# CHAPTER SIX

# ANALYSIS OF THE THINK-ALOUD PROTOCOLS (TAPs)

## 6.0 Introduction

The participants for the think-aloud protocols comprised five part-time translators, that is, four science lecturers and one PhD science student from the University of Malaya. They were asked to translate different source language science texts (in English language), which they chose on their own, into the target language texts (in Malay language). These five participants were also interviewed by the researcher.

The detailed analysis of the transcriptions of these five case studies using **TAPs** is presented in **Appendices H1 to H5** and the transcripts of the **interviews** are given in **Appendices F1 to F5**. The researcher analysed the transcriptions of the five TAPs using the inductive method on her own and then matched the analyses against the language strategies or **SILL** (Strategy Inventory for Language Learning) proposed by Oxford (1990) to investigate if other strategies were used. This language strategies taxonomy or SILL by Oxford (1990) has been proven to be highly reliable and valid and it is presented in **Appendices G1, G2 and G3**. For this study O'Malley and Chamot's (1990) language learning taxonomy is subsumed under Oxford's (1990) SILL. From the findings of this study, a **translation strategies taxonomy** is proposed by the researcher which is open for further research and experimentation by other researchers dealing with other pairs of languages and other texts besides scientific texts.

The researcher used Oxford's (1990) SILL and mapped this on to her own analysis of the translation process by the five participants using TAPs, as translation is also a language task, besides involving other disciplines such as culture, linguistics, communication, situation, concepts etc. According to Oxford (1990:11), "Language learning strategies are tools. They are used because there is a problem to solve, a task to

accomplish, an objective to meet, or a goal to attain". Furthermore Oxford (1990:11-12) suggests that the other important features of language strategies are problem orientation, action basis (specific actions taken to enhance understanding such as planning, evaluation etc), involvement just beyond cognition (including metacognitive, emotional, social and other functions), ability to support learning directly or indirectly, degree of observability (they are not always readily observable to the human eye), level of consciousness, teachability (easier to teach and modify), flexibility and influences on strategy choice (such as sex, stage of learning, task requirement etc).

In the analysis of the transcriptions of the five TAPs, it was discovered by the researcher that these language strategies were used by the participants while translating. According to Oxford (1990:10), language learning strategies encourage greater overall self-direction for learners. Robinson (1997:49-51) suggests that, "translation is an intelligent activity involving complex processes of conscious and unconscious learning...requiring creative problem-solving in novel textual, social and cultural conditions...translators learn words and phrases, styles and tones and registers, linguistic and cultural strategies while translating". In other words, the researcher feels that the translator is generally speaking, a learner, as he works with a pair of languages in a translation task.

The participants for this study were all graduates who had completed secondary education and were thus advanced language learners. They were using two languages, that is English and Malay, in their translation task and were actually learning the languages further because the translation process involves finding the closest, natural, accurate, matching equivalent terms in the target language. In addition to this, the participants in this study also had to ensure that the target language used to communicate the source language message was natural and smooth-flowing, and that it would be easy for the target readers to understand their translated product.

By analysing the transcriptions of the five TAPs, additional strategies, besides the language learning strategies that were used by the participants in their translation process, were discovered.

The following research questions based on the internal translation process of English language scientific texts into the Malay language via TAPs by the five participants of the study will be answered. The research questions are as follows:

1. What are the direct and indirect strategies used by the participants in their TAPs, based on the Taxonomy of Language Learning Strategies provided by Oxford (1990) and O'Malley and Chamot (1990)?
2. What are the other strategies used in their TAPs besides those provided in the Language Learning Taxonomies proposed by Oxford (1990) and O'Malley and Chamot (1990)?
3. What are the steps in their translation process?
4. Based on the translation models of Bell (1991), Sager (1994) and Darwish (1989, 1995, 1999), what are the approaches used by the participants while translating using the think-aloud protocol technique?

## 6.1 Time Taken to Translate Texts

The TAPs were timed, that is, from the time the participants actually started translating the English language scientific texts into the Malay language to the end of the translation task, not taking into account the comments made after translating. The findings are presented in **Table 6.1** on **page 252**. In Table 6.1, cases refer to the **participants**. The number of words in the source language and target language texts is also shown. It is seen that in Case 5, the participant took only nine minutes to complete a translation of 220 words. This is because the participant has 17 years of experience in translating and for him translating has become automatic and he is able to do it smoothly without much difficulty. The rest took a much longer time as they had to

Table 6.1

**Time Taken by Participants to Translate**

| Cases<br><br>Texts | Number of Minutes Taken | Number of Words in English Language Text (source text) | Number of Words in Translated Malay Language Text (target text) |
|---|---|---|---|
| Case 1<br>Text 1 | 25 | 163 | 151 |
| Case 2<br>Text 1 | 23 | 111 | 115 |
| Case 2<br>Text 2 | 7 | 83 | 90 |
| Case 3<br>Text 1 | 10 | 53 | 54 |
| Case 4<br>Text 1 | 30 | 188 | 158 |
| Case 4<br>Text 2 | 12 | 70 | 59 |
| Case 5<br>Text 1 | 9 | 220 | 220 |

pause to analyse the sentences. They had to divide the long, complex sentences in the source language text into smaller chunks: that is, they had to analyse the phrases, keywords and difficult expressions first, and sometimes they had to elaborate these chunks so that they could understand what the original writer was saying. Then they had to decide on choosing an appropriate equivalent term in the target language by using the discrimination strategy to choose a term from two or three alternative terms identified which best suited the context of the situation in the text and the culture of the target readers. Once they had found the closest, natural equivalent terms in the target language, only then could they complete the translation of the whole sentence into the target language. Thus, they spent a lot of time in actually understanding and conveying the information accurately in the target language. This is clearly seen in Case 1 - Text 1 and Case 4 - Text 1 where the texts were more complex and difficult and therefore the participants took a longer time to translate, that is 25 minutes and 30 minutes respectively.

As this study did not investigate the translation product, the researcher will not delve into the details, but suffice to say, that the number of words when translated into the target language texts were about the same as the source language texts, except for Case 4 - Text 1, where there were 30 words less in the translated target language texts compared to the source texts, whereas, in the others, there was a difference of ten words. In Case 4, the possible reason might be that the participant was able to paraphrase the meaning of the source language text into the target language text in fewer words. In Case 5, the participant came up with exactly the same number of words, that is 220, the reason being that he had 17 years of experience in translating.

## 6.2 Analysis of Strategies Used in TAPs

The report of the five case studies on the translation of scientific texts from English to Malay using TAPs is presented below. All the five participants are experienced, part-time translators from the University of Malaya.

