CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.0 Introduction

The main objective of this study was to investigate the internal translation process, that is the processes that go on in the minds of the participants, who are part-time, non-professional translators, while translating scientific texts from English to Malay in Malaysia. The general objective of this study was to investigate the current translation situation of scientific texts from English to Malay. This chapter focuses on the research design and methodology that will be used in the collection and analysis of data. The main objective of this study was to investigate the internal translation process of scientific texts from English to Malay. A suggestive **case study approach** was used here. The triangulation methodology involving three research methods that is the **Think-Aloud Protocol (TAP), interviews** and **questionnaire** will be used for this study. To investigate the internal translation process, the think-aloud protocols (TAPs) and interviews will be used to obtain data from the five participants who volunteered to participate in this study. A questionnaire survey will be carried out to investigate the current situation in relation to the translation of scientific texts from English to Malay in Malaysia.

4.1 Participants of the Study

The participants who were selected for this study were chosen based on purposive sampling. Purposive sampling rests on the assumption that since one wants to discover, understand and gain insight on a particular aspect, therefore, "one needs to select a sample from which one can learn the most" (Merriam 1990:48). The part-time translators chosen as participants for this study were only those who were involved in the translation of scientific texts from English to Malay.

For the internal translation process via TAPs and interviews, the participants comprised four science lecturers and one PhD science student from the University of Malaya who are doing translation on a part-time basis.

For investigating the current translation situation of scientific texts from English to Malay, 120 questionnaires were sent via post, by hand and e-mail to the registered translators from the Malaysian National Institute of Translation (ITNMB), Institute of Language and Literature (DBP), all local and private universities, broadcasting stations, private and public colleges. However, only 50 participants responded and their responses were used for this study. Of the 50 part-time translators who responded, 18 were from the Malaysian National Institute of Translation (ITNMB), 9 were from the University of Malaya (UM), 5 were from Universiti Sains Malaysia (USM), 10 were from the Language Institute, 1 from Universiti Telekom Malaysia, 2 were from the TV3 Broadcasting station, 1 was from Universiti Kebangsaan Malaysia and 4 were from a Law Firm.

4.2 Data Collection and Procedure of the Study

The instruments used in this study comprised the questionnaire (see **Appendix D**), interview (see **Appendix E**) and TAPs (see **Appendices H1 to H5**). Three research techniques were used to ensure the reliability and validity of this study. This entails according to Seliger and Shohamy (1989:104) three areas which are "representativeness, retrievability and confirmability". In this study, the researcher takes representativeness to mean showing most of the ideas or opinions found amongst a particular group of people (*Oxford Advanced Learner's Dictionary* (1995:994). Retrievability in this study is taken to mean ability to get something back, to find or extract stored information (*Oxford Advanced Learner's Dictionary* (1995:1004). Confirmability is an aspect of validation in heuristic research and it is related to

representativeness and retrievability. It is concerned with the ability of the researcher to confirm findings either by re-inspection or by demonstrating the same findings through different resources and this process is referred to as "triangulation" (Long, 1983 in Seliger and Shohamy, 1989:105). Three different methods of data collection were thus used in this qualitative and quantitative research to compile a more complete picture of the translation process described, as this provided insights and it facilitated validation and triangulation. In **triangulation**, the same pattern found in the data collected through various means is sought and "this process increases the reliability of the conclusions reached" (Seliger and Shohamy 1989:123). In this way, subjectivity may be controlled. Triangulation helps to provide multiple perspectives on a single phenomenon. All the three techniques used in this study are discussed in the following sections. Their implementation in this study is also described.

4.2.1 Think-Aloud Protocol (TAP)

According to Toury (in Tirkkonen-Condit 1991:59), the research technique involving TAPs basically requires participants who are faced with the task of producing a translation to say aloud whatever comes to their minds while they are working on it. The verbalisations are recorded, the recorded protocols transcribed and the running transcripts are then submitted to analysis.

According to Dechert and Sandrock (1986:115), the claim is that think-aloud protocols "allow particular analyses of the levels, steps, units of processing, the role and the interaction of the source and target languages, the amount of proceduralisation, the origin and course of search processes, and the times used for these processes".

