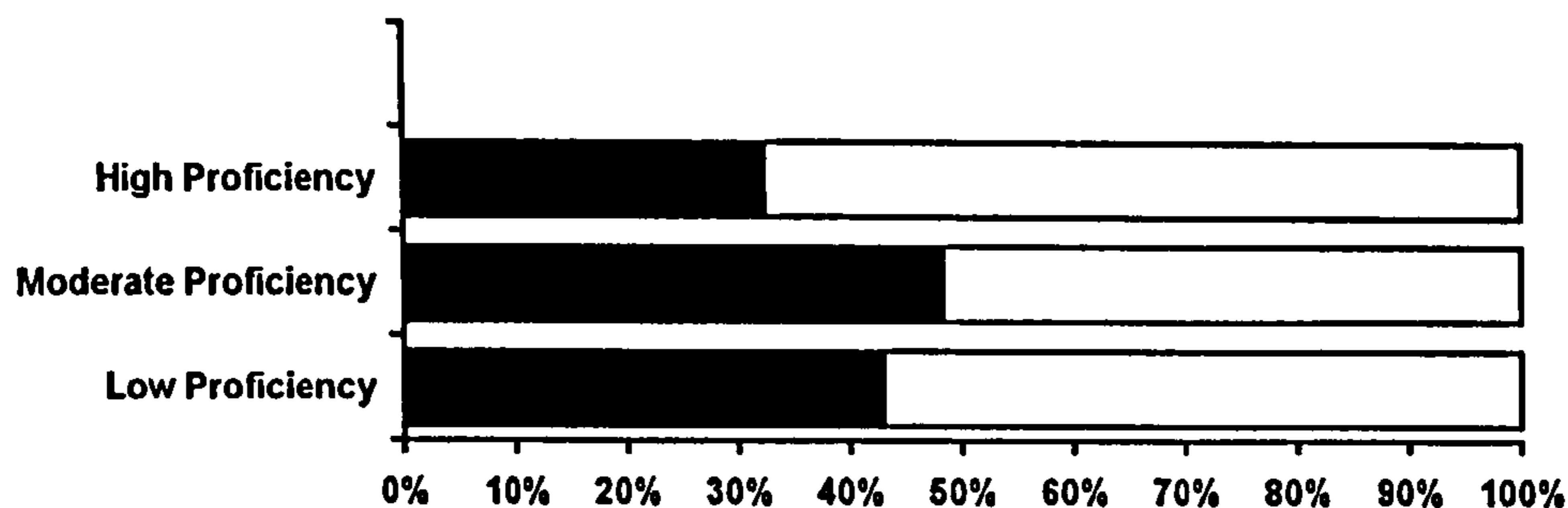
Figure 7.4 : Example of Variation Pattern Classified as Mixed (High > Low > Moderate)

SCR4.3 Guess the meaning of a new vocabulary item from the contexts



	<u>n</u>	(Darker areas) 'Often' or 'Always or almost always'		(White areas) 'Never' or 'Sometimes'	
		<u>Response</u>	(%)	<u>Response</u>	(%)
High Proficiency	191	111	58.1	80	41.9
Moderate Proficiency	184	68	37.0	116	63.0
Low Proficiency	195	76	39.2	118	60.8

Note : $\chi^2 = 20.75$ ($df = 2$) $p < .00$

Figure 7.5 : Example of Variation Pattern Classified as Mixed (Mod > Low > High)**SCRPS.3 Sit next to a bright or quiet student in order to avoid being distracted while studying**

	<u>n</u>	(Darker areas) 'Often' or 'Always or almost always'		(White areas) 'Never' or 'Sometimes'	
		<u>Response</u>	(%)	<u>Response</u>	(%)
High Proficiency	191	62	32.5	129	67.5
Moderate Proficiency	184	89	48.4	95	51.6
Low Proficiency	195	84	43.1	111	56.9

Note : $\chi^2 = 10.21$ ($df = 2$) $p < .006$

As discovered in the previous sections, the results of ANOVA and chi-square tests provide us with a clear picture of significant variations in frequency of use of strategies ranging from students' overall strategy use to their use of individual learning strategies in relation to the five variables. What follow are the results of a factor analysis which will give another perspective of the underlying structure of the language learning strategies in the strategy inventory for the present investigation. They will also provide a strong relationship of each extracted factor to each of the five variables involved in the present investigation.

7.6. Factor Analysis Results

Factor analysis is another approach to allow a researcher to make sense of a large number of correlations between variables, or a complex set of variables, by reducing

them to a smaller number of factors which account for many of the original variables (Seliger and Shohamy, 1990; Robson, 1993; Howitt and Cramer, 1997; 2000). It is particularly appropriate in exploratory research where the researcher aims to impose an orderly simplification upon a number of interrelated measures (Cohen and Manion, 1994). However, Howitt and Cramer, (1997) comment that factor analysis is more subjective and judgmental than most statistical techniques. This is not only because of the subjectivity of interpreting the meaning of factors, but also because there are many variants of factor analysis. For the present investigation, the factor analysis helps the researcher to seek the underlying structure of the whole set of language learning strategies in the strategy inventory. It should be noted that the present factor analysis is intended to be exploratory rather than confirmatory. This is because the researcher does not have a clear idea or pre-assumption about what the factor structure might be.

In seeking the underlying structure of the learning strategies across the strategy inventory, a principal component factor analysis, and then varimax rotation was conducted on the correlations of the thirty-nine language learning strategies, which varied significantly in relation to the five independent variables. Initially, eleven factors were extracted with eigenvalues equal to or greater than 1.00. The eigenvalues or the sums of the squared loadings of the extracted eleven factors are presented in Table 7.19.

Table 7.19: The Sums of the Squared Factor Loadings of the Initial Eleven Factors

Factor	Extraction Sums of Squared Loadings (Eigenvalues)		
	Total	% of Variance	Cumulative %
1	9.890	25.358	25.358
2	3.639	9.332	34.689
3	2.023	5.186	39.876
4	1.672	4.286	44.162
5	1.583	4.059	48.221
6	1.425	3.654	51.875
7	1.397	3.583	55.457
8	1.213	3.109	58.567
9	1.131	2.900	61.467
10	1.052	2.698	64.165
11	1.009	2.588	66.753

When taken together, these eleven factors accounted for 66.75 % of the variability among 39 language learning strategies which were found to vary significantly in relation to the five variables as mentioned above. In fact, there could be as many factors as variables which a researcher started off with and this makes it difficult to interpret. Instead of making use of the initial eleven extracted factors, the researcher decided to explore further by reducing the number of factors to five and seven. The results of the varimax rotation show slightly different groupings of strategies between five and seven factors. Having also taken the factor interpretation into consideration, the researcher found that it would be more straightforward to interpret the extracted five factors rather than seven factors. Both are slightly different in terms of internal relationship among the strategies emerging under the same factors. The percentage of variance in Table 7.19 suggests that almost 50 per cent of the total variation between the frequency of strategy use can be explained by the first five principal components. In other words, the 48.22 per cent figure means that slightly more than half of the variability was not explained by the five factors, so other influences may also make a difference in strategy use. Then, the individual language learning strategies were ordered or sorted according to their loading on the first factor. The factor loadings indicate the level of correlation between the factors and the different variables used in the analysis (Seliger and Shohamy, 1990). The language learning strategies which have the highest loadings with the first factor, are used to define the factor, i.e. the language learning strategies which are highly loaded are grouped together in order of their loading on the first factor. According to Howitt and Cramer (1997), this grouping helps interpretation of the factor since the high loading strategy items are the ones which primarily help a researcher to decide what factor they might be. Further, with factor analysis, differences in interpretation may occur. This means different researchers may describe differently the factors which emerge.

The language learning strategies as identified in the strategy inventory and the five factors resulting from the factor analysis were not expected to be identical, but they were expected to be mutually supportive.

In this present investigation, each factor is described in terms of the content or the relationship of the majority of the language learning strategy items which appear under the same factor. The five extracted factors, the factor loadings on each strategy item, and the percentage of variance accounted for by each factor are presented in Table 7.20 below.

Table 7.20 : List of the Five Extracted Factors

Factor 1 : Strategies for out-of-class language improvement through English media utilisation	Factor Loading	% of variance
SCIP 1.3 Watch an English-speaking film to expand their knowledge of English vocabulary and expressions	.83	25.36
SCIP 2.1 Watch an English-speaking film to improve their listening skill	.80	
SCIP 1.4 Listen to English songs to expand their knowledge of English vocabulary and expressions	.78	
SCIP 2.2 Listen to English songs or cassette tapes of English conversations to improve their listening skill	.72	
SCIP 1.2 Play games in English such as crosswords and computer games to expand their knowledge of English vocabulary and expressions	.57	
SCIP 1.1 Read printed materials in English such as billboards, leaflets, newspapers and magazines to expand their knowledge of English vocabulary and expressions	.53	
SCIP 2.3 Listen to a radio programme in English to improve their listening skill	.53	
SCIP 5.4 Surf the Internet to acquire general knowledge in English	.48	
SCIP 5.3 Read printed materials such as books, textbooks or magazines in English to acquire general knowledge in English	.47	
SCIP 4.1 Correspond in English by electronic mail (e-mail) or by a letter to improve their writing skill	.41	
Factor 2 Strategies for the productive classroom learning process		
SCRP 4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English to learn new vocabulary	.60	9.33
SCRP 2.4 Think to oneself along with the teacher to keep up with the teacher	.58	
SCRP 4.3 Guess the meaning of a new vocabulary item from the context	.57	
SCRP 4.4 Look at the root or the form of a new vocabulary item	.57	
SCRP 2.1 Listen to the teacher attentively to keep up with the teacher	.56	
SCRP 2.2 Attend the class regularly to keep up with the teacher	.56	
SCRP 4.5 Group new vocabulary items according to their similarity in meanings or spellings	.52	
SCRP 2.3 Take notes while studying in class with the teacher	.47	
SCRP 6.3 Ask a classmate or classmates either in class or outside class to solve the problems which they experience in the classroom	.46	
	.35	

Table 7.20 (contd) : List of the Five Extracted Factors

Factor 3 Strategies for avoiding distraction	Factor Loading	% of variance
SCRP 5.2 Try not to talk with other students while studying to avoid being distracted	.80	5.17
SCRP 5.4 Try not to pay attention to what other students are doing while studying to avoid being distracted	.77	
SCRP 5.3 Sit next to a bright or quiet student to avoid being distracted while studying	.75	
SCRP 5.1 Try to get a seat in the front row to avoid being distracted while studying	.70	
Factor 4 Strategies for language skills practice and improvement		
SCIP 3.5 Go to a private language school to improve their speaking skill	.62	4.29
SCRP 7.4 Attend extra classes at a private school to pass the English examinations	.61	
SCIP 4.2 Practise writing sentences or essays in English to improve their writing skill	.56	
SCIP 4.3 Practise translating from Thai into English to improve their writing skill	.50	
SCRP 7.2 Practise tests from different sources to pass the English examinations	.46	
SCIP 5.1 Seek an opportunity to be exposed to English to acquire general knowledge in English	.45	
SCRP 6.2 Ask the teacher after class to solve the problems which they experience in the classroom	.44	
SCRP 4.6 Use new vocabulary items to converse with peers to learn new vocabulary in the classroom lessons	.40	
SCIP 3.3 Converse in English with peers, siblings or foreigners to improve their speaking skill	.39	
Factor 5 Strategies for active classroom learning and lesson preparation in advance		
SCRP 3.1 Try to have an interaction with the teacher by asking or answering questions while studying in class to get the teacher's attention in the classroom	.77	4.06
SCRP 3.2 Take part in classroom activities other than asking or answering questions to get the teacher's attention in the classroom	.76	
SCRP 1.4 Do revision of the previous lessons to be well-prepared for the classroom lessons	.61	
SCRP 1.2 Try some exercises in advance to be well-prepared for the classroom lessons	.60	
SCRP 1.3 Prepare oneself physically to be well-prepared for the classroom lessons	.60	
SCRP 6.1 Ask the teacher in class either immediately or when appropriate to solve the problems which they experience in the classroom	.41	
SCRP 7.3 Join a tutoring group to pass the English examinations	.28	

Table 7.20 provides the detail of the five extracted factors as the results of a factor analysis, i.e. varimax rotation. It shows that:

- Factor 1, which is termed 'Strategies for out-of-class language improvement through English media utilisation' accounted for 25.36 per cent of the variance among the language learning strategies in the strategy questionnaire for the present investigation. It comprises ten of the out-of-class or classroom-independent strategies which involve using English media such as English-speaking films, television or radio programmes in English, computer programmes, or printed materials in English.
- Factor 2, 'Strategies for the productive classroom learning process' accounted for 9.33 per cent of the whole strategy variance. It comprises nine of the classroom-related strategies which involve learning new vocabulary items in classroom lessons, keeping up with the teacher while studying in class, and solving problems which students experience in class.
- Factor 3, 'Strategies for avoiding distraction', accounted for 5.19 per cent of the variance of the strategy items. This factor comprises four classroom-related strategies which students reported employing in order to avoid being distracted while studying.
- Factor 4 which is termed 'Strategies for language skills practice and improvement', accounted for 4.29 per cent of the variance of the strategy items. This factor comprises four classroom-related strategies, and five out-of-class or classroom-independent strategies which students reported employing the former in order to enhance their classroom learning as well as, the latter in order to practise and improve their language skills.
- Factor 5 which is termed 'Strategies for active classroom learning and lesson preparation in advance', accounted for 4.06 per cent of the variance of the strategy items. This factor comprises seven classroom-related strategies reported to be employed by students in order to be well-prepared for classroom lessons, get the teacher's attention, and pass the English examinations.

As can be seen above, the underlying factors of the language learning strategies, the percentage of variance of each factor, and the factor loading for each strategy item have been identified. The next task is to examine which of these factors are strongly related to each of the five variables in the present investigation.

In determining such a relationship, factors which are strongly related to a particular variable are emphasised. For the purpose of the discussions of the factor analysis results in the following section, the criteria for strong relation between the factors and each of the variables suggested by Seliger and Shohamy (1990) are adopted, i.e. a factor is said to be strongly related to a variable if half or more of the learning strategies in that particular factor have a loading of .50 or more, showing a significant variation in relation to that variable. In the present investigation, the results of the varimax rotation show that three extracted factors were found to be strongly related to type of institution, and two were found to be strongly related to students' language proficiency levels.

7.6.1. Factors Strongly Related to 'Type of Institution'

As reported in the previous sections, the ANOVA results show significant variations in frequency of strategy use of classroom-related strategies analysed according to this variable. Similarly, the results of the factor analysis reveal that three factors (Factors 2, 3, and 5) which were found to be strongly related to type of institution, are dealing with the students' employment of classroom-related strategies. The results of the factor analysis have confirmed the ANOVA results in terms of variations in students' reported use of classroom-related strategies as presented earlier. The three factors which were found to be strongly related to type of institution are presented in Table 7.21 below.