### 6.2.1 Report of TAP for Case 1

Case 1 was a female lecturer from the Biochemistry Department, Faculty of Medicine, University of Malaya. She has translated seven science books from English into the Malay language and has fifteen years of experience as a part-time translator in this field. Besides translating, she also edits translated Malay language scientific books for DBP.

Firstly, the participant planned and organised her translation task - see **Appendix H1** for analysis of TAP and **Table 6.2** on **page 259** for source and target texts. She decided to read the whole source text as presented in English and actually read it out aloud. After reading once, she summarised the content of the paragraph as, "the main content of this paragraph is transport of amino acids into cells". Next, she decided to type the translation of each sentence straight into the computer, as she felt that it would be faster than first writing on paper, and then typing into the computer,

which meant double work. After this, she thought of the keyword, "transport" and immediately knew that it was *pengangkutan* in the Malay language. Being a Malay lecturer, she immediately translated the title, without much difficulty, and decided to highlight it, and actually bolded it on the computer. Then she decided to read the first sentence, and actually read it out aloud in English. After this, she paraphrased the meaning of the sentence in simpler language – *This means that the concentration in extra-cellular cells is lower than in body.* Again, she thought of the keyword "concentration" and immediately came up with the equivalent word in the Malay language, which was *kepekatan.* She analysed the words and translated them, but paused at the phrase, "significantly lower" and repeated it, and thought for a little while on how to translate it, and came up with the expression *lebih rendah,* after which she was able to complete the translation of the first sentence. Then she repeated the first sentence in the English language and then read the translated Malay language sentence, and was satisfied that the sentence conveyed the same meaning as the source text sentence. Then she went on to the second sentence in the source text in English, and read it out aloud. She caught the keyword, "gradient" and translated it immediately as *kecerunan.* She managed to translate the sentence but had to stop for a second for the word "space". She had translated it as *cecair,* but decided to read the word again for confirmation and realised that she had misread it, as the word was "space" and she decided to correct it to the correct equivalent word in the target language, *ruang,* and continued translating the sentence. After this, she evaluated her production of the second translated target language sentence against the original source language sentence. The researcher realised that she was satisfied with her performance because she nodded, smiled and acknowledged that she had translated accurately. Next, she decided to read the third sentence and actually read it from the source language text. The phrase "overlapping specificity", caught her attention and she pondered over it and

voiced her feelings that it was difficult, but because she was a subject specialist, she paraphrased the term and elaborated it, and thus made it simpler to translate, that is, "the same one may carry more than one type of amino acid". She translated the term "at least" as *sekurang-kurang*, and managed to complete translating the third sentence. At this point, she read out the completed translated sentence in the target language and revealed the fact that, as she read in the target language, her brain thought in the source language. In other words, she could realise the meaning of the source language sentence, in her own target language translation, as she had reached the stage of automaticity, over the years of experience in translating. After this, she decided to read the fourth sentence in the source text and actually read it out aloud. Here, she revealed aloud that this sentence was easy to translate and that she could do it immediately. For the word "responsible", she was able to discriminate between the target language equivalent *tanggungjawab* which she clarified was used for human beings, but in this context she decided to use the term *berperanan* which was more appropriate in the context. Here, she spoke about her own beliefs on how to translate, that is, translation should not be literal, but should involve understanding, so that the target language version would not sound strange to the readers. The preposition "in" was translated as "at" or in the target language *pada*, as she felt that when talking in general, one should use "at" and not "in". She predicted that the students would understand, as they knew which direction the amino acids go in and out of the kidney tubules, as this was just an introduction. She then translated the sentence. Next, she decided to read the fifth sentence and read it. The key phrase "inherited disorder" was pondered and she made a choice between translating it as *penyakit warisan*, or *gangguan terwaris*, which she felt was too direct a translation and decided on choosing the former term. Then she went on to elaborate the term "cystinuria" showing that she knew her subject well. She then told of how the term "carrier system" could be translated, that is, as *sistem pengangkutan*.

For the term "defective" she came up with two suggestions, that is, *defektif* whereby the same term is kept but the spelling in the target language is different, or *rosak* which is a more common term, and she thus used this equivalent term in her translated sentence so that the target readers would be able to understand it. She also decided to highlight the name of the disease, *sistinuria,* in her target language sentence, where the translated term had the same sound as the source language term, "cystinuria". Next, she went on to the sixth sentence in the passage, and decided to read it first and actually read it in the source language. Here again, she identified the most difficult phrase, "most common genetic error" and analysed it and decided that it could be translated as *ralat genetik yang paling umum.* Then she pondered on the word *umum* and realised that it meant "general" whereas the source text used the word "common" and she decided to replace the word *umum* with a better equivalent term, *lazim*, which was more appropriate to the context of the situation, and translated the sentence. After this, she went on to read the seventh sentence and analysed a long phrase "precipitation of cystine to form kidney stones" and translated it as *pemendapan sistina sebagai karang.* For "stones" she used the word *karang,* and not the common term, *batu,* because, according to her, from her retrieval of the image of kidney stones from her memory, they have a coral texture and thus the equivalent term in the target language should be *karang.* She had actually seen them, as she is from the medical faculty. The Malays know the word *karang,* as this word is common in their culture. Next, she elaborated the term "urinary tract" and explained how the kidney stones block the flow of urine. The phrase "urinary tract" was translated as *saluran urinari* instead of the earlier term *trak urinari* which she said could also be used but she chose an equivalent term, *saluran* which is a term commonly used in the Malay culture. Finally, she evaluated her performance by reading each sentence in the source text against each sentence in the translated target language and was satisfied with her performance (as perceived by the researcher because the

participant nodded and smiled) as it was accurate in content and the flow of the language was natural and grammatically correct.

**Table 6.2** on **page 259** shows her final target language translation against the original source language text.

### 6.2.1.1 Sequence of the Translation Strategies Used by Case 1 for Text 1

For Case 1, from the analysis of the transcriptions of the TAPs as discussed in section 6.2.1, it was seen that the sequence of the translation strategies used was as follows:

1. Planning and organising of translation process. Here, the participant made decisions and implemented them. These decisions included typing every translated sentence in the target language straight into the computer, reading the whole source text first to get the gist of it, translating sentence by sentence by first reading aloud the source language sentence, and then translating it into the target language. She also made a decision to monitor her own translation and did this by rereading each translated sentence against the original source language sentence to ensure that the content delivered was accurate.
2. Reading and understanding of the source language text. Here, the participant read the whole source language text and summarised the content. In this way, she got a gist of the whole text and understood clearly the message it conveyed.
3. Selective attention. First, she read the title and translated it. Then she attended to one sentence at a time. The difficult sentences were paraphrased into simpler language. Here, elaboration of difficult concepts such as "overlapping specificity", "urinary tract" etc was done as the participant was also a subject specialist and this enabled her to further understand the text.
4. Analysing and reasoning of the sentences first before translating. Here, the participant actually thought over the difficult expressions and keywords such as

*overlapping specificity, responsible, inherited disorder, defective* etc in the source text and made a decision on the equivalent terms available in the target language. She used the discrimination strategy to finally decide on the best option from two or three alternative terms identified which best suited the context of the situation. The culture of the target readers was also taken into account during the choosing of the closest, natural equivalent term in the target language. For example, the word "responsible", was translated as *berperanan* as it suited the context of the situation. The word *bertanggungjawab*, was not used because it is used for human beings and in this context was inappropriate.