According to Toury (in Tirrkonen-Conditt 1991:59), the validity of introspective data for the study of cognitive processes has often been questioned, but most of the objections seem to have been disproved and it has been claimed that, of all mental

processes, it is translating which is most suitable for verbal reporting. As Krings (1987:166) puts it, "thinking aloud while translating is an almost natural type of activity to which most of the criticism leveled at verbal report data does not apply". This TAP analysis is applied to products which investigators assume tell them "something relevant about the underlying processes" (Hoffstaedter 1987:76, cited in Toury 1991:59). The argument is that even though TAPs "should not be taken as *direct* reflections of thought processes", they can be regarded "as data which are *correlated* with underlying thought processes" (Olson et al. 1984:254, cited in Toury 1991:59), hence taken as strongly *indicative* of them.

According to Seliger and Shohamy (1989:169), "thinking aloud involves externalising the content of the mind while engaged in a particular task without inferring mental processes". Participants are "told to say aloud everything they think and everything that occurs to them while performing the task, no matter how trivial it may seem" (Hayes and Flower, 1980 in Seliger and Shohamy 1989:169). The think-aloud protocols are believed to yield rich data as they elicit information which is kept in short memory and is therefore directly available for further processing.

According to Seliger and Shohamy (1989:170), some of the problems of think-aloud protocols are that some participants may not be used to carrying out think-aloud protocols and may find it difficult to perform two tasks simultaneously and therefore fail to verbalise important information. They feel that in an effort to please the researcher, the participants may over-compensate and provide information they feel the researcher is hoping to obtain, but which does not really reflect their true mental states. They suggest that the researcher's hope of obtaining certain data may also indirectly bias the participants' behaviour. The task of verbalising may result in the need for additional verbal processing which may interfere with the processing that is being

commented on. To overcome these problems, researchers, they feel should collect secondary data through questionnaires to corroborate the primary data, and obtain inter-rater reliability for their TAPs analysis. This was done in this study as the researcher also collected data via a questionnaire and interviews.

As the researcher wanted to investigate the strategies used by the participants while translating English language scientific texts into the Malay language, she felt that using TAPs was the best way. In this study involving TAPs using the case study approach, the five participants who were faced with the task of producing a translation of an English language scientific text into the Malay language were asked to say aloud whatever came into their minds while they were translating. The text contained about two paragraphs. A practice session was first carried out to familiarise them with the technique and once they were ready, the actual tape-recording was done. The verbalisations were recorded on a tape-recorder and the recorded protocols were then transcribed (see Appendices H1 to H5). The transcripts were then analysed inductively and matched against the language strategies put forward by O'Malley and Chamot (1990) and Oxford (1990) (see **Appendices G1 and G2**). The taxonomy by Oxford (1990) is the very highly reliable and valid Strategy Inventory for Language Learning (SILL) which has been used in many studies to do with language tasks (see Chapter 3). O'Malley's and Chamot's model was subsumed under Oxford's (1990) for this study and together the researcher repeats that it will be referred to as Oxford's model or SILL (1990).

The researcher believes that translators are advanced language learners. In line with this thinking, Oxford's (1990) taxonomy was used to analyse the TAPs texts. In this study, the participants had completed secondary and tertiary education with distinctions and credits in English language (source language) and the Malay language

(target language). They need these strategies for finding equivalent terms in the target language in their translation process. According to Robinson (1997:51), translators learn words, phrases, styles, tones, registers, cultural and linguistic strategies while translating and the researcher will investigate if this is the case in this study via the TAPs.

The aim of matching or mapping the strategies analysed from the TAPs by the researcher, on to the language learning strategies proposed by Oxford (1990) was to investigate:

1. what language learning strategies were used by the participants in their TAPs;
2. if other strategies besides these were used by the participants in their translation process

4.2.1.1 Justification of Scientific Texts Used in TAPs

In this study using the think-aloud protocol (TAP) technique, the researcher wanted to study only the internal translation process. The translated product was not studied. The five participants who participated in the TAPs were given the liberty to choose their own science texts, but three of them decided to let the researcher choose the text from a science book provided by them. All the five participants translated texts based on their own field of specialisation in science, that is, pharmacy, zoology, biochemistry, biology and pharmacology. Even though the texts chosen were from different branches of science, they still qualify as scientific texts in the context of this study. The number of words in the texts was not controlled. The chosen science texts ranged from 53 to 188 words. As the participants were doing translation on a part-time basis, they could only spare time for one short text as translating would take up some of their precious time. However, two of them agreed to translate two texts instead of one, as they had slightly more time to spare. The researcher analysed all the texts separately for the purpose of discussion. Accounting for the different science texts used or why two of the

participants translated two texts while three of them translated only one text was not the focus of the research. The focus of the research was to analyse the TAPs and discuss the strategies used in the internal translation process.