Table 7.21 : Factors Strongly Related to 'Type of Institution'

Factor 2 Strategies for the productive classroom learning process	Factor Loading	Comment
SCRP 4.2 Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English to learn new vocabulary in the classroom lessons	.60	RIT>PRU>SRU
SCRP 2.4 Think to oneself along with the teacher while studying in class to keep up with the teacher while studying in the classroom	.58	RIT>PRU>SRU
SCRP 4.3 Guess the meaning of a new vocabulary item from the context to learn new vocabulary in the classroom lessons	.57	N.S.
SCRP 4.4 Look at the root or the form of a new vocabulary item to learn new vocabulary in the classroom lessons	.57	N.S.
SCRP 2.1 Listen to the teacher attentively to keep up with the teacher while studying in the classroom	.56	RIT>PRU>SRU
SCRP 2.2 Attend the class regularly to keep up with the teacher while studying in the classroom	.52	PRU>RIT>SRU
SCRP 4.5 Group new vocabulary items according to their similarity in meanings or spellings to learn new vocabulary in the classroom lessons	.47	N.S.
SCRP 2.3 Take notes while studying in class with the teacher to keep up with the teacher while studying in the classroom	.46	PRU>RIT>SRU
SCRP 6.3 Ask a classmate or classmates either in class or outside class to solve the problems which they experience in the classroom	.35	N.S.
Factor 3 Strategies for avoiding distraction		
SCRP 5.2 Try not to talk with other students while studying	.80	PRU>RIT>SRU
SCRP 5.4 Try not to pay attention to what other students are doing while studying	.77	PRU>RIT>SRU
SCRP 5.3 Sit next to a bright or quiet student	.75	PRU>RIT>SRU
SCRP 5.1 Try to get a seat in the front row	.70	PRU>RIT>SRU
Factor 5 Strategies for active classroom learning and lesson preparation in advance		
SCRP 3.1 Try to have an interaction with the teacher by asking or answering questions while studying in class to get the teacher's attention in the classroom	.77	N.S.
SCRP 3.2 Take part in classroom activities other than asking or answering questions to get the teacher's attention in the classroom	.76	RIT>PRU>SRU
SCRP 1.4 Do revision of the previous lessons to be well-prepared for the classroom lessons	.61	RIT>PRU>SRU
SCRP 1.2 Try some exercises in advance to be well-prepared for the classroom lessons	.60	PRU>RIT>SRU
SCRP 1.3 Prepare oneself physically to be well-prepared for the classroom lessons	.60	PRU>RIT>SRU
SCRP 6.1 Ask the teacher in class either immediately or when appropriate to solve the problems which they experience in the classroom	.41	RIT>PRU>SRU
SCRP 7.3 Join a tutoring group to pass the English examinations	.28	PRU>RIT>SRU

Notes: PRU>RIT>SRU means private university students reported using that particular strategy significantly more frequently than RIT or state university students; and RIT>PRU>SRU means students studying at Rajamangala Institutes of Technology reported using that particular strategy significantly more frequently than private or state university students did.

7.6.2. Factors Strongly Related to Students' Language Proficiency Levels

Table 7.22 below shows the two factors which were found to be strongly related to students' language proficiency levels. These are Factors 1 and 4. The results of the factor analysis have confirmed the ANOVA results, showing significant variations in students' reported use of out-of-class or classroom-independent strategies in most cases in association with their language proficiency levels. Similarly, the two factors which were found to be strongly related to this variable involve students' employment of out-of-class or classroom-independent strategies rather than classroom-related strategies. The relationship between the two factors and students' language proficiency levels is presented in Table 7.22 below.

Table 7.22 : Factors Strongly Related to Students' Language Proficiency Levels

Factor 1 : Strategies for out-of-class language improvement through English media utilisation	Factor Loading	Variation by Proficiency Levels
SCIP 1.3 Watch an English-speaking film to expand their knowledge of English vocabulary and expressions	.83	Positive
SCIP 2.1 Watch an English-speaking film to improve their listening skill	.80	Positive
SCIP 1.4 Listen to English songs to expand their knowledge of English vocabulary and expressions	.78	Positive
SCIP 2.2 Listen to English songs or cassette tapes of English conversations to improve their listening skill	.72	Positive
SCIP 1.2 Play games in English such as crosswords and computer games to expand their knowledge of English vocabulary and expressions	.57	Positive
SCIP 1.1 Read printed materials in English such as billboards, leaflets, newspapers and magazines to expand their knowledge of English vocabulary and expressions	.53	N.S.
SCIP 2.3 Listen to a radio programme in English to improve their listening skill	.53	Positive
SCIP 5.4 Surf the Internet to acquire general knowledge in English	.48	Positive
SCIP 5.3 Read printed materials such as books, textbooks or magazines in English to acquire general knowledge in English	.47	Positive
SCIP 4.1 Correspond in English by electronic mail (e-mail) or by a letter to improve their writing skill	.41	Positive

Note: Positive means that particular strategy was reported to be used significantly more frequently by high-proficiency students than moderate- and low-proficiency students; Mixed means low-proficiency students reported employing that particular strategy significantly more frequently than either high- or moderate-proficiency students did; N.S. means no statistical significance was found in use of that particular strategy.

Table 7.22 (contd): Factors Strongly Related to Students' Language Proficiency Levels

Factor 4 Strategies for language skills practice and improvement	Factor Loading	Variation by Proficiency Levels
SCIP 3.5 Go to a private language school to improve their speaking skill	.62	Mixed
SCRP 7.4 Attend extra classes at a private school to pass the English examinations	.61	Mixed
SCIP 4.2 Practise writing sentences or essays in English to improve their writing skill	.56	Mixed
SCIP 4.3 Practise translating from Thai into English to improve their writing skill	.50	N.S.
SCRP 7.2 Practise tests from different sources to pass the English examinations	.46	Mixed
SCIP 5.1 Seek an opportunity to be exposed to English to acquire general knowledge in English	.45	Mixed
SCRP 6.2 Ask the teacher after class to solve the problems which they experience in the classroom	.44	Mixed
SCRP 4.6 Use new vocabulary items to converse with peers to learn new vocabulary in the classroom lessons	.40	N.S.
SCIP 3.3 Converse in English with peers, siblings or foreigners to improve their speaking skill	.39	Positive

In conclusion, five factors were extracted as the results of a factor analysis. Factors 2, 3, and 5 were found to be strongly related to type of institution. Factors 1 and 4 were found to be strongly related to students' language proficiency levels. No factors were found to be strongly related to gender of students, 'perceived' class size or location of institution. Table 7.23 below summarises the strong relationship between the factors and the variables for the present investigation.

Table 7.23 : Summary of Factors Strongly Related to Different Variables

Extracted Factor	Type of Institution	Gender	Perceived Class Size	Location of Institution	Proficiency Level
1: Using media	no	no	no	no	YES
2: Productive learning	YES	no	no	no	no
3: Avoiding distraction	YES	no	no	no	no
4: Skills practice	no	no	no	no	YES
5: Advance preparation	YES	no	no	no	no

7.7. Summary

In this chapter, the researcher has systematically examined variations in frequency of students' overall reported strategy use, use of strategies in the two main categories, use of learning strategies for classroom-related and classroom-independent purposes, and use of individual learning strategies by five independent variables, namely, type of institution, gender of students, 'perceived' class size, location of institution, and language proficiency levels. Data were collected through the use of the language learning strategy questionnaire which investigates the twelve purposes of strategy use and a total of 49 individual language learning strategies. Analysis of variance, chi-square tests and a factor analysis were the three forms of analysis carried out on the data.

The research findings and discussions presented in this chapter have demonstrated or implied a number of points which are listed below. The researcher believes that each focal point of discussion will contribute to our understanding about learning strategies in a new perspective, as well as the relationships between the use of language learning strategies at different levels and the factors which are the main focus for the present investigation. The main points can be summarised as follows.

- Significant variations in frequency of students' overall strategy use were found in relation to type of institution and language proficiency levels. In terms of type of institution, private university students reported more frequent overall use of strategies than RIT and state university students. In terms of language proficiency levels, high-proficiency students, referred to as good language learners, reported more frequent overall strategy use than moderate- or low-proficiency students, referred to as poor language learners. Significant variations were not found in relation to gender of students, 'perceived' class size or location of institution.

- Significant variations in frequency of use of classroom-related strategies were found in relation to type of institution, with private university students reporting more frequent use of these strategies than RIT and state university students. These significant variations were not found in relation to gender of students, 'perceived' class size, location of institution or language proficiency levels.
- Significant variations in frequency of use of out-of-class or classroom-independent strategies, were found in relation to location of institution, and language proficiency levels. In terms of location of institution, students studying in Bangkok and the metropolitan areas reported more frequent use of these strategies than those studying outside Metro-Bangkok. In respect of language proficiency levels, good language learners reported more frequent use of these strategies than poor language learners did. These significant variations were not found in relation to type of institution, gender of students, and 'perceived' class size.
- In respect of purposes of strategy use, significant variations in frequency of use of learning strategies to achieve classroom-related and classroom-independent purposes were found in relation to type of institution, gender of students, location of institution and language proficiency levels.
- In respect of type of institution, students studying at different types of institution reported using strategies to achieve most of the classroom-related purposes including to be well-prepared for the classroom lessons; to keep up with the teacher while studying in the classroom; to get the teacher's attention in the classroom; to avoid being distracted while studying in the classroom; to solve the problems which they experience in classroom lessons; and to pass the English tests.
- In respect of the gender of students, female and male students differ in using out-of-class strategies to improve their writing skill.

- Students studying in Metro-Bangkok and those studying outside Bangkok differ in using classroom-related strategies to pass the English tests, and out-of-class strategies to expand their knowledge of English vocabulary and expressions; and to improve their listening skill.
- Good and poor language learners reported using strategies to achieve three classroom-related purposes and out-of-class strategies to achieve all of the five classroom-independent purposes differently. The classroom-related purposes include to get the teacher's attention in the classroom; to learn new vocabulary items in the classroom lessons; and to avoid being distracted while studying in the classroom.
- No significant variations in frequency of use of either classroom-related strategies or out-of-class strategies to achieve any language learning purposes were found in relation to 'perceived' class size.
- Among the five variables in the present investigation, gender of students and 'perceived' class size do not appear to have much relationship to students' frequency of use of learning strategies.
- Based on the results of ANOVA, private university students appear to be the most active strategy users, while RIT students are moderate users, and state university students are the least active strategy users.
- Students studying at different types of institution in Metro-Bangkok are not different in terms of using out-of-class or classroom-independent strategies, but they are different in the way they deal with language learning in class. This is evidenced in significant variation in frequency of use of classroom-related strategies.
- There is a minor but significant difference between female and male students in use of strategies, with female students reporting more frequent use of three learning strategies than male students. These individual strategies include attend the class

regularly; ask friends either inside or outside class to solve classroom problems; and practise translating from Thai into English.

- High-proficiency students reported more frequent use of out-of-class or classroom-independent strategies than did moderate- or low-proficiency students. Generally, they did not differ in terms of their employment of classroom-related strategies.
- State university students, though least active in strategy use, reported making more use of computers in improving their language skills than did RIT and private university students, while RIT students focus more on reading printed materials, and private university students rely on mass media for their language improvement.
- Five factors (Factor 1-Factor 5) were extracted as the results of factor analysis. The results of the factor analysis provide parallel evidence to the findings obtained through the different levels of an analysis of variance. Generally speaking, the results of the factor analysis demonstrate that type of institution, and language proficiency levels show greater relationship to students' use of learning strategies than do the gender of students, 'perceived' class size, and location of institution.
- Factor 2 'Strategies for the productive learning process'; Factor 3 'Strategies for avoiding distraction'; and Factor 5 'Strategies for active classroom learning and lesson preparation in advance', were found to be strongly related to type of institution.
- Factor 1 'Strategies for out-of-class language improvement through English media utilisation', and Factor 4 'Strategies for language skills practice', were found to be strongly related to students' language proficiency levels.
- No factors were found to be strongly related to gender of students, 'perceived' class size or location of institution.

The research findings for the present investigation have provided the researcher with useful information for another perspective of research into the field of language learning strategy. Chapter 8, which is the last chapter of the thesis, summarises the research findings in response to the research questions posed in Chapter 3, the contributions of the present investigation, the implications, as well as limitations of the present investigation and proposals for future research.

CHAPTER 8

SUMMARY OF THE FINDINGS, PROPOSALS FOR FUTURE RESEARCH, AND IMPLICATIONS FOR TEACHING AND LEARNING ENGLISH FOR ENGINEERING STUDENTS IN THAILAND

CHAPTER EIGHT

SUMMARY OF THE FINDINGS, PROPOSALS FOR FUTURE RESEARCH, AND IMPLICATIONS FOR TEACHING AND LEARNING ENGLISH FOR ENGINEERING STUDENTS IN THAILAND

8.1. Introduction and Purpose of the Chapter

The main purpose of this last chapter is to present the principal findings of the present investigation in response to research questions 1 to 8 presented earlier in Chapter 3. This is followed by a discussion of the implications arising from the research for the teaching and learning of English for engineering students in Thailand. Then, the contributions of the present investigation to related areas are considered. Finally, the limitations of the present investigation and proposals for future research are presented.

In Chapters 6 and 7, the researcher has systematically attempted to identify types of language learning strategies and the reported frequency of use of these language learning strategies by 570 engineering students learning English at the tertiary level in Thailand obtained through a strategy questionnaire. Chapter 7 considers significant variations in strategy use, specifically the relationships between students' reported frequency of use of language learning strategies and different independent variables, i.e. type of institution, gender of students, 'perceived' class size, location of institution, and students' language proficiency levels. Arising out of the language learning strategy questionnaire for the present investigation are significant findings in students' frequency of strategy use. In order to help the reader to understand certain patterns of significant variations in strategy use, as well as other apparent significant differences in association with each variable which were presented in Chapter 7, the researcher will suggest reasons for them in the subsequent discussion section (Section 8.3).

8.2. Summary of the Research Findings

The present investigation has reported on the research findings of students' reported language learning strategy use. These findings also form responses to the research questions and are discussed further below.

8.2.1. 'What are the types of language learning strategies reported being employed by engineering students learning English at the tertiary level in Thailand?' (Research Question 1)

In response to the first research question, the research findings demonstrate that a total of 49 individual language learning strategies were reported by engineering students. These 49 language learning strategies were primarily classified according to the purposes for which they were employed. As a result, 12 purposes of strategy use emerged and these purposes were further grouped into two main categories, which are Category 1: Classroom-Related Category (CR), comprising seven purposes (CRP) and twenty-nine individual learning strategies (SCRP); and Category 2: Classroom-Independent Category (CI) comprising five purposes (CIP) and twenty individual learning strategies (SCIP). What follows is the strategy inventory for the present investigation:

1. Classroom-Related Category

CRP 1: To be well-prepared for the lessons

- SCRP1.1. Study the lessons beforehand such as the subject content or the objective of each lesson
- SCRP1.2. Try some exercises in advance
- SCRP1.3. Prepare oneself physically
- SCRP1.4. Do the revision of the previous lessons

CRP 2: To keep up with the teacher while studying in class

- SCRP 2.1. Listen to the teacher attentively
- SCRP 2.2. Attend the class
- SCRP 2.3. Take notes while studying in class with the teacher
- SCRP 2.4. Think to oneself along the line with the teacher

CRP 3: To get the teacher's attention in the classroom

- SCRP 3.1. Try to have an interaction with the teacher by asking or answering questions while studying in class
- SCRP 3.2. Take part in classroom activities other than asking or answering questions
- SCRP 3.3. Try to have an interaction with the teacher outside the class time so that the teacher will pay attention to one in the class

CRP 4: To learn new vocabulary for the classroom lessons

SCRP 4.1. Memorise new vocabulary items with or without the vocabulary lists

SCRP 4.2. Use a dictionary to check the meaning of a new vocabulary item either in Thai or in English

SCRP 4.3. Guess the meaning of a new vocabulary item from the contexts

SCRP 4.4. Look at the root or the form of a new vocabulary item

SCRP 4.5. Group new vocabulary items according to their similarity in meanings or spellings

SCRP 4.6. Use new vocabulary items to converse with peers

CRP 5: To avoid being distracted while studying

SCRP 5.1. Try to get a seat in the front row

SCRP 5.2. Try not to talk with other students while studying

SCRP 5.3. Sit next to a bright or quiet student

SCRP 5.4. Try not to pay attention to what other students are doing while studying

CRP 6: To solve problems encountered in the classroom lessons

SCRP 6.1. Ask the teacher in class either immediately or when appropriate

SCRP 6.2. Ask the teacher after class

SCRP 6.3. Ask a classmate or classmates either in class or outside class

SCRP 6.4. Ask people other than one's regular teacher or classmates

CRP 7: To pass the English tests

SCRP 7.1. Do the revision of the lessons only for the examination

SCRP 7.2. Practise tests from different sources

SCRP 7.3. Join a tutoring group

SCRP 7.4. Attend extra-classes

2. Classroom-Independent Category**CIP1: To expand one's knowledge of English vocabulary and expressions**

SCIP1.1. Read printed materials in English such as billboards, leaflets, newspapers and magazines