5. Translating the sentences one at a time, after having analysed the difficult phrases and keywords and choosing the closest, accurate, natural equivalent terms for these in the target language. While translating, the participant kept in mind her own beliefs on how to translate and implemented them.

6. Reading the translated target language sentence against the original source language sentence to ensure that the meaning communicated was accurate and that the target language used was natural, so that the target readers would have no problem in understanding the target language text.

7. Performance evaluation. Upon completing the translation of the whole source language text, the participant read her whole completed translated target language text and matched it against the original source language text to ensure that the content communicated was accurate and the target language used was natural.

The above sequence was repeated for each sentence and it was seen that the strategies used in the translation process were cumulative, cyclical, iterative and integrative.

**Table 6.2**

**CASE 1: Lecturer from the Biochemistry Department, Faculty of Medicine, University of Malaya**

| **Source Text in English Language** (Excerpt taken from Pamela C. Chause and Richard A. Harvey. (1994) *Biochemistry - Second Edition.* U.S.A: J.B. Lippincott Co.) | **Final translated version in the Malay Language** |
|---|---|
| **Transport of Amino Acids into Cells**<br><br>The concentration of free amino acids in the extracellular fluids is significantly lower than that within the cells of the body. This 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. At least seven different transport systems are known that have overlapping specificity for different amino acids. One transport system is responsible for re-absorption in kidney tubules of the amino acids cysteine, ornithine, arginine and lysine. In the inherited disorder **cystinuria**, this carrier system is defective, resulting in the appearance of all four amino acids in the urine. Cystinuria occurs at a frequency of 1 in 7000 individuals, making it one of the most common inherited diseases and the most common genetic error of amino acid transport. The disease expresses itself clinically by the precipitation of cystine to form kidney stones (calculi), which can block the urinary tract. | ***Pengangkutan asid amino ke dalam sel***<br><br>*Kepekatan asid amino bebas di dalam cecair luar sel adalah lebih rendah daripada kepekatannya di dalam sel tubuh. Cerun kepekatannya dikekalkan kerana sistem pengangkutan aktif yang didorong oleh hidrolisis ATP, digunakan untuk .pergerakan asid amino dari ruang di luar sel ke dalam sel. Sekurang-kurangnya tujuh sistem pengangkutan yang berlainan diketahui yang mempunyai kekhususan yang bertindihan untuk asid amino yang berlainan. Salah satu daripada sistem pengangkutan tersebut berperanan untuk menyerap semula asid amino, sisteina, ornitina, arginina dan lisina pada tubul ginjal. Dalam penyakit warisan* ***sistinuria,*** *sistem pengangkut ini rosak yang mengakibatkan ke-empat-empat asid amino muncul di dalam air kencing. Sistinuria berlaku pada kekerapan sebanyak 1 dalam 7000 individu, yang menjadikannya salah satu penyakit warisan yang lazim ditemui dan ralat genetik yang paling lazim berlaku untuk pengangkutan asid amino. Secara klinikal, penyakit ini menjadi ketara melalui pemendapan sistina sebagai karang ginjal (kalkulus) yang mungkin menyumbat saluran urinari.* |

### 6.2.1.2 Translation Pattern Used by Case 1 while Translating Text 1

From the above sequence of the translation process and from the analysis of the TAP (see Appendix H1), the following translation pattern or organisation can be extracted for the Case 1 participant for translating each source language sentence into the target language:-

a. reading the English language source text sentence first;

b. analysing the difficult phrases using the elaboration technique;

c. concentrating on the difficult keywords in the sentence, and translating them first, by making decisions on the closest, natural equivalent terms in the target language using the discrimination strategy to choose an equivalent term from two or three alternatives identified, which best suit the context of situation in the text;

d. expressing own beliefs on how to translate and implementing these beliefs while translating;

e. thinking about how best to communicate the content of the sentence in the target language so that it can be understood by the target readers and after careful thought, translating with this point in mind;

f. evaluating performance by checking the completed target language text against the original text and making revisions where necessary

### 6.2.2 Report of TAP for Case 2 - Text 1

Case 2 was a male lecturer from the Zoology Department, Faculty of Science, University of Malaya. He has been translating for the past four years and has translated three science books.

For Text 1, the participant first did some self-talking on his task, which was, he understood, to translate an English language scientific text into the Malay language. His TAP transcript is given in **Appendix H2. Table 6.3 on page 264** shows his source

language and target language texts. Firstly, he decided to place his translation tools such as dictionary, terminology lists etc on his table so that he would not have to search for them while translating. Secondly, he made a decision to read the English language source text and did the reading to get an idea of what the writer was trying to convey. After this, he read the first sentence and paraphrased it: *the hormones, that is, the tissues produce the hormones in the body*. He was satisfied that he had grasped the meaning of the sentence. Then he spoke of his own beliefs on how to translate the meaning in the sentence, that is, by using his own words in the target language, so that the original meaning is not lost. He also expressed aloud that he did not believe in word-for-word translation as this was not good. He stated that he could use two ways to deliver his translation, that is, by either typing straight into the computer or writing it down. He chose the latter. Then he translated the first sentence. Next, he went on to the second sentence and read it aloud. Here, he used his imagery to visualise or picture what the source sentence meant, that is, he paraphrased the sentence: *that the hormones are released directly into the blood without a channel and then these hormones are transported into the body.* Then he translated the sentence into the target language. After translating, he read the translated version again to ensure that it reflected what the original version meant, and he was satisfied with his performance. After this, he decided to go on to the first sentence of the second paragraph and read it out aloud – *Hormonal control mechanisms have been found in a variety of invertebrates: those in insects have been most extensively studied.* The participant realised that the English language style of writing using the colon and explaining the earlier part is quite difficult to transfer into the target language. In addition to this, the participant realised that the sentence was too long and decided to divide it into two shorter sentences. He also expressed his beliefs on how to translate, that is, that he never translates word-for-word as it is bad. He prefers understanding the sentence first before translating. This makes