4.2.2 The Interview

According to Seliger and Shohamy (1989:166), "the purpose of the interview is to obtain information by actually talking to the subject". They suggest that questions asked by the interviewer are answered by the participants, either face-to-face or by telephone. They believe that it allows flexibility and free response as information can be probed, and unforeseen information can be sought. According to Seliger and Shohamy (1989:166), interviews are very personalised and thus allow a level of in-depth information-gathering, free response and flexibility that cannot be obtained by other methods.

Oppenheim (1992:65) says, "the interview, unlike most other techniques, requires interpersonal skills of a high order", such as making the participants feel at ease, showing interest in the questions and replies, letting the conversation flow naturally and at the same time, the interviewer is assisted or restricted by his or her own sex, age and background, skin colour etc. He proposes that the purpose is to obtain information in the form of factual replies to factual questions or responses to attitude scale items, or ideas and feelings or expectations or attitudes and the like.

Interviews, according to Seliger and Shohamy (1989:167), can be differentiated by their degree of explicitness and structure, ranging from very open interviews to very structured ones. "Open" interviews they suggest provide the interviewee with broad freedom of expression and elaboration and he is at ease to speak freely. This is because they suggest that there is no pre-planned agenda and the talk can go to greater depths and often unexpected information emerges. This type of interview they think is mostly

used in qualitative and descriptive studies.

According to Seliger and Shohamy (1989:167), in "semi-open" or semi-structured interviews, there are definite, important questions set prior to the interview and the interviewer leads the interview, probing as the interview proceeds to examine in-depth information and elaborating within limits. They propose that in structured interviews, the questions are set beforehand, shown to the interviewee and no elaboration is allowed in either the questions or the answers. The data obtained can be, they suggest, by written means, audio and video recordings. The procedures for analysing the data they think depend on the type of data obtained, so that descriptive and narrative data are analysed by looking for patterns and categories within the data.

4.2.2.1 Advantages of Interviews

According to Oppenheim (1992: 81-83), the advantages of interviews are that:

1. they often have a higher response rate when compared to questionnaires
2. the interviewers can give a prepared explanation of the purpose of the study more convincingly than a covering letter can
3. they can easily reach less well-educated respondents
4. they can help the ones with reading difficulties
5. they can offer standardised explanations to certain problems that arise
6. they can prevent many misunderstandings
7. they can maintain control over the order or sequence in which the questions are answered
8. many research workers also like to use interviewers because they feel that interviewers are more "valid" as there has been a face-to-face talk and therefore the responses have been appropriate

9. interviewers are also an advantage, for getting on-the-spot assessments of on-going projects

4.2.2.2 Disadvantanges of Interviews

On the other hand, according to Oppenheim (1992:82), there are some disadvantages of interviews too, which are:

1. interviews are expensive and time-consuming to conduct and to process
2. there is always the risk of interviewer bias
3. interviews are usually too expensive to reach a widely, dispersed sample.

Seliger and Shohamy (1989:166) agree with Oppenheim's opinion that interviews have some disadvantages, such as:

1. they can be costly, time-consuming and difficult to administer
2. interviews require skills and one has to undergo extensive training to become a good interviewer
3. they may introduce elements of subjectivity, personal bias and rapport and may cause the interviewee to respond in a certain way to please the interviewer.

4.2.2.3 Interview in this Study

The same five participants who participated in the TAPs were interviewed. The researcher used the interview to obtain a deeper understanding of the translation process and the problems and difficulties faced by the part-time translators of English language scientific texts into the Malay language.

For this study, the researcher used a semi-structured interview. According to Seliger and Shohamy (1989:167) "the semi-structured interview consists of specific and defined questions determined beforehand, but at the same time it allows some elaboration in the question and answer". During the interview, the researcher asked the interviewee questions prepared beforehand but allowed the interviewee freedom in

elaboration and probed as the interview proceeded but kept within limits of the subject. The interviewer (the researcher) made sure that the place where the interview was conducted was comfortable, drinks were provided and gave full attention to the answers provided by the interviewee. According to Oppenheim (1992:65) "the interview requires interpersonal skills of a high order". The interviews were tape-recorded and then transcribed for analysis.