SCIP1.2. Play games in English such as crosswords and computer games

SCIP1.3. Watch an English-speaking film

SCIP1.4. Listen to English songs

CIP2: To improve one's listening skill

SCIP2.1. Watch an English-speaking film

SCIP2.2. Listen to English songs or cassette tapes of English conversations

SCIP2.3. Listen to a radio programme in English

SCIP2.4. Watch TV programmes in English

CIP3: To improve one's speaking skill

SCIP3.1. Talk to oneself

SCIP3.2. Try to imitate a native speaker from media such as films or cassette tapes

SCIP3.3. Converse in English with peers, siblings, or foreigners

SCIP3.4. Use a computer programme like a 'chat' programme

SCIP3.5. Go to a language school

CIP4: To improve one's writing skill

SCIP4.1. Correspond in English by electronic mail (e-mail) or a letter

SCIP4.2. Practise writing sentences or essays in English

SCIP4.3. Practise translating from Thai into English

CIP5: To acquire one's general knowledge in English

SCIP5.1. Seek an opportunity to be exposed to English

SCIP5.2. Go to a language school

SCIP5.3. Read printed materials such as books, textbooks or magazines in English

SCIP5.4. Surf the Internet

8.2.2. 'What is the level of frequency of use of these language learning strategies reported by these students?' (Research Question 2)

In response to the second research question, the research findings reveal that the students' reported overall use of these language learning strategies based on the holistic mean score is of medium frequency according to the measure explained in Chapter 6 (Section 6.2). The mean frequency score was 2.14. There is a similar frequency of use of the strategies in the classroom-related and classroom-independent categories. The mean frequency scores were 2.21, and 2.05 respectively. When the reported frequency of use of strategies to achieve both classroom-related and classroom-independent purposes was determined, it was found that students reported high frequency of use of strategies to achieve classroom-related purpose CRP 2, which is to keep up with the teacher while studying. The mean frequency score was 3.25. Students reported medium frequency of use of strategies to achieve four classroom-related and three classroom-independent purposes. The four classroom-related purposes include CRP 4, which is to learn new vocabulary items in classroom lessons; CRP 5: to avoid being distracted while studying; CRP 6: to solve problems encountered in classroom lessons; and CRP 7: to pass the examinations. The three classroom-independent purposes include CIP1, which is to expand English vocabulary and expressions; CIP2: to improve their listening skill; and CIP5: to acquire general knowledge in English. Lastly, students reported low frequency of use of strategies to achieve two classroom-related and two classroom-independent purposes. The two classroom-related purposes include CRP1, which is to be well-prepared for classroom lessons; and CRP3: to get the teacher's attention while in class. The mean frequency scores were 1.76 and 1.53 respectively. The two classroom-independent purposes include CIP4: to improve their writing skill ; and CIP3: to improve their speaking skill. The mean frequency scores were 1.74, and 1.73 respectively.

At the individual strategy level, it was found that students reported high frequency of use of four individual classroom-related strategies, which are: SCRP2.2: 'attend the class regularly', which was reported more frequently than any other individual strategy. The reported mean frequency score was 3.65. This is followed by SCRP2.1: 'listen to the teacher attentively'; SCRP 2.3: 'take notes while studying in class'; and SCRP7.1: 'do the revision especially for the examinations'. The mean frequency scores were 3.26, 3.07, and 3.06 respectively. Students reported medium frequency of use of 23 individual strategies, and low frequency of use of 22 individual strategies. The four individual strategies which were found to be reported less frequently than any other strategy are SCRP3.3: 'try to have an interaction with teacher outside the class time'; SCRP7.4: 'attend extra-classes to pass the examinations'; SCIP5.2: 'go to a language school to acquire general knowledge in English'; and SCIP3.5: 'go to a language school to improve their speaking skill'. The mean frequency scores were 1.37, 1.36, 1.34, and 1.26 respectively.

8.2.3. Do students' choices of language learning strategies vary significantly according to the type of institution at which they study? If they do, what are the main patterns of variation? (Research Question 3)

In response to the third research question, an attempt to examine variation in use of language learning strategies as well as patterns of variation has been made and was reported in Chapter 7. As found in the strategy questionnaire responded to by 570 engineering students learning English at the tertiary level in Thailand, the findings at the four different levels of data analysis and the results of a factor analysis in relation to type of institution can be summarised as follows:

- **Overall Strategy Use**

The results of ANOVA showed that there was significant variation in students' reported overall strategy use in relation to type of institution. The post hoc Scheffe Test

results showed that students studying at private universities and Rajamangala Institutes of Technology reported more frequent overall strategy use than those studying at state universities. No significant variations in the overall strategy use were found between students studying at private universities and Rajamangala Institutes of Technology.

- **Use of Strategies in the Classroom-Related and Classroom-Independent Categories**

The results of ANOVA showed that significant variations in use of the classroom-related strategies in the CR category were found in relation to this variable, but they were not found in use of the out-of-class strategies in the CI category.

The results of the post hoc Scheffe Test showed that significant variations in use of the classroom-related strategies in the CR category were found, indicating that the students studying at private universities and Rajamangala Institutes of Technology reported more frequent use of strategies in this category than those studying at state universities. No significant variations in use of such strategies were found between students studying at private universities and those studying at Rajamangala Institutes of Technology.

- **Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes**

The ANOVA results showed that significant variations in reported frequency of use of strategies to achieve six classroom-related purposes were found in association with this variable. These classroom-related purposes are CRP1, which is to be well-prepared for classroom lessons; CRP2: to keep up with the teacher while studying in class; CRP3: to get the teacher's attention while in class; CRP5: to try to avoid being distracted while studying in class; CRP6: to solve problems they experience in classroom lessons; and CRP7: to pass the examinations. The main significant variations in the use of such strategies are summarised below.

1. Private university students reported more frequent use of strategies to achieve four classroom-related purposes than did state university students. These are CRPs1, 2, 5, and 7. Private university students also reported more frequent use of strategies to achieve CRP 5 than did RIT students.
2. RIT students reported more frequent use of strategies to achieve four classroom-related purposes than did state university students. These are CLPs2, 3, 5, and 6.

- **Use of Individual Language Learning Strategies**

The Chi-square tests showed that use of 21 out of 49 individual language learning strategies (42.86%) varied significantly according to type of institution. The two main variation patterns were: PRU>RIT>SRU, and RIT>PRU>SRU. The former pattern indicates that private university students reported most frequent use of individual strategies, while the latter pattern indicates that RIT students reported most frequent use of individual strategies. The former pattern includes eleven individual strategies such as 'try some exercises in advance', 'prepare oneself physically before coming to an English class', or 'attend the class regularly'. The latter pattern includes 8 individual strategies, such as 'listen to the teacher attentively', 'do the revision for the next lessons', or 'ask the teacher in class either immediately or when appropriate'. However, state university students reported employing two strategies significantly more frequently than did both private university and RIT students. These are SCIP 4.1: correspond in English by an electronic mail (e-mail) or a letter in order to improve one's writing skill; and SCIP 5.4: surf the Internet in order to acquire one's general knowledge in English.

- **Factor Analysis Results**

The results of a factor analysis showed that three factors were found to be strongly related to type of institution. These include Factor 2 'Strategies for productive learning

process'; Factor 3 'Strategies for avoiding distraction'; and Factor 5 'Strategies for active classroom learning and lesson preparation in advance'. The main underlying relationship between students' reported strategy use and type of institution is in the use of classroom-related strategies in the CR category.

8.2.4. Do students' choices of language learning strategies vary significantly with their gender? If they do, what are the main patterns of variation? (Research Question 4)

In response to the fourth research question, the results of the ANOVA showed no significant variations in relation to gender of students in students' reported overall strategy use, use of strategies in the two main categories, or use of strategies to achieve either classroom-related or classroom-independent purposes. However, the chi-square tests showed that use of 3 out of 49 individual language learning strategies (6.12 %) varied significantly according to this variable, with female students reporting more frequent use of these strategies than their male counterparts. These three individual strategies are 'attend the class regularly', 'ask classmates or friends either in class or after class', and 'practise translating from Thai into English'.

As mentioned earlier in Chapter 7, the results of a factor analysis showed that no extracted factors were found to be strongly related to this variable.

8.2.5. Do students' choices of language learning strategies vary significantly according to their perception of the size of class they find themselves in? If they do, what are the main patterns of variation? (Research Question 5)

In response to the fifth research question for the present investigation, the results of the ANOVA showed no significant variations in relation to 'perceived' class size in students' reported overall strategy use, use of strategies in the two main categories, and use of strategies to achieve either classroom-related or classroom-independent purposes. However, the chi-square tests showed that use of 3 out of 49 individual language learning strategies (6.12 %) varied significantly according to this variable. The variation

patterns were not consistent, with students who perceived their class size as either small or optimum reporting more frequent use of certain strategies than those who perceived their class size as large. Students perceiving their class size as optimum reported more frequent use of one strategy - sit next to a bright or quiet student - than those perceiving their class sizes as large or small. Students perceiving their class size as small reported more frequent use of two strategies than those perceiving their class sizes as optimum or large. These strategies include 'ask the teacher in class either immediately or when appropriate', and 'listen to a radio programme in English to improve their listening skill'. Another interesting finding of this study reveals that engineering students did not report doing extra things in response to finding themselves in what they recognise to be larger classes.

As mentioned earlier in Chapter 7, the results of a factor analysis showed that no extracted factors were found to be strongly related to this variable

8.2.6. Do students' choices of language learning strategies vary significantly according to the location of the institution at which they are studying? If they do, what are the main patterns of variation? (Research Question 6)

In response to the sixth research question, the researcher has made an attempt to examine variation in students' reported frequency of use of language learning strategies as well as patterns of variation, as presented in Chapter 7. As evidenced in the strategy questionnaire responded to by 570 engineering students, the research findings at the four different levels of data analyses and the results of factor analysis in relation to location of institution can be summarised as follows:

- **Overall Strategy Use**

The results of ANOVA showed that no significant variations were found in reported frequency of overall strategy use between students studying in Bangkok and the metropolitan areas, and those studying in the other regions of the country.

- **Use of Strategies in the Classroom-Related and Classroom-Independent Categories**

The results of ANOVA showed significant variations in students' reported frequency of use of out-of-class strategies in the classroom-independent category in relation to this variable, indicating that students studying at the institutions located in Bangkok and the metropolitan areas reported more frequent use of strategies in this category than those studying at the institutions located in the other regions of the country.

- **Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes**

The ANOVA results showed significant variations in use of strategies to achieve one classroom-related purpose, and two classroom-independent purposes in relation to this variable. These purposes are CRP7, which is to pass the English examinations; CIP1 to expand knowledge of English vocabulary and expressions; and CIP2 to improve their listening skill. The significant variation indicates that students studying at the institutions located in Bangkok and the metropolitan areas reported more frequent use of these strategies than those studying at the institutions located in the other regions of the country.

- **Use of Individual Language Learning Strategies**

The Chi-square tests showed that use of 9 out of 49 individual language learning strategies (18.37 %) varied significantly according to location of institution. The main variation pattern was Metro-BKK > Regional, indicating that the students studying at the institutions located in Bangkok and the metropolitan areas reported more frequent use of certain individual strategies than those studying at the institutions located in the other regions of the country. This pattern of variation includes eight individual strategies, such as 'take notes while studying in class', 'watch an English-speaking film or listen to cassette-tapes to improve their listening skill'. However, students studying outside

Bangkok and the metropolitan areas reported more frequent use of one strategy - use a dictionary to check the meaning of a new word - than those studying in Metro-Bangkok.

The results of a factor analysis showed that no extracted factors were found to be strongly related to this variable.

8.2.7. Do students' choices of language learning strategies vary significantly according to their language proficiency levels? If they do, what are the main patterns of variation? (Research Question 7)

In response to the seventh research question, the researcher has examined the different levels of students' reported frequency of use of language learning strategies as well as patterns of variation, which were presented in Chapter 7. The findings at the four different levels of data analysis and the results of a factor analysis in relation to the students' language proficiency levels can be summarised as follows:

- **Overall Strategy Use**

The results of ANOVA showed that significant variations in students' reported frequency of overall strategy use were found in relation to students' language proficiency levels. The results of the post hoc Scheffe Test showed that high-proficiency students reported greater overall strategy use than the moderate- and low-proficiency students. No significant variations in the overall strategy use were found between moderate- and low-proficiency students.

- **Use of Strategies in the Classroom-Related and Classroom-Independent Categories**

The results of ANOVA showed that significant variations in use of out-of-class strategies in the classroom-independent category were found in relation to this variable, indicating that high-proficiency students reported more frequent use of these strategies than moderate- and low-proficiency students.

- **Use of Strategies to Achieve Classroom-Related and Classroom-Independent Purposes**

The ANOVA results showed significant variations in use of strategies to achieve three classroom-related and five classroom-independent purposes in relation to this variable. The classroom-related purposes are CRP3, which is to get the teacher's attention while in class; CRP4: to learn new vocabulary items in classroom lessons; and CRP5: to try to avoid being distracted while studying in class. The five language improvement purposes are CIP1, which is to expand their knowledge of English vocabulary and expressions; CIP2: to improve their listening skill; CIP3: to improve their speaking skill; CIP4: to improve their writing skill; and CIP5: to acquire general knowledge in English. The main significant variations of strategy use in relation to this variable are as follows.

1. High-proficiency students reported more frequent use of strategies to achieve classroom-related purposes CRP3, and CRP4, and classroom-independent purposes CIPs 1, 2,3, 4, and 5 than moderate-proficiency and low-proficiency students.
2. Moderate-proficiency students reported more frequent use of strategies to achieve CRP5 - to try to avoid being distracted while studying - than high-proficiency students.

- **Use of Individual Language Learning Strategies**

The Chi-square tests showed that use of 22 out of 49 individual language learning strategies (44.90 %) varied significantly according to students' language proficiency levels. The existing dominant variation pattern was considered positive, indicating that higher-proficiency students reported more frequent use of the strategies than did lower-proficiency students. More than half of the individual strategies showing a significant

variation were related to the use of out-of-class strategies in the classroom-independent category. Twelve individual strategies which exhibit a positive variation include 'take part in classroom activities other than asking or answering questions'; 'watch an English-speaking film to improve their listening skill'; and 'converse with peers, or siblings in English'.

- **Factor Analysis Results**

The results of a factor analysis showed that two extracted factors were found to be strongly related to the students' language proficiency levels. These factors are Factor 1 'Strategies for out-of-class language improvement through English media utilisation'; and Factor 4 'Strategies for active classroom learning and lesson preparation in advance'. The underlying relationship between students' reported strategy use and their language proficiency levels was principally in the use of out-of-class strategies in the classroom-independent category.

8.3. Discussions of the Research Findings

As seen above in response to the research questions, the relationships of the language learning strategy use at different levels by 570 engineering students to the five variables have been described. What follow are discussions of the research findings in association with the variables investigated. The discussions are presented in two main parts regarding the possible explanations for what have been discovered. The first part will present the interrelationships of patterns of significant variations in strategy use among the variables so as to offer a clear explanation, especially in terms of the characteristics of the subjects for the present investigation. The second part will offer possible reasons hypothesised by the researcher to where significant differences in certain strategy use with reference to each variable become apparent. It is worth pointing out that it may not be easy to relate strategy use by students in the very detailed manner of this study to

earlier studies. This is because the present investigation has a different way of classifying learning strategies and the resulting analysis has to be performed according to the strategy classification. The difficulty in making comparisons of strategies reported in one study with those reported in another has also been pointed out previously by Chamot (1987); and Ellis and Sinclair (1989). (See Chapter 2, Section 2.3 for the strategy classification systems proposed by seven researchers).