translation easier for him. After reminding himself of his beliefs, he translated the long source language sentence into two shorter target language sentences: *Mekanisme pengawalan hormon telah ditemui dalam pelbagai haiwan inveterbrata. Mekanisme pengawalan hormon yang terdapat dalam serangga adalah yang paling banyak dikaji.* He also expressed the fact that he did not like to use connectors such as *dimana, yang mana* etc to create long sentences in the target language because the meaning will not be clear. Then he decided to translate the next sentence which was short and he managed to translate it quickly. The participant expressed that the last two sentences were problematic as they were rather long and he solved the problem by dividing each of the long sentences into two shorter sentences while translating into the target language. The researcher suggests that in the English language, sentences can convey two or three ideas as linkers such as *that, which*, or, *whether* are very often used. In the Malay language, there are not many linkers and the participant felt that it would be clearer to convey a single fact instead of two or three facts in one sentence. This would ensure that the target readers will have no problem in understanding the translated version in the Malay language. The participant was not happy with his last translated sentence as it conveyed the meaning that the *gland controls the molting* whereas in the source text it was *the invertebrate hormone that controls the molting process.* Therefore, he revised his translation of the last sentence to convey this meaning: "it is the invertebrate hormone that controls the molting process and not the gland." The researcher realised that the participant was satisfied with his second translation, which read as: *Aras hormon juvenil ini akan menentukan sama ada larva melakukan salin kulit menjadi peringkat larva seterusnya atau menjadi pupa atau dewasa.* In conclusion, he evaluated his whole performance by reading the whole translated version against the original source text. The researcher realised that he was satisfied with his translation when he nodded and smiled.

### 6.2.2.1 Report of TAP for Case 2 – Text 2

The participant had some time to spare and was asked to translate a very short paragraph of another scientific text. For Text 2, the participant first read the first sentence in the source language and paraphrased its meaning. It was simple and he translated it straight into the target language. The next two sentences were rather short and he translated them without any difficulty. However, the fourth sentence was rather long as it had connectors such as *including, but, even*, and it conveyed two ideas: The sentence, "A certain number of non-ferrous metals, including aluminium and zinc, are also important, but even today the majority of our engineering products are of iron or steel". The participant had to divide this long sentence into three ideas which he conveyed in three target language sentences: *Terdapat beberapa jenis logam yang bukannya besi, iaitu aluminium dan zinkum. Aluminium dan zinkum juga penting. Walaubagaimanapun, sebahagian besar daripada hasil kejuruteraan sekarang ini menggunakan besi dan juga keluli.* He read the last sentence and commented that it was simple and he translated it easily. Finally, he read the whole translated text and was happy with his performance. He found the second text to be very much simpler to translate than the first, because it contained less difficult scientific terms. **Table 6.3** on **page 264** shows his translation of the two texts.

### 6.2.2.2 Sequence of the Strategies Used in the TAP by Case 2 While Translating Text 1

The sequence of the strategies used in the TAP for Case 2- Text 1 was as follows:

1. Planning and organising. The participant first decided to place all his translation tools such as the dictionaries, thesaurus and terminology lists on his table and did so. He also decided to read the whole source text first to get the gist of it and implemented his decision.

**Table 6.3**

**CASE 2: Lecturer from the Zoology Department, Faculty of Science, University of Malaya (Text One and Text Two)**

| Source Text in English Language | Final Translated Version in the Malay Language |
|---|---|
| **TEXT ONE**<br><br>The tissues that produce and release hormones in animals are termed endocrine tissues. The hormones are secreted directly into the blood, which then transports them to other parts of the body.<br>Hormonal control mechanisms have been found in a variety of invertebrates; those in insects have been most extensively studied. In invertebrates the nervous system and endocrine functions are usually intimately associated. In insects the brain produces a brain hormone that stimulates glands in the prothorax to secrete ecdysone, which induces molting. Levels of juvenile hormone, which is secreted by glands closely associated with the brain, determine whether the larva molts into another larval stage or to a pupa or adult. | **TEKS SATU**<br><br>*Tisu yang menghasilkan dan merembeskan hormon-hormon dalam haiwan disebut sebagai tisu-tisu endokrin. Hormon adalah dirembeskan secara langsung ke dalam darah yang kemudiannya diangkut ke bahagian-bahagian badan yang lain.*<br>*Mekanisme pengawalan hormon telah ditemui dalam pelbagai haiwan invertebrata. Hormon yang terdapat dalam serangga adalah yang paling banyak dikaji. Dalam haiwan invertebrata didapati sistem saraf dan fungsi endokrin adalah sangat berkait atau berhubung rapat. Dalam serangga otak menghasilkan hormon otak yang akan merangsang kelenjar-kelenjar dalam protoraks untuk merembeskan hormon ekdison. Hormon ekdison akan mengaruh proses penyalinan kulit. Hormon juvenil dirembeskan oleh kelenjar yang berhubungkait dengan otak. Aras hormon juvenil ini akan menentukan sama ada larva melakukan salin kulit menjadi peringkat larva seterusnya atau menjadi pupa atau dewasa.* |
| | |

| TEXT TWO | TEKS DUA |
|---|---|
| The earth contains a large number of metals which are useful to man. One of the most important of these is iron. Modern industry needs considerable quantities of this metal, either in the form of iron or in the form of steel. A certain number of non-ferrous metals, including aluminium and zinc, are also important, but even today the majority of our engineering products are of iron or steel. Moreover, iron possesses magnetic properties which have made the development of electrical power possible. | *Bumi mengandungi berbagai jenis logam dan logam ini sangat berguna kepada manusia. Salah satu daripada logam yang paling penting ini adalah besi. Industri moden memerlukan kuantiti logam yang agak banyak (considerable quantities) sama ada ianya dalam bentuk besi atau besi keluli atau keluli sahaja. Terdapat beberapa jenis logam yang bukannya besi, iaitu aluminium dan zinkum. Aluminium dan zinkum juga penting. Walaubagaimanapun, sebahagian besar daripada hasil kejuruteraan sekarang ini menggunakan besi dan juga keluli.*<br>*Tambahan lagi, besi mempunyai sifat magnet yang menyebabkan pembentukan tenaga bagi elektrik itu dapat dijalankan atau dihasilkan.* |

2. Reading and understanding. The participant first read the whole source text in English language and grasped the ideas put forward by the original writer. He then decided to read and understand the first sentence, followed by the second sentence and so on.

3. Attending to one sentence at a time. The participant first read and understood the first sentence in the source text. He then analysed it and found the closest, natural equivalent terms in the target language and then only translated the sentence into the target language. After checking his work, he then went on to the next sentence. Likewise, this sequence was repeated for the other sentences.