4.2.3 The Questionnaire

According to Seliger and Shohamy (1989:172), "questionnaires are printed forms for data collection which include questions or statements to which the participant is expected to respond, often anonymously". According to Oppenheim (1992:100), the questionnaire is an important research tool for data collection and its function is measurement. What is measured is laid in the questionnaire specification. Many weeks of planning, reading, design and exploratory pilot work are needed before any sort of specification can be determined. The questionnaire specification must follow directly from the operational statement of the issues to be investigated and from the research design that has been adopted.

4.2.3.1 Advantages of the Questionnaire

The questionnaire technique was used as it has a few advantages. The main advantages of the postal questionnaires according to Oppenheim (1992:102) are:

1. the low cost of data collection and processing
2. avoidance of interviewer bias
3. ability to reach respondents who live at widely dispersed addresses or abroad.

The main advantages of questionnaires according to Seliger and Shohamy (1989:172) are that:

1. they are self-administered
2. they can be given to large groups of participants at the same time
3. they are less expensive to administer
4. when confidentiality and anonymity are assured, participants tend to share information of a more sensitive nature more easily
5. when the same questionnaire is given to all the participants at the same time, the data are more uniform, accurate and standard.

4.2.3.2 Disadvantages of the Questionnaire

The main disadvantages of the postal questionnaire according to Oppenheim (1992:102) are the generally low response rates. Seliger and Shohamy (1989:172) too agree with Oppenheim (1992:102) that questionnaires generally have a relatively low response rate.

4.2.3.3 Ways to Increase Questiononaire Response Rates

In an effort to increase the response rates in the questionnaire, the researcher followed what Oppenheim (1992:104) has suggested that is, by informing the respondents of the study in advance and inviting participation, assuring confidentiality by making an explicit statement on the questionnaire to overcome possible apprehensions, by sending reminders via telephone to return the completed questionnaires and by assuring anonymity. This is not the same as confidentiality and was done to ensure that they were free to express their frank opinions on the questions asked. The questions were typed on A4-sized pages with each question written in both English and Malay. Return stamped envelopes were enclosed in the posted questionnaire so that the respondents would return the completed questionnaire at no

cost on their side.

4.2.3.4 Question Types

According to Oppenheim (1992: 112), broadly speaking, most questions are either 'open' or 'closed'.

4.2.3.4.1 Closed Questions

A closed question is one in which the respondents are offered a choice of alternative replies. They may be asked to tick or underline their chosen answer(s) in a written questionnaire, or the alternatives may be read aloud or shown to them on a prompt card or a slide. Questions of this kind may offer simple alternatives such as "Yes" or "No" for example, "Have you received any training in translation"?, "Are you good and proficient in both English and Malay"?

4.2.3.4.2 Open Questions

Open or free-response questions are not followed by any kind of choice and the answers have to be recorded in full, for example, "Please give your reasons for being unable to translate a science book from English to Malay". In the case of a written questionnaire, the amount of space or the number of lines provided for the answer will partly determine the length and fullness of the responses obtained. Inevitably, some of this richness is lost when the answers are classified later, but it is useful to report a few such answers in full in the final report to give the reader some of the flavour of the replies. Statistical tabulations are important and must remain the first aim, but they make dull reading.

The chief advantage of the open question is the freedom it gives to the respondents. Once the intention of the question is understood, their thoughts can be left to roam freely, unencumbered by a prepared set of replies. Ideas are obtained in their own language, expressed spontaneously, and this spontaneity is often extremely

worthwhile as a basis for new hypotheses.

Free-response questions are often easy to ask, difficult to answer, and still more difficult to analyse. As a rule, a classification process known as coding is employed which requires drawing up some system of categories, a coding frame. The design of such coding frames and the actual coding operation require trained staff and are extremely time-consuming; for this reason, researchers have to curb their desire to have too many open questions. Sometimes, if the first answer seems a little ambiguous or does not go far enough, the interviewer should probe. This often takes the form of asking the respondent to explain further or to give reasons for something stated earlier; at times, a particular issue may be brought into the discussion deliberately, if the respondent has not already mentioned it. Such probes should be as nondirective as possible, thus the researcher suggests such probes like, "Could you say a little more about the training you received at DBP". "Why did you say just now that it is difficult to translate a science book from English to Malay on your own"?, "Now, what about the experience you gained from translating as a team"?, and "How do you feel about having translated six books on science from English to Malay"? The risk of interviewer bias is probably at its highest, whenever probes are employed. They are "safe" only in the hands of the most highly trained and experienced fieldworkers, and many survey organisations avoid probes altogether.