8.3.1. The Interrelationships of Patterns of Significant Variations in Strategy Use among the Five Variables

In Chapter 7, significant variations in students' reported use of language learning strategies at different levels resulting from the ANOVA and chi-square tests were discovered. However, it is still worth exploring further these emergent patterns of significant variations in relation to the five variables. This section aims to explore the interrelationships of certain patterns of significant variations in students' reported strategy use among the five variables in the light of possible explanation for such significant variations.

Based on the research findings presented in Chapter 7, the frequencies of students' reported use of a total 39 individual learning strategies across the strategy questionnaire were found to vary significantly in association with at least one of the five variables. Sixteen of these learning strategies which are worth exploring further were found to vary significantly by two or more variables. Though an interrelationship has been found among the variables in terms of significant variations in use of strategies, it is not always possible to find an explanation for such an interrelationship. There are only certain types of patterns of significant variations in use of certain strategies which could possibly be explained by, for example, the distribution of the research population as shown in Chapter 3. In this perspective, the researcher has attempted to illustrate such a

distribution of the research population in the light of explanation for the interrelationship of the variables investigated and some prominent patterns of significant variations in frequency of students' reported strategy use. These include the interrelationships found mainly between:

- 1) type of institution and students' language proficiency levels;
- 2) type of institution and location of institution; and
- 3) location of institution and students' language proficiency levels.

There are also minor significant variations in use of strategies which were also found between type of institution and gender; type of institution and 'perceived' class size, and gender and language proficiency levels. What follow are some explanatory points for the three patterns of significant variations which were found to be interrelated among the variables. Tables 8.1-8.3 present these interrelationships.

Table 8.1: Interrelationship of Patterns of Significant Variation in Use of Strategies between Type of Institution and Language Proficiency Levels

Individual Strategy	Patterns of Variation by Variable	
	Type of Institution	Proficiency Levels
SCIP4.1 Correspond in English by an e-mail or letters to improve one's writing skill	SRU>RIT>PRU	Positive (Hi>Mod>Lo)
SCIP5.4 Surf the Internet to acquire general knowledge	SRU>RIT>PRU	Positive (Hi>Mod>Lo)
SCRP 7.2 Practise tests from different sources to pass the English examination	PRU>RIT>SRU	Mixed (Lo>Hi>Mod)
SCRP 6.2 Ask the teacher after class to solve the lesson problems	PRU>RIT>SRU	Mixed (Hi>Lo>Mod)
SCRP 3.2 Take part in classroom activities to get the teacher's attention	RIT>PRU> PRU	Positive (Hi>Mod>Lo)
SCRP 5.3 Sit next to a bright or quiet student to avoid being distracted	PRU>RIT> SRU	Mixed (Mod>Lo>Hi)

Table 8.1 demonstrates the significant variations in use of six learning strategies found to be interrelated between type of institution and language proficiency levels. However, different patterns of variations emerged in either of the variables. For examples, two learning strategies (SCIP4.1- Correspond in English by e-mail or letters to improve their writing skill, and SCIP5.4- Surf the Internet to acquire general knowledge in English) share exactly the same patterns of variations of both variables. The emerged pattern for the type of institution was *SRU>RIT>PRU* (used significantly more frequently by state university students), and that for the language proficiency levels was *Positive* (used significantly more frequently by higher-proficiency students). The significant variations which were found to be interrelated between these two variables could possibly be explained by the research population distribution shown in Chapter 3. The distribution of type of institution in terms of language proficiency levels shows that a significantly greater percentage of state university students than private university and RIT students falls in the high-proficiency category, while a significantly higher percentage of private university students than RIT and state university students falls in the low-proficiency category. Hence, such a distribution of the research population between the two variables may reflect this interrelationship. This explanation may also be applied to the interrelationship between the two variables which exists in use of SCRP7.3 - Practise tests from different sources - where the pattern of significant variation for the type of institution was *PRU>RIT>SRU* (used significantly more frequently by private university students), and *mixed* (used significantly more frequently by low-proficiency students, i.e. predominantly private university students) for the language proficiency levels.

Table 8.2: Interrelationship of Patterns of Significant Variation in Use of Strategies between Type of Institution and Location of Institution

Individual Strategy	Patterns of Variation by Variable	
	Type of Institution	Location of Institution
SCRP 4.2 Use a dictionary to check meaning	RIT>PRU>SRU	Metro-BKK> Regional
SCRP 7.3 Join a tutoring group to pass the tests	PRU>RIT>SRU	Metro-BKK> Regional
SCRP 2.3 Take notes while studying	PRU>RIT>SRU	Metro-BKK> Regional
SCRP 5.3 Sit next to a bright or quiet student to avoid being distracted	PRU>RIT> SRU	Metro-BKK> Regional

Table 8.2 presents the interrelationship between significant variations in use of strategies between type of institution and location of institution. As shown in the table, the dominant pattern for type of institution is *PRU>RIT> SRU* and that of location of institution is *Metro-BKK>Regional*. What could possibly be an explanation for this interrelationship is the distribution of the research population, indicating that a significantly greater percentage of students studying at private universities and Rajamangala Institutes of Technology are in Bangkok and the metropolitan areas, while the fact for the distribution of state university students is that a significantly greater percentage are studying outside Bangkok and the metropolitan areas.

Table 8.3: Interrelationship of Patterns of Significant Variation in Use of Strategies between Location of Institution and Language Proficiency Levels

Individual Strategy	Patterns of Variation by Variable	
	Location of Institution	Proficiency Levels
SCRP 5.3 Sit next to a bright or quiet student to avoid being distracted	Metro-BKK> Regional	Mixed (Mod>Lo>Hi)
SCIP1.3 Watch an English-speaking film to expand vocabulary and expressions in English	Metro-BKK> Regional	Positive (Hi>Mod>Lo)
SCIP2.1 Watch an English-speaking film to improve one's listening skill	Metro-BKK> Regional	Positive (Hi>Mod>Lo)
SCIP2.2 Listen to English songs or cassettes tapes to improve listening skill	Metro-BKK> Regional	Positive (Hi>Mod>Lo)
SCIP2.3 Listen to a radio programme to improve one's listening skill	Metro-BKK> Regional	Positive (Hi>Mod>Lo)

Table 8.3 shows the interrelationship between the patterns of significant variations in use of four learning strategies (SCIPs 1.3, 2.1, 2.2, and 2.3) found to exist in location of institution and students' language proficiency levels. The pattern of variation for location of institution was *Metro-BKK > Regional*, and for students' language proficiency levels was *Positive*. The *Metro-BKK > Regional* pattern indicates that students studying in Metro-Bangkok reported employing these strategies significantly more frequently than those studying outside Metro-Bangkok. The latter pattern classified as *Positive* indicates that higher-proficiency students reported using these strategies significantly more frequently than lower-proficiency students. In this case, the distribution of population may not be a good explanation for such an interrelationship between these two variables. This is because the distribution of location of institution in terms of language proficiency levels shows that students studying in Bangkok and the metropolitan areas do not differ from those studying outside Metro-Bangkok in this respect. As a result, this significant difference in use of these strategies could be possibly explained by examining how high-proficiency students in both locations reported these strategies. It appears that a significantly greater percentage of high-proficiency students studying in Metro-Bangkok than those studying outside Metro-Bangkok reported high frequency of use of these four strategies.

8.3.2. Language Learning Strategy Use in Association with the Five Variables

In Section 8.3.1, the researcher has attempted to find some possible explanation of the research findings by examining the interrelationship between certain patterns of significant variations in strategy use and the five variables, especially in terms of the distribution of the research population. What follows are further discussions of the findings in relation to the five variables. At this particular stage, the researcher has hypothesised what may be an explanation for significant differences in certain strategy

use with reference to each variable. However, it is worth noting that we are not certain that these hypotheses can be the definite explanation for what has been mentioned above. Consequently, proposals for future research are recommended.

- **Use of Language Learning Strategies and Type of Institution**

The three different types of institution offering a degree in engineering in Thailand have been defined as: State-run universities; Private-run universities; and Rajamangala Institutes of Technology

The findings of the present investigation reveal that of the three types of institution, the overall strategy use of the students studying at private-run universities and Rajamangala Institutes of Technology is significantly higher than those studying at state-run universities. Similarly is the use of the language learning strategies in the classroom-related category. This may also be the result of the use of language learning strategies to achieve the classroom-related purposes (CRPs1-7), which the students studying at private-run universities and Rajamangala Institutes of Technology reported using significantly more frequently than those studying at state-run universities. No significant differences were found in use of the strategies in the classroom-independent category.

The findings of this study suggest that the type of institution at which students are studying was significantly related to their choice of strategy use, especially the classroom-related strategies. To date, no previous empirical research has been conducted to support the findings of such a relationship. Therefore, a few factors which could possibly be explanations for such significant differences have been hypothesised by the researcher. These factors include members of staff, access to and provision of the facilities such as computers, and students' favourite learning styles. The outstanding

findings which are worth discussing are significant differences of strategy use between students studying at private-run universities and those studying at state-run universities.

In respect of members of staff, many private-run universities can afford to attract foreigners to work as members of teaching staff. In the report of the Private Education Section, Ministry of the University Affairs (1995), 490 foreigners worked as permanent or temporary members of teaching staff at different private-run universities throughout the country. The main responsibility of most of them was to teach English. Foreign teachers or lecturers may be seen as a factor which could encourage students studying at private universities to expend effort in learning language in class. Students may have to try every possible way to keep up with their teachers so as to understand the lessons. The effort may be, for example, in preparing themselves before coming to class; attending classes regularly; or listening to the teacher attentively. They may also have a good opportunity to expose themselves to the target language environment directly with their foreign lecturers.

Another possible factor which may explain high use of classroom-related strategies of private university students is students' learning styles. Cohen (1998:15) defines learning styles as 'general approaches to learning'; and Gardner and Miller (1999: 157) see learning styles as 'the ways learners like or dislike learning a language'. The study of Sattacomkul (1993) showed that three favourite learning styles among private-run university students were participant, collaborative, and dependent learning styles. These learning styles imply that private-run university students may like going to classes or having classroom participation; may not take responsibility for their own learning; and may see classes as a place to have interactions with friends and a place to learn.

However, the strategy use of state university students is also interesting to be discussed. At the individual strategy items level, the students studying at the state

universities reported using the language learning strategies which were based on using computers to improve their language skills significantly more frequently than those studying at the other two types of institution. This may be related to the fact that state universities are basically government-funded and they may be able to afford to provide facilities, such as computers, for the students more easily than the other two types of institution. As a result, it may be easy for state university students to gain access to computers and other facilities which they can use for their classroom-independent language learning.

Besides the strategy use of private and state university students, it is interesting to point out that RIT students reported employing the strategies to achieve two classroom-related purposes: CRP 3 - to get the teacher's attention while studying in class -; and CRP6 - to solve problems encountered in classroom lessons - significantly more frequently than those studying at state-run universities. A possible explanation for this significant difference may be the number of students per class. According to the data obtained through the background questionnaire administered in the first phase of data collection, the average number of 27.33 students per class at Rajamangala Institutes of Technology was smaller than that of state and private universities, which were 37.40 and 40.15 respectively. This smaller class size may be an advantage for RIT students in that it may offer a better opportunity for RIT students to have more interactions with their teacher than students studying at the other two types of institution, while studying in class.

In summary, some possible explanations hypothesised by the researcher for the significant differences in the strategy use by students studying at different types of institution may be accounted for by members of staff, access to and provision of the facilities such as computers, and students' favourite learning styles. However, as

mentioned earlier, we cannot be definitely certain about what really caused these significant differences; thus, research to examine these aspects is needed.

- **Use of Language Learning Strategies and the Gender of Students**

The results of most of the previous studies in which the gender of the learner was taken into account have concluded that females employ certain strategies significantly more frequently than their male counterparts, especially social strategies. Emphasis on the significant differences in use of these learning strategies might be explained by the female's greater social orientation, and greater conformity to norms, both linguistic and academic as evidenced in Ehrman and Oxford (1989) and Oxford and Nyikos (1989).

The findings of the present investigation, however, showed no strong relation between the gender of students and their choices of strategy use, being consistent with the study by Politzer (1983). The findings in this respect suggest that Thai engineering students reported employing learning strategies, both classroom-related and classroom-independent, in more or less the same degree, irrespective of their gender. However, there is a minor significant difference in use of individual strategy items which female students reported using significantly more frequently than their male counterparts. These language learning strategies are: attend the class regularly; ask a classmate or classmates to solve the problem encountered in classroom lessons; and practise translating from Thai into English. Male students reported no strategies significantly more frequently than did females.

- **Use of Language Learning Strategies and Students' Perception of Class Size**

To date, a small amount of research has been carried out to investigate students' perceptions of their class size in relation to use of language learning strategies. As evidenced in Chapter 2, the research findings carried out by a few researchers, e.g. Sarwar (1992); Mebo (1995); and Embi (1996), have concluded that students who

perceived their class size as large tended to report using language learning strategies significantly more frequently than those perceiving their class size as either optimum or small. The findings of this study, however, showed no strong relation between students' perception of their class size and their employment of language learning strategies. Further, the variation patterns are not consistent. That is to say, students' perceptions about their class size tended to associate with what purpose they reported trying to achieve. In this study, for example, students who perceived their class size as optimum reported using SCRP5.3: sit next to a bright or quiet student in order to avoid being distracted while studying, significantly more frequently than those perceiving their class size as either large or small. On the other hand, the students who perceived their class size as small reported using SCRP6.1: ask the teacher in class either immediately or when appropriate in order to solve the problem encountered in classroom lessons, significantly more frequently than those perceiving their class size as either large or optimum. One possible hypothesis for the significant variation in use of this strategy may be that students perceiving their class size as small could see an opportunity to have a verbal interaction with the teacher while studying, while the students perceiving their class size as either large or optimum may not have such an opportunity. The findings of this study also suggest that students who perceived their class size as large did not exhibit a strategy employment significantly more frequently than did students who perceived their class size as either optimum or small. This finding is inconsistent with the previous studies as shown above. An investigation into this issue is needed.

- **Use of Language Learning Strategies and Location of Institution**

The three different types of institution offering a degree in engineering are located in every part of the country. The locations of institutions in this investigation have been

categorised as: Bangkok and the metropolitan areas (Metro-Bangkok); and the other regions of the country (Regional).

The findings of the present investigation reveal that no significant variations in the overall strategy use of students studying at an institution situated in either location were found. However, when it comes to the use of learning strategies in the classroom-related and classroom-independent categories, it was found that students studying in Bangkok and the metropolitan areas reported employing out-of-class strategies in the classroom-independent category significantly more frequently than those studying in the other regions of the country, especially in respect of making use of mass media to expand their knowledge of vocabulary and expressions, as well as to develop listening skills. No previous research has been carried out to investigate the relationship between location of institution and students' choice of strategy use. However, a few possible factors hypothesised by the researcher may help to explain these significant differences in use of strategies of students studying in the two locations. These factors include: access to and availability of mass media in English, and students' socio-economic background.

In Thailand, Bangkok and the metropolitan areas can be seen as the centre of the country in terms of the use made of English by the mass media and the concentration of mass media outlets. Consequently, it is probably easier for students in Bangkok and the metropolitan areas to gain access to these media and hence exposure to the English language. This may also reflect the socio-economic status of students in this area. As shown in the distribution of the research population, it can be seen that the majority of the research population studying in Bangkok and the metropolitan areas are private university students. Generally speaking, most of these students are from the families with high socio-economic status (Achava-Amrung, 1992). As a result, access to these media may be relatively easy whenever they want to improve their language skills. On the other

hand, students studying in the other regions of the country may not have such easy opportunities as their institutions are located out of town, and public transportation is limited. Moreover, access to English media is also difficult unless provided by their own institutions. As a result, the students studying outside Bangkok and the metropolitan areas have to rely on the provision of these media from their institutions.

Some students studying in the other regions of the country may come from families with a high socio-economic families, yet this may count as nothing to them if availability of media resources remains scarce or limited. So, access to and availability of mass media in English may be a possible explanation regarding use of out-of-class or classroom-independent strategies which mainly consist of those dealing with mass media utilisation.