4. Stating own beliefs on how to translate. Here the participant stated his own beliefs on how to translate based on his four years of experience in translating and actually carried them out while translating. Some of his beliefs included not translating word-for-word, understanding the source language

sentence thoroughly first before translating, and not using connectors which make sentences too long etc.

5. Problem identification. As some of the sentences in the source language text were problematic as they were too long, the participant solved the problem by dividing the long sentence into two shorter sentences while translating into the target language. In this way, he managed to translate them easily as they were manageable. For example, if a source language sentence expressed two ideas, then the participant used two sentences in the target language, putting one idea I in one sentence.

6. Analysing and reasoning. Here, the participant analysed the phrases and the clauses in each of the sentences and paraphrased them in the source language. Then he found the closest, natural equivalent terms for them and translated them first into the target language, and only then did he translate the sentences one at a time. The participant made sure that he thoroughly understood the source sentence first by paraphrasing and analysing it before translating.

7. Reviewing and revising. Here, the participant reviewed each translated sentence against the source text sentence to ensure that the translation was accurate. The last sentence was found to be translated wrongly as it conveyed a wrong idea and he corrected and revised it upon the second reading by translating it again to ensure that the meaning conveyed was accurate. The correct meaning conveyed in the revision was: "it is the invertebrate hormone that controls the molting process and not the gland".

8. Peformance evaluation. After the participant had finally completed his translation task, he read his translated version again and was satisfied with his performance.

### 6.2.2.3 Sequence of the Translation Strategies Used by Case 2 while Translating Text 2

The sequence of the translation strategies used for Case 2 – Text 2 was as follows:

1. Planning and organising – making decisions to read and then translate, for example, "the first sentence, ....." ( reads it ).
2. Reading and comprehension of source text sentence by sentence.
3. Paraphrasing the meaning conveyed in the sentences in the source language. For example, the participant suggested that the first sentence carried the meaning "that the earth contains metals and metals are useful to man".
4. Translating the sentences into the target language after having analysed the sentences in the source language.
5. Problem identification. For complex sentences in the source language that were difficult to translate into the target language, the participant divided them into two or three shorter sentences for the purpose of translation. Each sentence carried only one idea in the translation in the target language. For example the sentence, "A certain number of non-ferrous metals, including aluminium and zinc, are also important but even today the majority of our engineering products are of iron or steel". This one English sentence was translated into three sentences by the participant when translating into the Malay language: *Terdapat beberapa jenis logam yang bukannya besi, iaitu aluminium dan zinkum. Aluminium dan zinkum juga penting. Walaubagaimanapun, sebahagian besar daripada hasil kejuruteraan sekarang ini menggunakan besi dan juga keluli.*
7. Performance Evaluation. The participant read the translated version as a whole to ensure that it conveyed the content accurately and that the target language used was natural, accurate and smooth-flowing.

### 6.2.2.4 Translation Pattern Used by Case 2 While Translating Text 1

The translation pattern for Case 2 – Text 1 based on the above sequence and from the analysis of the TAPs (see Appendix H2) is as follows:-

a. planning and organising of translation task - making and implementing decisions for each step in the translation process

b. preparing translation tools before translating

c. reading the whole source text first in the English language to get an idea of what it is all about

d. deciding to attend to one sentence at a time

e. analysing and paraphrasing the difficult phrases in the source language text

f. division of the long source language sentences which carried two or three ideas, into two or three sentences in the target language sentence with each sentence carrying only one idea.

g. translating sentence by sentence

h. using his own beliefs on how to translate and implementing them

i. revising the translated version upon reviewing

j. evaluating his whole performance by reading his completed translated target language version against the original source language version to ensure that the meaning that is conveyed, is accurate and the target language used is natural, and smooth-flowing so that the target readers would not find it difficult to understand.

### 6.2.2.5 Translation Pattern Used by Case 2 While Translating Text 2

The translation pattern based on the sequence of translation above and the TAPs analysis (Appendix H2 – Text 2) for Case 2 – Text 2 was as follows:-

1. planning and organising – making decisions

2. reading and understanding

3. attending to one sentence at a time
4. paraphrasing of content of sentences in source language
5. translating sentences into the target language
6. dividing the problematic, very long source language sentence into two or three shorter target language sentences in his translation, with each sentence carrying only one idea.
7. evaluating performance by reading final translated version again to ensure accuracy of content and natural flow of target language.

### 6.2.3 Report of TAP for Case 3

Case 3 was a female lecturer from the Pharmacy Department, Faculty of Medicine, University of Malaya. She has been translating English language pharmaceutical forms and medical brochures from pharmaceutical offices into the Malay language for about seven years.

Refer to **Appendix H3** for her think-aloud protocol analysis and **Table 6.4 on page 270** for the source language and target language texts. First, the participant expressed her feelings that she was not in the mood to translate in the afternoon but decided to do it, anyway. Next, she decided to read the whole text on "Childhood Asthma" to get the gist of it. After this, she decided to translate sentence by sentence. Before starting on the sentences, she read the title "Childhood Asthma" and decided to translate it, and translated it as, *Asma Dikalangan Kanak-Kanak.* Then, she read the first sentence and translated it quite easily into the target language (as perceived by the researcher). For the word "special", she clarified that she had translated it as *khusus,* as it suited the context of the situation. After this, she went on to read the second sentence, and realised that it was too long as it contained two ideas. She decided to divide it into two shorter sentences, to make translating easier. For the key phrase "emotional response", she pondered on how to translate it. She came up with two equivalents in the

target language, which were *tindakbalas emosi* and *gerakbalas*. She decided to choose *gerakbalas*, as it suited the context of the situation, whereas *tindakbalas* was used in the context of "reaction in chemicals". She then translated the sentence. She also stated her own beliefs on how to translate, that is, reading the source language text first to get an idea of what it was all about. She also did not believe in word-for-word translation.

**Table 6.4**

**CASE 3: Lecturer from Pharmacy Department, Faculty of Medicine, University of Malaya**

| **Source Text in English Language** (excerpt taken from Russel J. Green et al. *Pathology and Therapeutics for Pharmacists - A basis for clinical pharmacy practice).* | **Final Translated Version in the Malay Language** |
|---|---|
| **Childhood Asthma**<br><br>**Young children present special problems in diagnosis and treatment. The emotional response of the child and the parents to the knowledge that they have a chronic disease, and the loss of time from school are also important, so careful counselling of the child and its parents, siblings and teachers is essential.** | ***Asma Dikalangan Kanak-Kanak***<br><br>*Kanak-kanak kecil lazimnya memperlihatkan masalah diagnosis dan rawatan yang khusus.*<br>*Gerak balas emosi kanak-kanak tersebut (dan ibubapa) setelah diberitahu bahawa mereka mempunyai penyakit kronik serta kehilangan masa daripada sekolah adalah juga penting. Oleh yang demikian, kaunseling terhadap kanak-kanak dan ibubapa mereka, adik beradik dan guru-guru adalah penting..* |

She believed in coming back the next day to revise her translation. She found translating easy because she was a native speaker of the target language and had the correct intuitiveness for the language. Table 6.4 shows her translated version against the original.