4.2.3.5 The Questionnaire Method

The questionnaire method was used by the researcher to obtain responses from the translators on the translation process of English language scientific texts into the Malày language because it has certain advantages which have been discussed in section 4.2.3.1. on page 203.

For this study, the researcher prepared her own questionnaire. It took the

researcher many weeks of planning, reading, designing and exploratory pilot work, before she came up with her own questionnaire which was designed to answer the research questions for this study. The questionnaire design was structured and unstructured. This meant that it contained close-ended questions, whereby the respondents were offered a choice of alternatives. They just had to tick in the boxes provided and do some rankings. There were also open-ended questions where the participants had to respond in a descriptive manner, by expressing their true feelings freely.

The wording of the questions was designed in accordance with the principles laid down by Oppenheim (1992: 121, 128-129). Questions were kept short, simple, no double-barrelled type questions were asked, no double negatives, acronyms, abbreviations, jargon and technical terms were used. Furthermore, no ambiguous, difficult words and proverbs were used. The focus and contents of the questions was ensured right, the wording was suitable and the context, sequence and response categories helped the respondent to answer accurately. To ensure comprehension on the part of the translators, the questions were written in English and Malay.

To ensure that the layout was clear and attractive, the Malay language version was italicised to differentiate it from the English language version, so that the translators who wished to read in the Malay language version would have no problem. The questions were typed on A4 paper and were well-spaced and numbered. The seven sections of the questionnaire were numbered using roman letters. They were capitalised and bolded. Confidentiality and anonymity was assured in the heading before the instructions and it was stated as, "The Contents of this Form are Absolutely Confidential. Information Identifying the Respondent will NOT be Disclosed Under any Circumstances".

The respondents were allowed to answer using either the English language or the Malay language, or a mixture of both the languages.

The prepared questionnaire was given to five lecturers from the Translation Department at the Faculty of Languages and Linguistics in the University of Malaya for vetting. They had been teaching and doing research in translation for years and the researcher felt that they had the expertise to vet it. From their feedback, the questionnaire was changed, adapted and improved.

Some examples of the changes made to the questionnaire, included that for each question, only one item was to be tested. Questions testing two items were discarded and replaced with questions that tested only one item, for example, instead of asking "How many years have you been translating and are you doing translation on a part-time or full-time basis"?, it was replaced with:

1. How many years have you been translating?
2. Are you doing translation on a full-time or part-time basis?

This was implemented for all the questions. Some phrases which seemed ambiguous were made clearer, for example, the word "honestly" in the instruction was changed into "accurately", and in the Malay version *bahan-bahan* and *buku-buku* were changed to *bahan* and *buku* respectively. The word *seikhlas* was changed into *setepat.* In question 6, "Where did you do your training"? was changed into "Have you received any training in translation"? Likewise for question 21 which was vague, was reworded as "While translating, is there anything (for e.g. computer, typist, language expert etc) that you need but do not have in the process of translation"? Question 25 was earlier worded as, "How are you paid"? and the response according to the vetters might be "by cheque". Thus, as this response was not required, it was changed into "Are you paid according to word, page or whole text"?

A pilot study on five participants who were part-time translators, and who were within reach of the translator, was first carried out. This pilot study was to check the validity of the questions in the questionnaire. As the participants had no problem in answering the questions, the questionnaire was then sent to all the other translators and from their responses, the researcher answered the research questions.

The questionnaire which was finally given to the translators was divided into seven sections as follows:

I. The Background of the Translators

II. Training in Translation

III. Practical Experience in Translation

IV. The Translation Process

V. Payment for Translation

VI. Publishing of Translated Books and Materials

VII. Recommendations for Better and Speedier Translations

Section I dealt with the **background of the translators**. Five questions were asked in this section. The questions were on their sex, age, race, present occupation and academic qualifications. The participants had to put a tick against the correct answer in the boxes provided. Questions 1 to 5a were closed while question 5b was open. Three questions in this section required them to write down their occupation, their field of specialisation and their grades for SPM (*Sijil Pelajaran Malaysia* – Form Five level examination) and STPM (*Sijil Tinggi Pelajaran Malaysia* – Form Six level examination) for English language and the Malay language.