- **Use of Language Learning Strategies and Levels of Language Proficiency**

Previous studies investigating the use of language learning strategies by students with different levels of language proficiency have concluded that higher-proficiency students generally reported employing learning strategies significantly more frequently than did lower-proficiency students. Examples are Ramirez (1986); Oxford and Nyikos (1989); Pearson (1988); Green and Oxford (1995); and Embi (1996). This investigation also reveals the similar results as previously shown that higher-proficiency students generally reported employing learning strategies significantly more frequently than did lower-proficiency students.

Based on the findings of the present investigation, higher-proficiency students reported greater overall strategy use than did lower-proficiency students. When it comes to the use of learning strategies in the two main categories (CR and CI), the findings showed significant differences among the students with different proficiency levels in the use of out-of-class strategies in the classroom-independent category, but not the use of strategies in the classroom-related category. One possible explanation for the tentative

conclusion that might be drawn from this study for the relationship between use of out-of-class or classroom-independent strategies and students' levels of language proficiency is students' motivation. Ellis (1994: 715) defines motivation as 'the effort which learners put into learning an L2 as a result of their need or desire to learn it'. Similarly, Gardner (1985:10) suggests that motivation refers to 'the combination of effort plus desire to achieve the goal of learning the language plus favourable attitudes toward learning the language.' In this regard, Yule (1996) comments that students who experience success in language learning are among those the highest motivated to learn and 'motivation may be as much a result of success as a cause,' (Yule, 1996 :195). The findings of this study suggest that higher-proficiency students may be highly motivated to seek opportunities to expose themselves to English outside the classroom setting. This is evidenced in their reported high frequency of use of out-of- class strategies. The effort which higher-proficiency students put into their language learning may enable them to employ a wider range of strategies. Equally, their employment of out-of-class or classroom-independent strategies may make them become high-proficient learners. As discussed earlier, the complex relationship between students' levels of language proficiency and strategy use needs to be interpreted with caution. Further, the findings of this study suggest that Thai engineering students, irrespective of their language proficiency levels, claimed to employ classroom-related strategies in more or less the same way. This conclusion may need to be reconsidered cautiously in terms of appropriateness in strategy use. As suggested in Chamot (1987), effective learners and ineffective learners are different in that the former are able to use strategies appropriately, while the latter also use a number of strategies but inappropriately. This is also reported in the study of Vann and Abraham (1990) that unsuccessful language

learners appeared to be active strategy users, but sometimes they applied strategies inappropriately.

The research findings further showed that moderate-proficiency students reported using learning strategies to achieve CRP 5: to avoid being distracted while studying in class, significantly more frequently than high- and low-proficiency students. This may be because high-proficiency students are good at managing themselves while studying in class. They may not have to try to avoid being distracted. On the other hand, moderate-proficiency students might find it hard concentrating on their lessons, so they had to try different strategies in coping with such difficulties.

In conclusion, the findings of the present investigation are generally consistent with the previous studies as shown in Chapter 2 in terms of students' language proficiency levels, where higher-proficiency students reported a higher frequency of strategy use than did lower-proficiency students. On the other hand, in respect of the gender of students, like 'perceived' class size, the findings of this study, being consistent with a few studies and being slightly different from some previous findings, suggest that there is a minor significant difference in strategy use between female and male students. There is also a minor significant difference in strategy use in relation to 'perceived class size. Regarding the relationship between type of institution or location of institution and students' choices of strategy use, to date, no previous research has been conducted to investigate such relationships. However, the findings of the present investigation suggest that type of institution has a relationship with students' choices of employment of language learning strategies, especially classroom-related strategies; and location of institution has an association with students' employment of out-of-class or classroom-independent strategies. All in all, irrespective of degree of relationship between strategy use and the variables investigated, we may come to the conclusion that the relationship

between students' choices of strategy use and language proficiency levels is still complex, while the relationship between students' choices of strategy use and the other four variables, i.e. type of institution, gender, 'perceived' class size, and location of institution seems to be more one directional as shown in the conceptual framework for investigating language learning strategies presented in Chapter 3, Section 3.3.

8.4. Implications of the Research Findings for the Teaching and Learning of English for Engineering Students in Thailand (Research Question 8)

The research findings summarised earlier in response to the research questions demonstrate that there is a relationship between type of institution; location of institution; and language proficiency levels, and students' employment of both classroom-related and out-of-class or classroom-independent strategies. Some implications for the teaching and learning of English for Thai engineering students may be drawn as follows:

1. Arising out of the research findings, high-proficiency students reported utilising different types of media in English as input sources of the target language in order to improve their language in general. These media include English-speaking films, and radio, television programmes, and cassette-tapes in English. It is recommended that language teachers provide these media in as many different forms as possible and encourage students to make maximum use of them as an alternative means of language learning.
2. One of the significant findings of this investigation is that, as a whole, the greatest number of Thai engineering students reported employing strategies to achieve classroom-related rather than classroom-independent purposes. To be more precise, these students reported attending class regularly; listening to the teacher attentively; and taking notes while studying in class with the teacher significantly more frequently

than other classroom-related or classroom-independent strategies. In this regard, teachers should be able to introduce language learning strategies, both classroom-related and classroom-independent, to their students while teaching or training their students how to learn. As a result, teachers may be able to promote autonomous learning to their students simultaneously. Nunan (1997) points out that there is enough evidence that strategy training can make a difference. Teachers can teach students how to learn. They can help their students to become empowered learners and to take some responsibility for their own success by providing them with a sense of what a strategy is and how they can develop their own strategies (Brown, 1993). Consequently, language teachers teaching English to engineering students may need to modify their roles in helping students to employ appropriate language learning strategies. In addition to Nunan and Brown, Prokop (1989) makes a sound comment about training or teaching language learning strategies to language learners, regardless of their language proficiency levels that:

“It has been determined that learning strategies can be taught, even to ‘poor’ learners, and that the average and low achievers are most likely to benefit from instruction in using effective second language learning strategies. Consequently, the time and effort needed for assisting weaker students to acquire such strategies yields a greater return than similar work with top students, who are likely to be aware of how they should approach a learning task’, (Prokop, 1989:159).

However, it is important for teachers to understand that certain language learning strategies may work with some learners, but not with others. In this respect, Cohen (1990) makes an interesting suggestion that:

“...learners differ notably in language learning and in the ways that they make effective use of a given strategy in a given instance. The view that strategies are inherently good for all learners or that their use would produce successful results for the same learners each time has been found to be simplistic. Rather, it is important to lay out a series of options and to let the particular learner choose according to taste and results from using a given strategy” (Cohen, 1990 : 15).

3. One other finding of this study reveals that high-proficiency students reported making use of computer programmes to improve their language skills such as writing,

speaking, or to acquire general knowledge in English. In this instance, language teachers may be able to provide interactive computer programmes in a self-access centre where students can study on their own outside class time.

4. As suggested in the research findings of this study, there is not much relationship between students' use of strategies and 'perceived' class size. In other words, students perceiving their class size as large, optimum, or small did not report employing language learning strategies differently. This means that students may not be thinking enough about language learning strategies. In this respect, teachers should therefore introduce a wide range of strategies to their students and encourage their students to apply appropriate learning strategies in their classroom context
5. The research findings of the present investigation reveal that Thai engineering students reported employing two main types of language learning strategies, i.e. classroom-related, and classroom-independent. Another implication drawn from this investigation is both teachers and students should be aware of what and how important language learning strategies are. In order to raise their awareness, the researcher would like to propose that:
 - 5.1. A workshop or mini-conference among the members of teaching staff should be held. The purpose of the workshop will primarily focus on disseminating the results of the research findings, as well as raising their awareness of how important language learning strategies are and how language learning strategies can enhance students' learning of English. The members of staff will also be encouraged to take part in brainstorming, thought-provoking activities, especially how to introduce language learning strategies to their students as part of classroom lessons. They will be also asked to examine the strategy inventory and think of what should be included so that the strategy

inventory will be more comprehensive and offer a wider selection for students when teachers use this inventory as a guide for samples of language learning strategies.

5.2. The researcher will be able to present the results of the present investigation at seminars and conferences both nationally and internationally as a way of disseminating them to a wider circle of interested personnel in the profession.

5.3. A mini-seminar about language learning strategies can be held for students, especially at the beginning of new terms before they start their language study, i.e. English. This will raise their awareness of how language learning strategies can help them in learning English. The seminar can be held in two separate sessions regarding types of language learning strategies, i.e. one session for classroom-related strategies, and the other for classroom-independent strategies. At the seminar, students may be also asked to examine the already-identified language learning strategies based on the strategy inventory for the present study, providing feedback on what they think about those strategies in terms of usefulness and workability. They may add into the list some strategies which they think are missing. Besides, an informal talk with students about language learning strategies can be held occasionally.

8.5. Contributions of the Present Investigation

The present investigation has made some significant contributions to the area of language learning strategies. These contributions can be characterised as follows:

1. As previously seen in Chapter 2, there has been some earlier research work on language learning strategies carried out with Thai students, but most of the focal points of study have generally been limited to looking into the relationship between

strategy use and students' language proficiency/achievement levels. In terms of the focal points of study, the present investigation has offered a broader investigation concerning the relationship between students' reported frequency of strategy use and variables which include type of institution, gender of students, perceived class size, and location of institution in addition to students' language proficiency levels.

2. Apart from the above factors, the researcher for the present investigation has systematically produced a language learning strategy inventory which was based on the self-report data arising out of students' oral interviews (see Chapter 4). This language learning strategy inventory has been used as the instrument to elicit details of the strategy use of engineering students learning English at the tertiary level in Thailand. Although a few researchers have carried out research on this area in Thailand, they have tended to make use of already-existing instruments, as was noted in the literature review chapter (see Chapter 2).
3. In measuring students' language proficiency, the researcher for the present investigation has constructed a proficiency test (see Chapter 5). The Proficiency Test in English for Science and Technology - PTEST - has been constructed rigorously, and it has been found to be effective in terms of reliability and validity. This also served the purpose of the present investigation. The test itself may be useful in similar contexts. If the test content is not suitable for other groups of subjects, the test construction processes may be served as a guide for other researchers to construct their own language proficiency tests.
4. In terms of data analysis, different types of statistical methods, i.e. an analysis of variance (ANOVA), chi-square tests, and factor analysis, were employed. This data analysis can be a guide or example for other researchers to apply in similar type of reported data.

8.6. Limitations of the Present Investigation and Proposals for Future Research

The present investigation has been valid and valuable in addressing the primary research questions, which are to describe types of language learning strategies reported by Thai engineering students and to investigate variation patterns of and to examine relationships between frequency of students' reported strategy use at different levels with reference to type of institution, gender, 'perceived' class size, location of institution, and language proficiency levels. However, in carrying out the research, certain limitations have been apparent, and areas for possible future research have been discerned. Looking first at the limitation issue, the researcher would wish to note critically that:

- Classroom observations should have been included as one of the methods of data collection for the present investigation. Though a few researchers (e.g. Naiman et al, 1978; Rubin, 1981; Cohen and Apehek, 1981; and Graham, 1997) comment that classroom observation is not a productive method to reveal students' learning strategies, the researcher for the present investigation realised that it may enable a researcher to discover other classroom aspects, for example, how the teacher handles his or her English class, teacher-student interactions, or students' classroom participation, other than students' learning strategies. The research findings in this study reveal that students studying at different types of institution reported significant differences in use of classroom-related strategies; therefore, classroom observation could have revealed what caused such significant differences in language classrooms in this regard.
- The research population should have been more homogeneous in terms of years of study at the university. This is because students with longer exposure in university study may have an advantage of acquiring certain learning strategies through their experiences than those with shorter exposure in university study.

- The number of each type of institution in each location should have been approximately the same.
- A larger number of students should have been involved in student oral interviews;
- Some language learning strategies from other existing strategy questionnaires by other researchers should have been derived and included in the strategy questionnaire for the present investigation to offer a wider range of learning strategies to students to choose from.

Notwithstanding the limitations, the research is nonetheless valid, but the researcher acknowledges that some areas might justify further research. These areas could include the following:

1. As shown in the literature review section in Chapter 2, it can be seen that a larger amount of research work on language learning strategies has been carried out with native speakers of English learning a foreign language and/or with non-native speakers of English learning English as a second language, particularly in the United States of America. More research work in the area needs to be carried out with a wider range of populations in different contexts, i.e. non-native speakers of English learning English as a foreign language.
2. Apart from differences between urban and rural areas, different types of institution also need to be examined. Through the review of related literature and available materials, to date no researchers in the field appear to have taken this variable into consideration as one of the factors which may relate to students' use of language learning strategies. Aspects which may be examined in a more detailed manner include students' socio-economic/academic backgrounds, or parents' attitude towards language learning, institutional ethos, or equipment and resources.

3. There tends to be an increasing number of institutions in Thailand offering a degree in engineering, where English is used as the medium of instruction. A comparison of language learning strategy use by students taking a programme in which Thai is used as the medium of instruction, and those taking the programme in which English is used as the medium of instruction, could be another feasible research variable.
4. In the Thai context, previous attempts to examine language learning strategies have been made only with English major students or successful language learners. Examples are Sarawit (1986), Rattanaprucks (1990), Mullins (1992), and Lappayawichit (1998). There is a need to examine use of language learning strategies of students majoring in different fields other than English who may also be successful language learners. The use of language learning strategies by poor or under-achieving language learners should not be overlooked.
5. As can be seen from a number of research works on language learning strategies, be it in The United States of America, or elsewhere in the world, the most commonly used instrument for the investigation is the strategy questionnaire, especially the one produced by Oxford (1987; 1990). There are differences in the nature of language learners learning English in different contexts. There needs to be a greater variety of instruments produced in order to reflect these differences, i.e. to elicit language learning strategies of different language learners in different contexts. However, there is also a counter-argument that there should be a standardised instrument to enable comparisons of learner's choices of strategy use among different contexts.
6. A comparison of teaching styles or habits of teachers teaching at different types of institution may be made in order to understand learning strategy use better. The teaching styles or teaching habits may include teaching methods, content areas,

teacher's expectation and language skills provided to students. The nationality of teachers may also be taken into consideration.

7. In terms of type of institution, future research in this area could examine the strategy use of students studying at different types of institution located in similar areas other than comparing those studying in urban institutions with those studying at rural ones. To some extent of this type of information is available from the present study, but it is not analysed in this way. Furthermore, supplementary data are required from other regions.
8. As shown in the research findings, there is a significant difference in use of classroom-related strategies among students studying at different types of institution, but not in use of out-of-class or classroom-independent strategies. Classroom observation may be a useful tool to find out more about what contributes to this significant difference.
9. Since the research population for the present investigation consists of students studying in different years, i.e. 1st, 2nd, 3rd, or 4th, the researcher has always recognised that the heterogeneity of students in terms of the number of years which students have been studying at each institution may have affected students' choices of strategy use. Thus, there is a need for future research to examine whether or not this aspect relates students' reported choices of strategy use. In addition, instead of exploring students' reported strategy use relying solely on a statistical comparison, students may be also asked to evaluate the proposed strategies in terms of their usefulness or workability.
10. Since the present investigation has successfully established statistically significant links between variables, the next job will be to try to understand why such links exist, i.e. to identify causality. That is, there is a feasibility of further analysis of currently available data obtained through student oral interviews. In terms of the interview data, some significant aspects of language learning in the formal setting in the context

of Thailand are worth examining in order to help explain the causal relationships among variables. These aspects may include, for example, students' perceptions about adequacy of time allocated for their language learning, and their relationship with their teachers, classroom learning and teaching processes. This can be done only in a more qualitative way.

11. Since replication, i.e. repeating a study in different settings or with different subjects, is an important factor in creating trust for the results and it contributes to reliable knowledge (Locke et al, 1998), it is recommended that the present study be replicated for the purpose as suggested above.