### 6.2.3.1 Sequence of the Strategies Used by Case 3 While Translating Text 1

The sequence of the strategies used in the TAP for Case 3 while translating Text 1 was as follows:

1. Expression of participant's feelings. She was not in the mood to translate that afternoon as she had other assignments to attend to, such as meeting students, getting exam questions ready, attending a meeting etc.
2. Making a decision to read and understand the whole text first to get the gist of it, and then implementing it.
3. Reading and comprehension of source text in the English language.
4. Attending to one sentence at a time.
5. Analysing phrases and keywords for better comprehension, such as emotional response.
6. Using the discrimination strategy to choose the closest equivalent terms in the target language, from the two options *tindakbalas* and *gerak balas* identified that best suited the context of the situation.
7. Translating sentence by sentence.
8. Where the source language sentences were too long, dividing them into two shorter sentences, each carrying only one idea so that translation would be easier.
9. Performance Evaluation. Reading the translated version to ensure that the content conveyed was accurate and also making a decision to revise the translated target language version the next day.

### 6.2.3.2 Translation Pattern Used by Case 3 for Translating Text 1

The translation pattern for Case 3 – Text 1 as extracted from the above sequence and the TAP analysis (see **Appendix H3**) is as follows:

a. expression of mood towards translating

b. making decisions and implementing them

c. reading and understanding of source language text

d. attending to one sentence at a time

e. problem identification and solution by dividing the long sentences into two when translating to target language

f. analysing phrases and keywords by paraphrasing followed by translation of these first, before translating the actual sentence

g. revision of completed translated version in the Malay language

h. making a decision to review again the next day

### 6.2.4 Report of TAP for Case 4 – Text 1

Case 4 was a PhD female student from the Zoology Department, University of Malaya. She has translated six short English language science books (about 30-60 pages) into the Malay language. She has two years of experience in translating.

Refer to **Appendix H4** for the TAP analysis and **Table 6.5** on **page 276** for the source language and target language texts. First, the participant planned and organised her translation task. She knew what she had to translate. Secondly, she decided to read the whole text first to get the gist of it and implemented her decision. She understood that the passage was "an explanation of the spermatozoon, mainly the structure of the spermatozoon". Next, she decided to translate sentence by sentence. She read the first sentence in the source language, and paraphrased and analysed it for some time in the source language before translating. While translating, she had problems in fitting in the words "electron microscope" and after some thinking, decided to translate it as *melalui kajiàn electron mikroskop*. The next sentence was found to be easy and straightforward, and she translated it easily. The phrase "The nucleus is so big that it fills up all of the head", after some thought was translated as, *Bahagian kepalanya mengandungi nukleus besar yang memenuhi hampir keseluruhan ruang kepala*. The following sentence, "The

nucleus is rich in DNA, which accounts for more than half the dry weight of the head", was found to be difficult and she translated it carefully to avoid confusion among the target readers as, *Nukleusnya kaya dengan DNA dan kandungan nukleusnya terdiri daripada separuh berat kering kepalanya.* She was not quite satisfied with this translation but decided to go ahead with the next sentence and to come back to it later. The following source language sentence contained two ideas and was long and she divided it into two sentences when translating into the target language, each carrying one idea. The next two sentences were straightforward and she managed to translate them without much difficulty. She also felt relieved (expressed by a smile and a sigh of relief as perceived by the researcher) when she expressed that this marked the end of the first paragraph. At this point, she also stated her own beliefs on how to translate, that is, having short sentences so that the target readers would not get confused because it is difficult to translate exactly like the English language style as the structure of the Malay language is different. For the next sentence, "The rest of the spermatozoon is concerned with propulsion", she translated half-way and pondered on how to translate "is concerned", and after some thought translated it as *terlibat dengan*, which was accurate for the context of the situation. The next sentence was very long: "Running down the centre of the middle piece and tail is an axial filament consisting of two central fibres surrounded by nine peripheral ones, the famous 9-2 structure typical of cilia and flagella", and the participant had to read it twice to understand it. As this sentence was too long, she decided to divide it into two sentences and her translation was: *Disepanjang bahagian tengah sperma terdapat sebuah filamen aksial yang terdiri daripada dua gentian fiber tengah yang dikelilingi oleh sembilan gentian periferi. Gentian ini mengikut struktur terkenal 9-2 silia dan "flagella".* The word "flagella" was problematic because in the Malay language, they do not express the plural form as in the English language, and she had to express this term in another way, as *banyak*

*flagellum*. Anyway, she decided that she would leave it as "flagella" as she needed to check this expression in the terminology book, which she did not bring along with her. The next sentence was simple, and she translated it easily. Finally, she decided to evaluate her own performance by reading the translated Malay language version, and she was satisfied with her rendition. She admitted that she always read the translated version twice, to ensure that the target language used was natural and accurate. She also believed in editing her work, so that it would not sound awkward. She ensured that the words used were precise and as far as possible repetitions were avoided. Furthermore, she claimed that she translated as though she was explaining the text to someone and she often got a colleague to read her translated version, so that she could make improvements on it. She made sure that the terminology used was consistent throughout her translated version. This was necessary to avoid confusion among the target readers of the translated text. For this text, she admitted that she had problems translating these expressions: *flagella, silium, running down the centre* and *large nucleus that very nearly fills it.*

#### 6.2.4.1 Report of TAP for Case 4 – Text 2

For text 2 by the same participant, please refer to **Appendix H4-Text 2** for the TAP analysis and **Table 6.5** on **page 277** for the source language and target language texts. For Text 2, she read the whole text first to get the gist of it. Then she thought for a moment about the keyword "soldering" and after a few seconds came up with the equivalent target language word *pateri.* Next, she translated the first sentence: "There are a number of methods of joining metal articles together, depending on the type of metàl and the strength of the joint which is required", by first reading and understanding it silently in her mind. Then she translated it into the target language in two sentences as the original sentence in the source language was too long. Her translation was: *Terdapat berbagai cara menyambungkan bahan logam. Cara-cara yang digunakan*

*bergantung kepada jenis logam dan kekuatan sendi yang diperlukan.* After this, she came to the next sentence and translated it, but could not find the equivalent terms for "brazed", "riveted" and "welded" and she decided to use them within inverted commas in her translation and said that she needed to do resourcing in the terminology list. The next sentence posed no problem, and she translated it quickly. As a conclusion, she read her whole translated version and was satisfied with her own performance (she smiled and nodded her head).