Section II dealt with their **training in translation**. This section had four questions having to do with their training in translation, that is, if they had received any training, where they obtained it, whether they were taught about the translation theories

and if no, what was lacking. Questions 6 and 8 were closed while questions 7 and 9 were open.

Section III dealt with their **practical experience in translating**. This section had six questions and they dealt with the number of years the translators had been translating, whether they were doing translation on a full-time or part-time basis, their ability to translate a science book into the Malay language and if they were not able to do so, then what were their reasons for their inability to do so and finally the number of books they have translated so far. Questions 11, 12 and 13 were closed while questions 10, 14 and 15 were open.

Section IV dealt with **publishing** and two open questions were asked that is, question 16 asked on how many of their translated books had been published while question 17 asked them to list the titles of the translated published books and materials and the years they were published in.

Section V dealt with the **translation process** and comprised eight questions. These had to do with their steps in the translation process, how long it took them to translate a page of 250 words, whether they were given deadlines to complete their translation, the support materials used in their translation, whether they lacked any translation tools, the problems and difficulties faced by the translators in their translation, how they overcame these difficulties and whether their translation fulfilled a list of criteria given. Closed and open questions were asked. Questions 18 to 19, 21 and 24 were open while questions 20 and 23 were closed -see **Appendix D**.

Section VI was concerned with the **payment for translators**. This section had eight questions. The questions touched on how much they were paid, whether they were happy with the payment received, and whether they were given royalties and if the answer was no, whether they would be happier if royalties were given. Furthermore,

whether there was any delay in the payment and if yes, how long was the delay and whether the delay had put them off from translating. Questions 26, 28 to 31 and 33 were closed whereby the translators just had to tick against their answers in the boxes provided. Question 32 required them to write down in the blank provided, the duration of the delay in their payment.

Section VII dealt with their **recommendations** for better and speedier translation of English language scientific texts into the Malay language. This section comprised one question, and only translators who had more than three years of experience in translating, were required to answer this open question.

A self-addressed, stamped return envelope was included in the envelope with the questionnaire, which was posted to the respondents. This was in line with what Oppenheim (1992:104) said that to increase response rates a return envelope with a stamp pasted on it indicated trust and honesty, and respondents would try their best to respond. Besides sending by post, some respondents wanted the questionnaire to be sent by e-mail which the researcher did so, while some who were within reach, were given the questionnaire by hand.

4.3 Data Analysis

This section describes how the data collected through the think-aloud protocols (TAPs), interviews and questionnaire were analysed.

4.3.1 Transcripts of the TAPs

The think-aloud protocols (TAPs) which had been tape-recorded, were transcribed. The TAPs were very carefully analysed to understand what was going on in the minds of the participants (cognitive functioning) during the process of translation. The researcher wrote down against each sentence what the translator was actually doing, for example, planning and organising, making a summary, translating etc. The

detailed transcriptions of the five TAPs by the researcher are presented in Appendices H1 to H5. The researcher used her own inductive analysis to analyse the transcriptions of the five TAPs. In order to obtain some indication of the reliability of the analysis, an independent rater was asked to verify the analysis of three of the five TAPs. The independent rater who was chosen was a PhD student whose area of research had to do with think-aloud protocols in language learning. She was a teacher who had sixteen years of experience in teaching and had written a number of books. The process yielded an 87.3 % inter-rater reliability level for the TAPs. All differences of opinion were resolved through discussions. An excerpt of one of the analyses of the TAPs by the researcher is given in Table 4.1 on page 213.

After this, the researcher matched the strategies used by the translators as analysed from the TAPs against the language learning taxonomies put forward by Oxford (1990) to see if there were any differences in the strategies used. The taxonomies are presented in **Appendices G1 and G2.**

Based on the findings from this study, the researcher came up with her own translation strategies taxonomy which can be used for the translation of scientific texts from English into Malay. However, it is open for further research by researchers to experiment it with other pairs of languages used across the world.