8.7. Conclusion

The present investigation has been conducted in a data-based, systematic, and non-judgemental descriptive manner. It has contributed to the field of research on language learning strategies in terms of language learning strategy classification, the variables investigated, and students' language proficiency measurement. One of the major contributions of the present investigation has been the classification system of language learning strategies which engineering students learning English at the tertiary level in Thailand reported employing in dealing with language learning, either in a classroom setting, or outside a classroom setting. The language learning strategies have been classified according to purposes to be achieved, i.e. classroom-related and classroom-independent, as reported by the research population. Of the variables investigated, two variables i.e. type of institution and location of institution, have rarely been taken into consideration by any researchers previously in this area.

Lastly, the researcher for the present investigation has suggested some implications arising out of the research findings for the teaching and learning of English to engineering students in Thailand. Limitations of the present investigation and some

proposals for future research have also been put forward. The researcher believes that with appropriate instruments for eliciting language learning strategies, as well as a research design as presented in Chapter 3, a researcher can gain further insights into how students deal with language learning, and how language learning strategies are employed by different students in different learning contexts. Other variables, for example, students' language proficiency levels, field of study, or the type of institution at which students study, could have an impact on such research.

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APPENDICES

Appendix 1. : The Institutions and Number of Students Participating in the First and the Second Phases of Data Collection for the Present Investigation

Type of Institution	1 st Phase of Data Collection	2 nd Phase of Data Collection	Number of Students	
			Interview	Questionnaire
SRU 1	X	--	10	--
SRU 2	X	--	9	--
SRU 3	--	X	--	41
SRU 4	--	X	--	43
SRU 5	--	X	--	29
SRU 6	--	X	--	54
SRU 7	--	X	--	64
PRU 1	X	--	10	--
PRU 2	--	X	--	50
PRU 3	--	X	--	40
PRU 4	--	X	--	43
PRU 5	--	X	--	31
PRU 6	--	X	--	37
RIT 1	X	--	10	--
RIT 2	--	X	--	37
RIT 3	--	X	--	52
RIT 4	--	X	--	14
RIT 5	--	X	--	35
TOTAL	4	14	39	570

Note: SRU stands for 'State-run University'
 PRU stands for 'Private-run University'
 RIT stands for 'Rajamangala Institute of Technology'

Appendix 2: The Interview Timetable

Institution	Date	Time	Activity
Suranaree University of Technology Nakhon Ratchasima	30 June 1998	12:10-12:40	Meeting with students
	2 July 1998	1:00 p.m.	Interviewing SRUI 1
		2:45 p.m.	Interviewing SRUI 2
	3 July 1998	10:00 a.m.	Interviewing SRUI 3
		11:00 a.m.	Interviewing SRUI 4
3:00 p.m.		Interviewing SRUI 5	
6 July 1988	10:00 a.m.	Interviewing SRUI 6	
	1:00 p.m.	Interviewing SRUI 7	
	2:30 p.m.	Interviewing SRUI 8	
7 July 1998	10:00 a.m. 11:30 a.m.	Interviewing SRUI 9 Interviewing SRUI 10	
Naresuan University Phitsanulok	15 July 1998	10:00 a.m.	Discussing the request with an engineering lecturer and making an arrangement
	17 July 1998	10:00 am	Interviewing SRUI 11
		11:00 am	Interviewing SRUI 12
3:00 p.m.		Interviewing SRUI 13	
4:30 p.m.		Interviewing SRUI 14	
5:15 p.m.		Interviewing SRUI 15	
18 July 1998	8:30 a.m.	Interviewing SRUI 16	
	9:15 a.m.	Interviewing SRUI 17	
	10:00 a.m.	Interviewing SRUI 18	
	10:45 a.m.	Interviewing SRUI 19	
Rajamangala Institute of Technology, Khon Kaen Campus	29 July 1998	10:00 a.m.	Meeting the teacher and making an arrangement
	31 July 1998	9:00 a.m.	Interviewing RITI 1
		9:30 a.m.	Interviewing RITI 2
10:00 a.m.		Interviewing RITI 3	
11:00 a.m.		Interviewing RITI 4	
31 July 1998	11:30 a.m.	Interviewing RITI 5	
	12:30 p.m.	Interviewing RITI 6	
	3:30 p.m.	Interviewing RITI 7	
	4:00 p.m.	Interviewing RITI 8	
	4:30 p.m.	Interviewing RITI 9	
	5:30 p.m.	Interviewing RITI 10	

Appendix 2 (contd): The Interview Timetable

Institution	Date	Time	Activity
Rangsit University Bangkok	6 August 1998	12:30 p.m.	Interviewing PRUI 1
		1:00 p.m.	Interviewing PRUI 2
		2:00 p.m.	Interviewing PRUI 3
		2:30 p.m.	Interviewing PRUI 4
		3:30 p.m.	Interviewing PRUI 5
	7 August 1998	9:00 a.m.	Interviewing PRUI 6
		9:45 a.m.	Interviewing PRUI 7
		10:30 a.m.	Interviewing PRUI 8
		11:15 a.m.	Interviewing PRUI 9
		11:45 a.m.	Interviewing PRUI 10

Note: SRUI 1 means the first student studying at a state-run university who was interviewed. This also applies to those studying at a private-run university (PRUI), and Rajamangala Institute of Technology (RITI).

Appendix 3: The semi-structured interview guide on language learning strategies

Q1: What is your name?

Q2: How many English classes are you studying this term?

Q3: How many students are studying English with you this term in one class?

Q4: According to 3, do you think your class is large, optimum, or small?

Q5: 5.1 Do you think it is a problem for you?
5.2 Why? Or Why not?

Q6: How often do you study English at university?

Q7: According to Q6, do you think it is enough for you?

Q8: What is the level of your ability in English as high, moderate, or low?

Q9: Do you do anything to help yourself understand the English lessons better?
If yes,
9.1 What do you do before coming to the class?
9.2 What do you do during the class?
9.3 What do you do after the class?

Q10: What do you do to improve your English in general?

Q11: What do you find (think) very difficult for you in learning English?

Q12: How do you usually solve the problem?

Q13: Do you have any comments about learning English in your present classroom?

Appendix 4: The Student's Background Questionnaire

Please provide the information about yourself by choosing the choices given (X) or write the response where necessary:

1. Your name: _____

2. Your institution: a state-run university
 a private-run university
 Rajamangala Institute of Technology

3. Your sex: male
 female

4. Your ability in English:
 high
 moderate
 low

5. Number of students in your present English class : _____

6. According to (5), you think your English class is:
 large
 optimum (neither large nor small)
 small

7. You think English is: (you can choose more than one)
 easy
 difficult
 interesting
 useful
 boring
 useless
 others (please specify) _____

Thank you very much for your co-operation



.....
 This part for the interviewer use only

CODE: SRU _____
 PRU _____
 RIT _____

Appendix 5: A Sample Interview

A Sample Interview Script (The translated Version)

Interviewer: Channarong Intaraprasert

Interviewee: SRUI 2

Date: 2nd July, 1998

Time: 14:45 hours

Place: Suranaree University of Technology, Nakhon Ratchasima, Thailand

.....

Me: Good afternoon.

SRUI2 : Good afternoon.

Me: Would you take a seat please?

SRUI2: Thank you.

Me: How are you today?

SRUI2: I'm fine, thank you. And you?

Me: Very well, thanks. *Q1 What's your name, please?*

SRUI2 : Somsak. You can call me 'Sak'.

Me: All right. I will call you 'Sak'.

SRUI2: Yes.

Me: Please do not worry about this interview as told you formerly. I have to record the interview as well. Is that all right?

SRUI2: Yes. No problem.

Me : *Q2 How many English courses do you take this term?*

SRUI2: Just one.

Me : *Q3 How many students are there in your class?*

SRUI2: About thirty students.

Me : *Q4 Do you think your class is large, optimum or small?*

SRUI2: I think it's small—fifty students should be all right.

Me : Why do you think a class of fifty should be all right?

SRUI2: I believe that one teacher can take care of fifty students with no difficulty. Thirty students may be too few in one class for one teacher.

Me : All right. From your own experience, what is the largest class are you in?

SRUI2: Logical Thinking and IT. There are more than one thousand students in one class.

Me : *Q5 Is it a problem for you?*

SRUI2: Yes. It's too large a group. Sometimes I can't catch up with the teacher because the teacher teaches too fast. I can't ask the question, either.

Me : What do you do then?

SRUI2: Sometimes I ask my friends and sometimes I just pay no attention.

Me : Right. Let's go back to your English class. *Q6 How often do you study English?*

SRUI2: Twice a week and each class lasts for one and a half hours. One class is a tutorial class and study with a teacher and the other one I study in the computer laboratory. So three hours altogether.

Me : *Q7 Do you think three hours a week is enough for you?*

SRUI2: I don't think it is enough because I can learn very little, particularly in the computer lab. I can't do much and the time is over.

Me : What do you study in the computer lab?

SRUI2: Well, I practise listening and speed reading. I have to do many exercises.

Me : So, how many hours should be all right for you then?

SRUI2: About four hours.

Me : If four hours a week, what do you think you can do?

SRUI2: I can learn more vocabulary, read the texts in the course book. This will help me learn more about the texts and in the computer lab, I will have more time to practise. I will know more vocabulary.

Me : Why do you think you will learn more vocabulary?

SRUI2: I think when I learn English, it is important for me to know vocabulary. I have to be familiar with them and this helps me understand the meaning of the passage I read. Still I have to understand grammar as well.

Me : Right. *Q8 What do you think about your ability in English?*

SRUI2: I think my ability in English is low. I feel that when I do exercises, I can't do very well. When they are more difficult, I don't get many correct. I can do at the basic level. If it is a grammar exercise, I can't do it much. When the teacher speaks English, I don't understand—I mean I don't get the meaning, particularly new vocabulary.

Me : Well, shall we now talk about how you study English? *Q9 Do you do anything to help you understand the lesson well?*

SRUI2: Yes. I will see where we were last time and I study in advance. See what the teacher is going to teach next. I do exercises in the past lessons and then the next one. I can do very little because I'm worried about other subjects as well. I study beforehand, do a revision, and look up the meaning of new words which are listed at the end of each lesson or unit.

Me : How do you find the meaning of new words?

SRUI2: I find the meaning of new words in a dictionary. I translate into Thai and very few words I can do in English. Before coming to class, I like to try new exercises. If I feel I can do, I will. This can help me understand better when studying with the teacher in class. Occasionally, I prepare myself well to come to class. If I feel exhausted or I don't feel fresh, I can't concentrate on the lesson. If I want to learn, I will pay close attention and I have to prepare myself physically as well.

Me : *Q9.1 Anything else do you like to do before you come to your English class?*

SRUI2: I'm afraid that's all I do.

Me : All right. *Q9.2 What about while studying in class?*

SRUI2: I listen to the teacher attentively. When the teacher introduces new words, I'll put them down. I will answer the questions when the teacher points out to me. I can answer some. If the question is too difficult, I can't. Most of the time, I will look at exercises in the book. I try to read for the gist and then answer the question. It may be slow.

Me : Anything else?

SRUI2: I have to be attentive, take notes of the new words on the board, try to understand when the teacher finishes teaching. If the teacher teaches too fast, I will just put a tick on what I can't catch up with or understand.

Me : Anything else?

SRUI2: When the teacher asks us to write and we can discuss with friends, we will form a group and help one another to finish the work and answer the questions.

Me : When getting into groups, do you have particular friends to work with?

SRUI2: No. But I like to work with someone who understands English better than I do because he/she can explain the points that are not clear to me.

Me : *Q9.3 What about after class? Do you do anything with your English lesson?*

SRUI2: Well, my brain needs to relax. I have to study other subjects as well. Sometimes I talk with friends. For English, I just do exercises beforehand, or just leave them until I go back to the class. Admittedly, I spare very little time for English when compared with other subjects. Sometimes I discuss with friends who are better at English than I am. Sometimes I persuade my friends to speak English and speak it on the phone, but I don't understand much. I have to ask my friend to repeat the questions frequently. I can respond to basic questions.

Me : Does that help you in learning English?

SRUI2: Yes. But I don't often see my friends. I also try to find an English book to read as suggested by the teacher. I can't do much as I have very little time for English and I'm worried about other subjects. That's all.

Me : Right. *Q10 Do you do anything to help improve your English in general?*

SRUI2: Well, I try to read any English sentences outside the classroom and try to understand them. If I'm not familiar with them, I'll remember them. I like to guess the meaning of new words on the billboards. I don't do much apart from classroom learning.

Me : Well, you told me you don't have much time for English. But *Q10 what else do you like to do to improve your English?*

SRUI2: I like to practise speaking English. I always want to speak English fluently. I also like to practise speed reading because I would be able to read a lot.

Me : Why do you like to practise speaking English?

SRUI2: I want to practise speaking English because I want to communicate with people who speak English. I want to be smart like you or other students who can speak English. Now, I can speak very little and can speak only with my friends.

Me : *Q10 What else do you like to do?*

SRUI2: I like to practise paraphrasing, skimming and scanning. When I can't guess the meaning of a new word, I always skip over. I know I should practise more. I should be able to use English every day. If I have a chance to use it more often, it should be good for me. It is useless if I can't make use of what I have learnt in class. When I was at a high school, I never put things into practice, I never used English. I also like to read a lot, for example, newspapers or any English statements.

Me : What do you do if you don't understand what you are reading?

SRUI2: If it is not important for me, I will pay no attention. If I often see it, I'll become familiar with it automatically or I'll check the meaning. Advertisements are not important for me, but if there is one which is important for me, I'll pay attention and try to understand it.

Me : Anything else?

SRUI2: That's all.

Me : *Q11What do you find difficult in learning English?*

SRUI2: Grammar. When I was at high school, I learnt basic grammar like past simple, present perfect. When grammar becomes more difficult, I need to study more. I have no idea how much grammar I have to use. What I do now is practise reading more frequently and correctly. I also practise writing. I try to use a word that has a similar meaning if I don't know the precise word.

Me : If you make a mistake in your writing, how do you correct it?

SRUI2: I check against a dictionary. If I haven't got a dictionary, I'll ask a friend. If not, I just guess, or leave it.

Me : *Q12How do you help yourself improve grammar?*

SRUI2: I ask someone who knows English to teach me. After that I do exercises. This will help me understand better. If I still have a problem, I'll ask the one who teaches me or the teacher.

Me : When do you usually ask the questions?

SRUI2: Well, I prepare the questions and go to see someone who teaches me or the teacher. But I don't often ask them because we don't live near each other. I sometimes ask my teacher after the class finishes. I will ask what I have noted or put a tick on. If I have a chance, I will ask in class but not immediately.

Me : Anything else?

SRUI2: No. That's all.

Me : OK. Thank you. *Q13What's your opinion about English learning and teaching from your own experience?*

SRUI2: Well, the teacher teaches very well and I want to practise more. I want my friends to speak English in the classroom rather than sit and listen to the teacher. This will help us speak English better. New vocabulary should be used as well as writing.

Me : Anything else?

SRUI2: That's all.

Me : Thank you very much indeed for your co-operation and your experiences. Thank you.

Appendix 6: The Language Learning Strategy Questionnaire

Instructions: The Language Learning Strategy Questionnaire (LLSQ) is designed to gather information about how you, as an engineering student, go about learning English. On the following pages, you will find statements related to learning English. Please read each statement carefully and choose the response 'Yes' or 'No' which applies to you. If the response you choose is 'Yes', go on to the statements that follow and mark (X) the response which best describes how often you actually do each activity when you are engaged in English. If the response you choose is 'No', proceed to the next part as instructed. Please also note that there are no right or wrong answers for your responses.