**6.2.4.2 Sequence of the Strategies Used by Case 4 While Translating Text 1**

The sequence of the strategies used by Case 4 while translating Text 1 is as follows:

1. Planning and Organising. Here the participant told of her translation task and how she would carry it out. She made decisions such as, reading the whole passage first to get the gist of it and then go sentence by sentence.
2. Reading and Understanding. Here the participant read the whole English language source text first and understood that it was an explanation of the spermatozoon, mainly the structure of the spermatozoon. Then she read sentence by sentence slowly for the purpose of translation.
3. Attending to one sentence at a time. Here she concentrated on one sentence at a time.
4. Analysing and Reasoning. She analysed the difficult source language phrases and keywords first, for example she said "how do I incorporate the word *electron microscope*"? After pondering for a while and getting the equivalent term, that is, *elektron mikroskop,* she translated the whole sentence. Through this process of analysing and pondering, she managed to translate all the sentences slowly.

**Table 6.5**

**CASE 4: PhD Student from the Zoology Department, Faculty of Science, University of Malaya (Text One and Text Two)**

| **Source Text in English Language (Excerpt taken from M.B.V. Roberts. *Biology - A Functional Approach.* Great Britain: Cox and Wyman Ltd. London.)** | **Final Translated Version in the Malay Language** |
|---|---|
| **The Spermatozoon**<br>The structure of the human spermatozoon is now fairly well understood, thanks largely to the electron microscope. It is divided into five regions: head, neck, middle piece, tail and end piece. The head carries genetic material in a large nucleus that very nearly fills it. The nucleus is rich in DNA, which accounts for more than half the dry weight of the head. The amount of DNA present in sperm nuclei is half that found in somatic cells. This is because it is haploid, containing only half the full number of chromosomes. The nucleus is surmounted by a thin cap, the acrosome, which we shall see plays an important part in fertilisation.<br>The rest of the spermatozoon is concerned with propulsion. Running down the centre of the middle piece and tail is an axial filament consisting of two central fibres surrounded by nine peripheral ones, the famous 9+2 structure typical of cilia and flagella. The sperm tail is thus a modified flagellum. By lashing from side to side, it propels the spermatozoon in the liquid medium through which it has to swim before reaching the egg. | ***Sperma***<br>*Struktur sperma manusia kini banyak difahami kerana kajian yang dijalankan menggunakan mikroskop elektron. Ia terbahagi kepada lima bahagian iaitu kepala, leher, bahagian tengah, ekor dan bahagian hujung. Nukleus besar memenuhi hampir keseluruhan bahagian kepala. Nukleus kaya dengan DNA. Berat DNAnya melebihi separuh daripada berat kering kepala. Jumlah DNA yang terdapat di dalam nukleus sperma adalah tetap. Jumlahnya separuh daripada jumlah DNA dalam sel somatik. Ini adalah kerana ia berbentuk haploid dan mengandungi hanya separuh bilangan kromosom. Bahagian hadapan nukleus pula dilitupi oleh lapisan nipis yang dipanggil akrosom. Akrosom memainkan peranan penting dalam persenyawaan.*<br>*Bahagian lain sperma berfungsi dalam pergerakan. Disepanjang pusat, dibahagian tengah dan ekor terdapat struktur yang disebut sebagai filamen aksial. Filamen aksial ini terdiri daripada dua gentian pusat yang dikelilingi oleh 9 gentian periferi, menurut struktur biasa 9+2 silium dan flagelum. Oleh itu, ekor sperma dikatakan sebagai flagelum terubahsuai. Sperma berenang dengan melibaskan ekornya dari sisi ke sisi dalam medium cecair untuk sampai ke telur.* |

| TEXT TWO | TEKS DUA |
|---|---|
| There are a number of methods of joining metal articles together, depending on the type of metal and the strength of the joint which is required. Soldering gives a satisfactory joint for light articles of steel, copper or brass, but the strength of a soldered joint is rather less than a joint which is *brazed, riveted* or *welded.* These methods of joining metal are normally adopted for strong permanent joints. | *Terdapat berbagai cara menyambungkan bahan logam. Cara yang digunakan bergantung kepada jenis logam dan kekuatan sendi yang diperlukan. Sambungan pateri boleh digunakan pada logam ringan seperti keluli, kuprum atau tembaga, tetapi keutuhan atau kekuatan sendi yang dipateri adalah kurang berbanding dengan sendi yang di* "brazed", "riveted" *atau* "welded." *Cara-cara penyambungan logam begini biasanya digunakan bagi memperolehi sendi yang kuat.* |

5. For complex sentences which were problematic, she found a solution by deciding to divide them into two sentences before translating, as this was easier to handle.

6. Need for Resourcing. Here, she expressed the need for resourcing for the plural of "flagella" in the target language which she did not know as she forgot to bring along her terminology book.

7. Stating own beliefs on how to translate. Here she stated her own beliefs on how to translate, such as reading the translated version twice to ensure that the language flow was smooth, translating as though she was explaining the content to someone. She made sure that she implemented these beliefs during the translation process.

8. Performance evaluation. After completing her translation, she read the translated version against the original to ensure that the translation was done well.

9. Proofreading. She also admitted that she showed her colleagues her translated work, to get feedback from them to further improve on it.

**6.2.4.3 Sequence of Strategies Used by Case 4 While Translating Text 2**

The sequence of the translation strategies used by Case 4 while translating Text 2 was as follows:-

1. Planning and organising. Here the participant decided to read the whole English language source text first to get the gist of it and implemented her decision.
2. Reading and understanding. Here she read the whole passage first in the source language and then read each sentence by sentence.
3. Analysing and reasoning. She analysed the difficult source language words and phrases such as "soldering", "brazed" etc and then thought of the equivalent terms in the target language.
4. Need for resourcing. Here, she expressed the need for resourcing for words like "brazed", "riveted" and "welded", as she could not recall from her memory on how to express them in the target language.
5. Performance evaluation. After completing her translation, she read the translated version against the original to ensure that the translation was done well.