4.3.2 Interview Transcripts

The five participants who participated in the TAPs were also interviewed. The interviews were tape-recorded and then transcribed. From the transcriptions, the researcher analysed the answers regarding their background in translation, their training in translation, their practical experience in translation, the number of their translated books that have been published, their translation process and the difficulties and problems they encountered while translating and how they overcame these problems.

Table 4.1

An Excerpt of a TAP

Think-Aloud Protocol Transcribed	Analysis of TAP by Researcher
First I'll read the text (reads text to herself loudly). **The main content of this paragraph is transport of amino acids into cells. Now, I'll type everything into the computer.**	Planning and organising – making a decision and implementing it. Summarising Planning and organising – making a decision and implementing it.
Transport is *pengangkutan* so,	Thinking – translating
Pengangkutan asid amino ke dalam sel	
That being the title I've made it bold. Now I go to the main text (reads the first sentence - The concentration of free amino acids in the extracellular fluids is significantly lower than that within the cells of the body). **This means that the concentration in extra-cellular cells is lower than in body.**	Highlighting Planning and organising - making a decision and implementing it - reading source text Comprehension of meaning – thinking and paraphrasing
Concentration is *kepekatan*, so:	Analysing and reasoning- translating.
*Kepekatan asid amino di dalam cecair luar sel adalah (*significantly lower is *lebih rendah) lebih rendah daripada kepekatan di dalam sel tubuh.*	Repetition - pausing – reverting to English phrase –thinking and continues translating.
Let me read the sentence in the text again and now I'll read the translated version (reads and is satisfied). Now, the next sentence (reads it - The concentration gradient is maintained because active transport systems driven by the hydrolysis of ATP are required for movement of amino acids from the extra cellular space into cells). Gradient is *kecerunan* so:	Production evaluation: rereads English sentence and compares with translated version in Malay . Planning and organising-making a decision and implementing it. Reading source text in English
*Cerun kepekatannya dikekalkan kerana sistem pengangkutan aktif, yang didorong oleh hidrolisis ATP, digunakan untuk pergerakan asid amino dari cecair (*let me read in English again, it's space, so *ruang not cecair) dari ruang di luar sel ke dalam sel.* (reads English sentence again and then reads the Malay sentence and is satisfied with the translation).	Analysing and reasoning: translating Repetition: stops for clarification – rereads phrase in English –confirms equivalent word in Malay and continues translation. Production evaluation: rereads English sentence and compares with translated sentence - shows satisfaction. Planning and organising – making decision Reading in English.
Now to the next sentence (reads - At least seven different transport systems are known that have overlapping specificity for different amino acids). **Overlapping specificity, that's a difficult one, that means the same one may carry more than one type of amino acids. At least is *sekurang- kurang* so:**	Repetition -tells phrase is tough - thinks and paraphrases - understands the term. Elaborates. Analyses and translates

She also became aware of their payment for translation and how they were paid. Finally, she also heard from them how the translation process of English language scientific texts into the Malay language could be made more accurate and faster.

4.3.3 Questionnaire Analysis

The completed questionnaires from the fifty respondents were analysed. The researcher was then able to answer the research questions. First, the breakdown of the participants from each organization, who responded to the questionnaire was presented in a table. For Sections I to VI, the findings were presented in the form of frequencies and percentages using tables. The findings were described and explained in detail.

For Section V on the steps in the translation process, the researcher also explained the steps or sequences in the translation process. The ways on how the participants overcame the problems in their translation, the researcher explained the process in a descriptive manner based on the responses she had received from the fifty completed questionnaires.

For Section VII on the recommendations for speedier and more accurate translation, the researcher read through the answers provided by the respondents and wrote a report of the findings.

According to Seliger and Shohamy (1989:213), "frequencies can help the researcher obtain insights into and understanding of the data and the results". Frequencies help one to gain a better understanding of the data and provide initial insights and impressions of the data. From the frequencies, the researcher was able to understand the translation process of English language scientific texts into the Malay language as she was able to find the answers to her research questions.

In conclusion, the findings from the data analyses of the TAPs, interviews and questionnaire were used to find the answers to the research questions for the internal

translation process and to understand the current translation situation of English scientific texts to the Malay language in Malaysia. The results and discussion of the findings are presented in Chapters Five and Six.