<p>Never Sometimes Often Always or almost always</p>

Never means that you never do the activity which is described in the statement

Sometimes means that you do the activity which is described in the statement less than half the time

Often means that you do the activity which is described in the statement more than half the time

Always or almost always means that you always or almost always do the activity which is described in the statement

Example:

1. Do you try to prepare yourself for the lessons? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If 'No', proceed to 2. If 'Yes', how often do you?				
Language Learning Strategy	Always or almost always	Often	Sometimes	Never
1A) study the lessons beforehand such as the content or the objective of each lesson 1B) try some exercises in advance 1C) prepare yourself physically 1D) do the revision of the lessons <input type="checkbox"/> other (please specify).....	X X	 X	 X	

1. Do you try to prepare yourself for the lessons?

Yes No

If 'No', proceed to 2. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
1A) study the lessons beforehand such as the content or the objective of each lesson	-----	-----	-----	-----
1B) try some exercises in advance	-----	-----	-----	-----
1C) prepare yourself physically	-----	-----	-----	-----
1D) do the revision of the lessons	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

2. Do you try to keep up with the teacher while studying in the classroom?

Yes No

If 'No', proceed to 3. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
2A) listen to the teacher attentively	-----	-----	-----	-----
2B) attend the class	-----	-----	-----	-----
2C) take notes while studying in class . with the teacher	-----	-----	-----	-----
2D) think to yourself along with the teacher while studying in class	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

3. Do you try to get the teacher's attention while in the classroom?

Yes No

If 'No', proceed to 4. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
3A) try to have an interaction with the teacher by asking or answering questions while studying in class	-----	-----	-----	-----
3B) take part in classroom activities other than asking or answering questions	-----	-----	-----	-----
3C) try to have an interaction with the teacher outside the class time	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

4. Do you try to learn new vocabulary for the classroom lessons?

Yes No

If 'No', proceed to 5. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
4A) memorise new vocabulary items with or without the vocabulary lists	-----	-----	-----	-----
4B) use a dictionary to check the meaning of a new vocabulary item either in Thai or in English	-----	-----	-----	-----
4C) guess the meaning of a new vocabulary item from the contexts	-----	-----	-----	-----
4D) look at the root or the form of a new vocabulary item	-----	-----	-----	-----
4E) group new vocabulary items according to their similarity in meanings or spellings	-----	-----	-----	-----
4F) use new vocabulary items to converse with peers	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

5. Do you try to avoid being distracted while studying?

Yes No

If 'No', proceed to 6. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
5A) try to get a seat in the front row	-----	-----	-----	-----
5B) try not to talk with other students while studying	-----	-----	-----	-----
5C) sit next to a bright or quiet student	-----	-----	-----	-----
5D) try not to pay attention to what other students are doing while studying	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

6. Do you try to solve the problem of the classroom lessons?

Yes No

If 'No', proceed to 1.7. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
6A) ask your teacher in class either immediately or when appropriate	-----	-----	-----	-----
6B) ask your teacher after class	-----	-----	-----	-----
6C) ask your classmate or classmates either in class or outside class	-----	-----	-----	-----
6D) ask people other than your regular teacher or your classmates	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

7. Do you try to pass the English tests?

Yes No

If 'No', proceed to 8. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
7A) do the revision of the lessons only for the examination.	-----	-----	-----	-----
7B) practise tests from different sources	-----	-----	-----	-----
7C) join a tutoring group	-----	-----	-----	-----
7D) attend extra-classes	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

8. Do you try to expand your knowledge of English vocabulary and expressions?

Yes No

If 'No', proceed to 9. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
8A) read printed materials in English such as billboards, leaflets, newspapers and magazines	-----	-----	-----	-----
8B) play games in English such as crosswords and computer games	-----	-----	-----	-----
8C) see an English-speaking film	-----	-----	-----	-----
8D) listen to English songs	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

9. Do you try to improve your English listening skill?

Yes No

If 'No', proceed to 10. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
9A) see an English-speaking film	-----	-----	-----	-----
9B) listen to English songs or cassette tapes of English conversations	-----	-----	-----	-----
9C) listen to a radio programme in English	-----	-----	-----	-----
9D) watch TV programmes in English	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

10. Do you try to improve your English speaking skill? Yes No

If 'No', proceed to 11. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
10A) talk to yourself	-----	-----	-----	-----
10B) try to imitate a native speaker from media such as films or cassette tapes	-----	-----	-----	-----
10C) converse in English with your peers, siblings, or foreigners	-----	-----	-----	-----
10D) use a computer programme like a 'chat' programme	-----	-----	-----	-----
10E) go to a language school	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

11. Do you try to improve your English writing skill? Yes No

If 'No', proceed to 12. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
11A) correspond in English by electronic mail (e-mail) or a letter	-----	-----	-----	-----
11B) practise writing sentences or essays in English	-----	-----	-----	-----
11C) practise translating from Thai into English	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

12. Do you try to acquire general knowledge in English? Yes No

If 'No', please stop here. If 'Yes', how often do you

Language Learning Strategy	Always or almost always	Often	Sometimes	Never
12A) seek an opportunity to be exposed to English	-----	-----	-----	-----
12B) go to a language school	-----	-----	-----	-----
12C) read printed materials such as books, textbooks or magazines in English	-----	-----	-----	-----
12D) surf the Internet	-----	-----	-----	-----
<input type="checkbox"/> other (please specify).....	-----	-----	-----	-----

Thank you very much for your co-operation.

Appendix 7 : The Proficiency Test in English for Science and Technology -PTEST

Instructions:

1. Please read the instructions carefully before doing each part.
2. In this test, there are four reading passages:

Reading Passage One: *Engineering*

Numbers 1 - 14 25 minutes

Reading Passage Two: *Information Technology and Industry*

Numbers 15 - 23 25 minutes

Reading Passage Three: *The Rocky Flats Story*

Numbers 24 - 34 20 minutes

Reading Passage Four: *The Steam Power Plant*

Numbers 35 - 44 15 minutes

Total 44 items 1.25 hours

3. Please do not write anything on the test paper.
4. Put the right answer on the answer sheet provided against each item.
5. Try to do every item and please remember there is only *one* correct answer for each item.
6. If you have any question, please ask before starting.
7. When you have finished the test, please proceed to the 'Language Learning Strategy Questionnaire'.

Thank you very much for your co-operation and good luck.

Reading Comprehension Test

Questions 1-14

You are advised to spend about 25 minutes on Questions 1-14 which refer to Reading Passage 1 below.

Reading Passage One

ENGINEERING

A Most simply, the art of directing the great sources of power in nature is for the use and the convenience of humans. In its modern form engineering involves people, money, materials machines, and energy. It is differentiated from science because it is primarily concerned with how to direct to useful and economical ends the natural phenomena which scientists discover and formulate into acceptable theories. Engineering therefore requires above all the creative imagination to innovate useful applications of natural phenomena. It is always dissatisfied with present methods and equipment. It seeks newer, cheaper, better means of using natural sources of energy and materials to improve the standard of living and to diminish toil.

B **Types of engineering.** Traditionally there were two divisions or disciplines, military engineering and civil engineering. As knowledge of natural phenomena grew and the potential civil applications became more complex, the practising engineer began to restrict operations to narrower channels. For instance, civil engineering came to concern primarily with static structures, such as dams, bridges and buildings, whereas mechanical engineering split off to concentrate on dynamic structures, such as machinery and engines. Similarly, mining engineering became concerned with the discovery of, and removal from, geological structures of metalliferous ore bodies, whereas metallurgical engineering involved extraction and refinement of metals from the ores. From the practical applications of electricity and chemistry, electrical and chemical engineering arose.

C Civil engineers had more specialised training as structural engineers, dam engineers, water-power engineers, bridge engineers; mechanical engineers as machine-design engineers, industrial engineers, motive-power engineers; electrical engineers as power and communication engineers (and the latter divided eventually into telegraph, telephone, radio, television and radar engineers whereas the power engineers divided into fossil-fuel and nuclear engineers); mining engineers as metallic-ore mining engineers and fossil-fuel mining engineers.

D As a result of this ever-increasing utilisation of technology, people and their environments have been affected in various ways-some good, some bad. Sanitary engineering has been expanded from treating the waste products of humans to also treating the effluents from technological processes. The increasing complexity of specialised machines and their integrated utilisation in automated processes has resulted in physical and mental of the operating personnel. This has led to the development of bioengineering, concerned with the physical effects upon humans, and management engineering, concerned with the mental effects.

E **Integrating influences.** While the specialisation was taking place, there were also integrating influences in the engineering field. The growing complexity of modern technology called for many specialists to co-operate in the design of industrial processes even in the design of individual machines. For instance, the design of a modern structure involves not only the static structural members but a vast complex including moving parts (elevators, for example); electrical machinery and power distribution; communication systems; heating ventilating, and air-conditioning; and fire protection. Even the structural members must be designed not only for static loading but for dynamic loading, such as for wind pressures and earthquakes. Because people and money are as much involved in engineering as materials, machine and energy sources, the management engineer arose as another integrating factor.

F Formal education must be broad and deep in sciences and humanities underlying the particular field. Then comes an increasing degree of specialisation in the intricacies of the discipline, also involving continued postscholastic education. Normal promotion thus brings interdisciplinary activity as the engineer supervises various specialists. Finally, the engineer enters into the management function by interweaving workers, money, materials, machines, and energy sources into completed processes for the use of humankind.

Questions 1-2

Complete the following statements by writing **ONE** word from Reading Passage One in the spaces numbered 1-2 on the answer sheet.

1. Engineering, unlike _____, requires the creative imagination to improve our standard of living.
2. In some countries, wind power is an alternative source of _____.

Questions 3-7

Read each statement and according to the text, write **T** if the statement is true, and **F** if the statement is false. Write your answers in the spaces numbered 3-7 on the answer sheet.

3. Science, unlike engineering, always finds new ways of making use of natural resources.
4. Each of the engineering fields always works independently.
5. Engineers need to have some knowledge in other disciplines such as the humanities.
6. The management engineer arose as the result of the involvement of people and money in engineering.
7. The engineers enter into the management function by separating workers from money and machines.

Questions 8-9

According to Reading Passage one, which **TWO** activities involve metallurgical engineering? Use **ONE** word for each activity. Write your answers in the spaces numbered 8-9 on the answer sheet.

Questions 10-14

Five sentences have been left out of Reading Passage one. Each sentence is divided into **Beginning of Sentence** and **End of Sentence**. Complete questions 10-14 by adding a phrase from **A-E**. Write your answers in the spaces numbered 11-14 on the answer sheet. One choice can be used only once. Number 10 has been done for you already.

Beginning of Sentence

10. Engineering
11. The civil engineering discipline tends to
12. Typical modern engineers
13. This splintering process
14. Interdisciplinary activity

End of Sentence

- | |
|---|
| <p>A ...continued as narrower specialisation became more prevalent.</p> <p>B ...developed to co-ordinate the specialists</p> <p>C ...go through several phases of activities during their careers.</p> <p>D ...become more and more specialised.</p> <p>E ...requires the creative imagination to innovate useful applications of natural phenomena.</p> |
|---|

Questions 15-23

You are advised to spend about 25 minutes on **Questions 15-23** which refer to Reading Passage two below.

Reading Passage Two

INFORMATION TECHNOLOGY AND INDUSTRY



Telecommunications have been with us since the invention of the telephone, and computers appeared in the 1950s. By 1983 over five million computers or data terminals were in use in American offices and the number has increased by about 25 per cent each year. Similar trends are occurring in Europe and the UK.

In order to assess the degree to which new information technology is likely to affect women workers, one should isolate the types of jobs and industries they are concentrated in (see Table 1). Defining an information job as any job in which information is communicated, processed or sorted; an examination of Table 1 reveals that the majority of British women workers are in information processing jobs ranging from banking, finance, insurance, travel agencies, publishing and consumer industries in the private sector to administrative jobs in education, local government and health services.

Table 1. Occupations and Industries with High Proportion of Women Workers

Occupation	Industry
Clerical (e.g. secretaries, typists, clerks)	Banking, insurance and finance; public administration; paper printing and publishing
Manufacturing (e.g. assemblers, packers, machinists)	Food, drink and tobacco; clothing and footwear; paper, printing and publishing; electrical engineering; textiles
Distribution (e.g. packers, store-keepers, cashiers, sales assistants)	Distribution; retailing; banking
Ancillary (e.g. cleaners, cooks)	Education; health services; manufacturing generally
Caring professions (e.g. teachers, nurses, social workers)	Education; health services

Source: TUC (1984)

Information technology in the office

The new office technology is made up of the following combination systems: writing system, e.g. word processors, typewriters; dictating systems, e.g. dictating machines; telecommunications, e.g. telefax, teleconferencing; librarian systems, e.g. viewdata; mailing systems, e.g. electronic mail; information storage systems, e.g. computer disk;

computerising, e.g. mainframe, minis, micros; and copying systems, e.g. photoelectronic transmission. With over one third of women workers being employed in office jobs, 90 per cent of whom are in routine clerical jobs, this is obviously an important area where women's jobs may be at risk due to the rapid introduction of information technology.

Huggett et al. (1985) suggest that with the adoption of microelectronics technology in the office, and male advantages regarding technological knowledge and training, the new job opportunities are being appropriated by men rather than women. Indeed, unless there are radical changes, these new technology jobs are in danger of becoming 'masculinised' and contributing to yet another facet of gender segregation in the workforce.

It has also been proposed that besides women's jobs being deskilled, their jobs are also at risk. Softly (1985) quotes a report by International Federation of Commercial, Clerical and Technical Employees, which estimated that technical change in offices will lead to the displacement of 20-25 per cent of clerical staff in Western Europe, or about five million people.

Health and safety issues

Another major area of concern for information technology workers has been related to health and safety issues, particularly among visual display unit (VDU) operators working on computer terminals and word processors. These include hazards from radiation, cataracts, epileptogenic effects, facial dermatitis, postural and visual fatigue and mental tiredness.

Certainly, psychological reactions in VDU workers have also been found to be important variables determining negative effects. Pierce (1986) points out that studies of employees who work *at* VDUs tend to report significantly higher levels of pain and discomfort than those who maintain their work *with* VDUs. In studies reviewed by Kalimo and Leppänen (1985) control over work seemed to be an important factor, with perceived lack of control their work being associated with VDU workers who complained of monotony.

Turning our attention to the area of stress and VDU work, stress reactions have been reported more in VDU workers in repetitive, non-challenging jobs, whose VDU work is excessive, and in VDU workers who are subjected to unpredictable delays and functional breaks with computer systems. Moreover, a recent study by Copper and Cox (1985) on female word process operators found they perceived more aspects of their jobs stressful and were more dissatisfied with their job than a control group of copy typists. Lack of job role clarity and limited career prospects were the major predictor of mental ill-health and job dissatisfaction. Indeed, one of the most serious hazards associated with female VDU workers is the suspected higher incidence of miscarriages and deformities in babies in those who work with VDU whilst pregnant (and the months before conception). This is based on a number of reported cluster effects of VDU workers and pregnancy problems since the late 1970s, from Canada, USA, Europe and Britain.

Questions 15-18

Use a maximum of **THREE** words from the reading passage to answer each of questions **15-18**. Write your answers in spaces numbered **15-18** on the answer sheet.

15. What is the trend of computer use in the UK when compared with that of America?
16. Indicate one of the two negative psychological effects found among VDU workers by Pierce (1986).
17. Indicate one of the two most serious problems associated with pregnant VDU workers.
18. What is at risk due to the rapid growth of information technology?

Questions 19-23

Decide whether the statements below support information in Reading Passage Two. In the spaces numbered **19-23**, write:

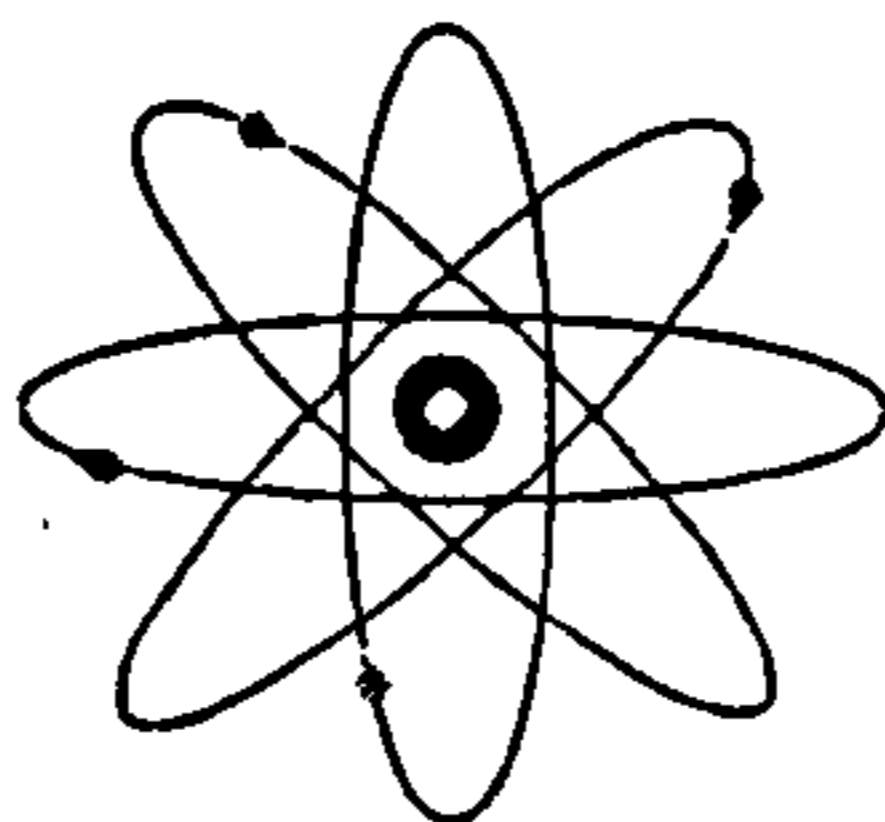
YES if the statements support information
NO if the statements do not support information
NOT GIVEN if the statements do not refer to the information

19. The majority of working women in the United Kingdom work in the information processing industry.
20. Women are inferior to men regarding technological knowledge and training.
21. Men workers always earn higher salaries than women workers.
22. Facial dermatitis and cataracts are a major concern which is related to safety and health issues among VDU workers.
23. The technical changes in offices do not have an impact on unemployment in Western Europe.



Questions 24-34

You are advised to spend about 20 minutes on **Questions 24-34** which refer to Reading Passage Three below.

Reading Passage Three**THE ROCKY FLATS STORY**

A The news media in metropolitan Denver, Colorado have been covering the Rocky Flats nuclear weapons production plant for 46 years, since 1951. The now defunct plant is located just 18 miles from downtown Denver. The plant's main task was to process plutonium and manufacture it into hollow, grapefruit sized cores for nuclear bombs used as stand-alone fission weapons or detonators for hydrogen bombs. The DOE abruptly halted plutonium production for safety reasons in late 1989. Intended as a temporary shutdown, production never restarted, leaving 14.2 tons of plutonium in various places in the production pipeline. Most of the plant's nuclear waste still has nowhere to go.

B "Plutonium Stockpile Fosters Fears of a Disaster Waiting to Happen," read the headline of a December 11, 1996 *New York Times* story. The quote didn't come from a scientist, engineer or public officer at Rocky Flats, but came from the president of the Denver Metro Chamber of Commerce who said, "I put this [Rocky Flats] in the category of a disaster waiting to happen."

C This and similar coverage in newspapers about Rocky Flats indicates that today's mainstream news media generally mirrored the community's values and assumptions. In the past, only after problems in plant operations were exposed by a huge industrial fire in 1969, did the media become somewhat more *aggressive in pursuing the story*. Until the waning years of the Cold War, the general public and mainstream media had gone along with *national security ideology and secrecy*. Besides, national security was lucrative for communities that landed military installations, contracts, and jobs.

D The fact that Rocky Flats was a nuclear weapon factory was no secret from the beginning in 1951. The public didn't question the morality of producing the incredibly destructive nuclear weapons. All details of the Rocky Flats operation were kept secret. The veneer of "national security" hid some rotten apples---sloppy practices and corruption bred by secrecy and a lack of accountability. The federal government and its corporate contractors and experts also kept secret the plant's potential risks to public safety and health. The message to and from the media was: Don't worry, the experts are in control.

E Journalists didn't ask questions very often, even about a major fire at the plant in 1957. The fire occurred in the cavernous building where chemical engineers transformed plutonium from liquid to solid to pure plutonium metal. The fire released plutonium into atmosphere. A story at the time on *The Denver Post's* front page, quoted a plant spokesman as attributing the fire to "spontaneous combustion" in a processing line. The newspaper didn't carry a single follow-up story. In terms of media coverage, there were by and large the "trusting, happily unquestioning years." They ran from 1951 to 1969. Newspapers and news broadcasters were boosters. Growth was good, good for the profits of newspaper owners and other entrepreneurs. During this period, editorials praised Dow Chemical Company and the Atomic Energy Commission (AEC) for the plant's safety record.

F Media coverage changed after the huge industrial fire in May 1969, but not immediately afterwards. Unlike the 1957 fire, there were follow-up stories in 1969. Most importantly, a group of concerned scientists, which had joined together to challenge the so-called peaceful nuclear bombs being exploded

in Western Colorado, did soil samples around Rocky Flats and found plutonium contamination. These scientists made journalists aware of their concerns. Journalists began asking AEC and Dow.

G In denying that the 1969 fire caused the plutonium in the soil, both the government agency and the industry operator revealed a major source of contamination that they had been keeping secret. More than 5,000 55-gallon and 30-gallon drums of plutonium contaminated oils and solvents had been stored outside, subject to snow and cold in the winter and heat in the summer. The barrels leaked. In 1967 a heavy rain storm spread contamination to a ditch near the drum storage field. Then, efforts to grade the land stirred up the plutonium particles, which were spread by high winds. Still, once again, plant officials successfully wielded "national security" to prevent close scrutiny of plant operations.

H Activist citizens opposed to the nuclear arms race, and opposed to war, began holding demonstrations outside the Rocky Flats gates in the mid-1970s. Journalists wrote and broadcast numerous Vietnam era anti-war protest stories. Later, the nation's entire nuclear weapons complex gained even more attention following the Chernobyl disaster of 1986.

I Headlines fuelled politicians who then made headlines themselves. Serious environmental problems involving toxic chemicals and radioactive waste disposal came into the open. The mood had changed. The media became more aggressive in pursuing the story. A federal grand jury was summoned to investigate Rocky Flats. Lawsuits proliferated. More journalists filed Freedom of Information Act requests to uncover old secrets and wrote stories based on the documents received.

J In a 1992 plea agreement, Rockwell International (now the plant operator) pleaded guilty to several pollution violations at Rocky Flats and agreed to pay \$18.5 million fine. A congressional subcommittee convened hearings. A federal judge refused to release the grand jury report. The report ultimately leaked to an alternative Denver weekly publication and portions were published. Secrets had found ways to get out.

K The formal name of Rocky Flats was changed 2 ½ years ago. It is now officially called the Rocky Flats Environmental Technology Site.

Questions 24-28

Put the statements below in the correct chronological order according to the reading passage. Start with number 24 for the event that happened first. Write the appropriate letter A-E, in the spaces numbered 24-28 on the answer sheet. Number 26 has been done for you already.

- A** The Rocky Flats nuclear weapon production plant was shut down.
- B** The plant operator agreed to pay the fine.
- C** A group of concerned scientists did soil samples around Rocky Flats.
- D** Anti-nuclear arms race activist citizens began demonstrations.
- E** The formal name of Rocky Flats was changed.

Questions 29-34

Find the appropriate word or words from the reading passage which has/have the same meaning as the definitions given below. The suggested paragraph in the brackets for each item will help you find the answer. Write your answers in the spaces numbered 29-34 on the answer sheet.

29. The spontaneous or induced disintegration of a heavy atomic nucleus into two or more lighter fragments (paragraph A)

30. Great damage (paragraph B)

31. The ignition of substance or material without direct application of flame (paragraph E)

32. Modification of the environment by release of noxious materials, particularly from factories or vehicles, rendering it harmful or unpleasant to life (paragraph J)

33. Very tiny and fine pieces of solid material (paragraph G)

34. One who is very knowledgeable or specialises in a certain field (paragraph D)



Parts of the Steam Power Plant

- A steam generator
- B condensate pump
- C superheater
- D low-pressure heater
- E steam turbine (turbogenerator)
- F deaerator
- G condenser
- H feed water pump
- I circulating pump
- J high pressure-heater



Thank you very much for your co-operation

Questions 35-44

You are advised to spend about 15 minutes on Questions 35-44 which refer to Reading Passage Four below.

Reading Passage Four

The Steam Power Plant

The steam generator produces high-pressure saturated steam, which will be superheated in the superheater to the rated level. The superheated steam is used in the steam turbine, which converts it to the required mechanical work. Thus the heat energy is converted to mechanical energy, which in turn is converted to electrical energy in the generator.

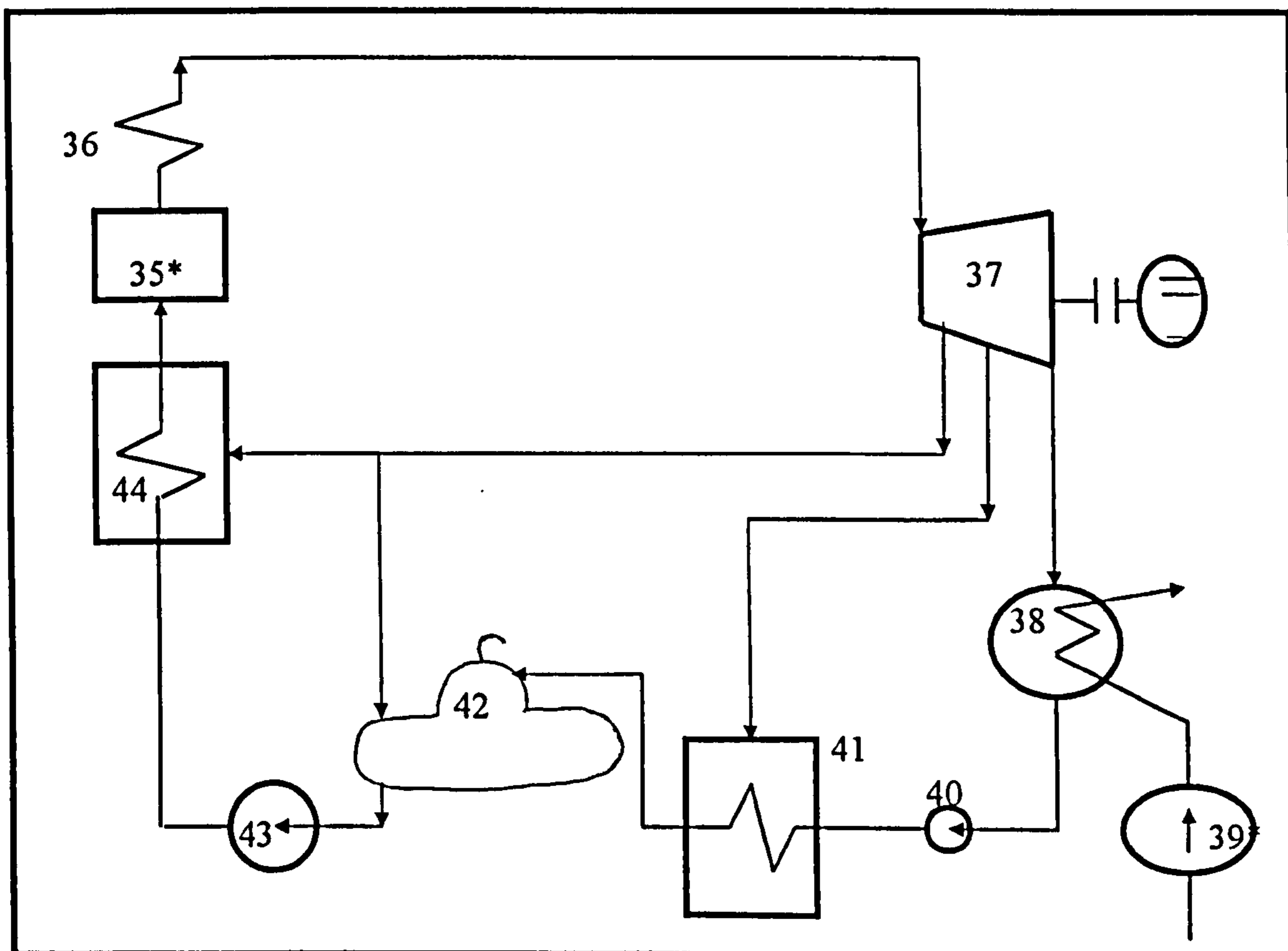
The exhaust steam then flows to the condenser where it is cooled and converted to the condensate. The condensate pump forces the condensate into the low-pressure heater. The heated condensate will be deaerated in the deaerator. In addition, make-up water has also been added and supplied to the deaerator for making up for the losses existing in the system. In this way the deaerated water becomes suitable for feeding the boiler.

The feed water pump increases the pressure to feed water and forces it into the high-pressure heater before being forced into the steam generator.

The whole system is connected by steam lines and water pipes, which ensure the proper circulation of the working fluid in the system of the steam power plant.

Questions 35-44

Complete the diagram below by choosing the appropriate letter A-J from the list given for each labelled part of the plant. Write your answers in the spaces numbered 36-45 on the answer sheet. Number 35* and 39* have been done for you already.



ANSWER SHEET**Proficiency Test in English for Science and Technology****Questions 1-14****Reading Passage One: "Engineering"****Questions 1-2**

1. _____ 2. _____

Questions 3-7

3. _____ 4. _____ 5. _____ 6. _____ 7. _____

Questions 8-9

8. _____ 9. _____

Questions 10-1410. E 11. _____ 12. _____ 13. _____ 14. _____**Questions 15-23****Reading Passage Two: "Information Technology and Industry"****Questions 15-18**

15. _____ 16. _____

17. _____ 18. _____

Questions 19-23

19. _____ 20. _____ 21. _____ 22. _____ 23. _____

Questions 24-34**Reading Passage Three: "The Rocky Flats Story"****Questions 24-28**24. _____ 25. _____ 26. A 27. _____ 28. _____**Questions 29-34**

29. _____ 30. _____ 31. _____

32. _____ 33. _____ 34. _____

Questions 35-44**Reading Passage Four: "The Steam Power Plant"****Questions 35-44**35. A 36. _____ 37. _____ 38. _____ 39. I

40. _____ 41. _____ 42. _____ 43. _____ 44. _____



Thank you very much for your co-operation

Appendix 8: Test Item Improvement and Refinement

- **Reading Passage One:**

Number 7: Some engineers have to educate other people about the environment. (IE)

Note: This item is rather difficult (.20) and has low power of discrimination (.18), so the researcher decided to change it to:

The management engineer came into being as the result of the involvement of people and money in engineering. (T)

Numbers 11-15:

Note: This section is rather difficult (.21) and cannot discriminate amongst the good and weak test takers (.13). One way to improve it is to turn the example to one of the items and the answer for one of the items is provided.

- **Reading Passage Two:**

Number 23: Facial dermatitis and cataracts are an important cause of stress among VDU workers. (No)

Note: This item is rather difficult (.28) and has low power of discrimination (.20), so the researcher decides to improve it as:

Facial dermatitis and cataracts are a major concern which is related to health and safety issues among VDU workers. (Yes)

- **Reading Passage Three:**

Numbers 30-35:

Note: This section is rather difficult and none of them can discriminate between the good and weak test takers. One way to improve it is to provide more clues about where to find the answer for each vocabulary item.

30. *The spontaneous or induced disintegration of a heavy atomic nucleus into two or more lighter fragments (Paragraph A)*

31. *Great damage (Paragraph B)*

32. *The ignition of substance or material without direct application of flame (Paragraph E)*

33. *Modification of the environment by release of noxious materials, particularly from factories or vehicles, rendering it harmful or unpleasant to life (Paragraph J)*

34. *Very tiny and fine pieces of solid materials (Paragraph G)*

35. *One who is very knowledgeable or specialises in a certain field (Paragraph D)*