**6.2.4.4. Translation Pattern Used by Case 4 While Translating Text 1**

The translation pattern extracted from the above sequence and the TAP transcription (in Appendix H4) for Text 1 by Case 4 is quite similar to that used by Case 2 while translating Text 1. This involved:-

a. planning and organising - making and implementing decisions
b. reading and understanding of source text
c. summarising of content in source text
d. selective attention - attending to one sentence at a time

e. analysing the difficult source language keywords and phrases by using the discrimination strategy to identify and choose the closest, natural, equivalent term from two or three terms in the target language that best suited the contextual meaning of the text.

f. translating the whole source language sentence into the target language

g. stating own beliefs on how to translate and carrying them out

h. expressing the need for resourcing of difficult terms

i. evaluating performance of the whole completed translated target text against the original source language text

#### 6.2.4.5 Translation Pattern Used by Case 2 for Translating Text 2

The translation pattern extracted from the sequence of the translation strategies used and the TAP transcription (in Appendix H 4) for Case 2 – Text 2 involves the following:

1. planning and organising of translation task
2. reading and understanding of source language text
3. analysing the difficult source language keywords and phrases by using the discrimination strategy to identify and choose the closest, natural, equivalent term from two or three terms in the target language that best suited the contextual meaning of the text and the culture of the target readers.
4. expressing the need for resourcing of difficult source language terms in the target language.

### 6.2.5 Report of TAP for Case 5

Case 5 was a male lecturer from the Pharmacology Department, Faculty of Medicine, University of Malaya. He has translated eleven English language science books into the Malay language and has seventeen years of experience in translating.

First, the participant planned and organised his translation task, which was, he said, to translate a scientific text entitled "Antimotility Agents". He described what he

had to do, that is, to translate from the source text in English language into the target text in the Malay language. Next, he decided to read the whole text in the source language first to get a gist of what it was all about and actually read it out aloud. After this, he decided to translate sentence by sentence. Being an experienced translator, he said that he would look at the English sentence line by line and straight away translate into the target language. He translated all the sentences straight away, one after the other, without much difficulty as he had reached the stage of automaticity. After paragraph one, he made a statement that he had completed the first paragraph showing a sign of achievement (as perceived by the researcher). He faced no obstacles in his translation and did not hesitate much at keywords, phrases or clauses as he was very sure of his subject matter and was experienced as a translator. He was translating as a professional even though he is just a part-time translator.

According to Robinson (1997: 94):

> translation for the professional translator is a constant learning cycle that moves through the stages of *instinct (unfocused readiness), experience (engagement with the real world)*, and *habit ( a "promptitude of action"*, and, within experience, through the stages of *abduction* (guesswork), *induction* (pattern-building), and *deduction* (rules, laws, theories); the translator is at once a *professional* for whom complex mental processes have become second nature (and thus subliminal), and a *learner* who must constantly face and solve new problems in conscious analytical ways.

The participant has 17 years of experience in translating and editing and he managed to translate automatically. This is explained by Robinson (1997: 49-50) as follows:-

> Experienced translators are fast because they have translated so much that it often seems as if their "brain" isn't doing the translation – their fingers are. They recognise a familiar source-language structure and they barely pause before their fingers are racing across the keyboard, rendering it into a well-worn target language structural equivalent, fitted with lexical items that seem to come to them automatically...It should be clear, however, that even at its most "habitual" or "subliminal", translation is always intelligent behaviour – even when it seems least conscious or analytical. Translation is a highly complicated process requiring rapid multilayered analyses of semantic fields, syntactic structures, the sociology and psychology of reader and cultural difference.

**Table 6.6** on the **page 282** shows the original source language text against the translated target language text.

### 6.2.5.1 Sequence of the Strategies Used by Case 5 while Translating Text 1

The sequence of the strategies used by Case 5 while translating Text 1 is as follows:

1. Planning and organising. Here the participant decided to read the whole text first in the source language to get an idea of what it was all about. He actually read the text entitled "Antimotility Agents" first before translating it into the target language.
2. Reading and understanding of the source text first and then reading the source text sentence by sentence slowly for translating purposes. Here he read the source text sentence by sentence and immediately translated into the target language without any difficulty. All the processing was done mentally automatically without any articulation of thoughts aloud.
3. Analysing and reasoning. The participant quickly analysed and comprehended the source text mentally by just pausing for a moment and then translating the source language sentences into the target language sentences very easily as he was an experienced translator. He did not articulate his thought processes as they were very fast and subliminal.
4. Attending to one sentence at a time. He read the source language sentence by sentence first and then translated sentence by sentence into the target language.
5. Translating. Translating was done very quickly for each sentence after he had read the source language sentence. There were almost no hesitations.
6. He articulated a statement that he had completed translating the first paragraph and one more to denote that he had completed his translation task.

## Table 6.6

## CASE 5: Lecturer from the Pharmacology Department, Faculty of Medicine, University of Malaya.

| Source Text In English Language | Translated Text in the Malay Language |
|---|---|
| **Antimotility Agents** | **Agen Antikomotilan** |
| The main pharmacological agents which decrease motility are opiates (details in Ch. 31) and **muscarinic-receptor antagonists** (details in Ch. 6). Agents in this latter group are seldom employed as primary therapy for diarrhoea because of their actions on other systems; but small doses of atropine are used combined with diphenoxylate (see below). | *Agen farmakologi utama yang mengurangkan kemotilan adalah opiat (perincian diberi dalam bab 31) dan antagonis reseptor muskarinik (perincian diberi dalam bab 6). Agen dalam kumpulan kedua jarang digunakan sebagai terapi prima untuk diarea sebab tindakannya atas organ-organ lain. Walaubagaimanapun, dos atropin yang kecil digunakan bersamaan dengan diphenoxilate (lihat dibawah).* |
| The action of **morphine**, the type-specific opiate, on the alimentary tract is complex and, furthermore, varies in different species. In man, morphine increases the tone and rhythmic contractions of the intestine but diminishes propulsive activity. Its overall effect is constipating. The pyloric, ileocolic and anal sphincters are contracted and the tone of the large intestine is markedly increased. | *Tindakan morfin opiat yang khusus terhadap jenis kepada trak alimentary adalah kompleks dan tambahan pula ia berbeza dalam spesies yang berlainan. Pada manusia, morfin meningkatkan tones dan pengecutan rithma oleh usus tetapi mengurangkan aktiviti pengunjurannya. Kesan keseluruhannya adalah menyebabkan sembelit. Spinkter pilorik, iliokolik dan anus dikecutkan dan tones usus besar juga dikurangkan dengan ketaranya.* |
| The main opiates used in diarrhoea are codeine (a morphine congener), diphenoxylate and loperamide (both pethidine congeners used only for their actions in the gut). All have unwanted effects which include nausea, vomiting, abdominal cramps, drowsiness and dizziness. Paralytic ileus can also occur. They should not be used in young children. | *Opiat utama yang digunakan dalam diarea adalah kodin (sejenis konjener morfin), difenoxilate dan loperamid (kedua-duanya adalah kongener pethidin yang digunakan hanya untuk tindakannya pada usus). Kesemuanya mempunyai kesan buruk yang termasuk loya, muntah, kekejangan otot perut , pening dan mengantuk. Kekejangan ileus boleh juga berlaku. Ia tidak boleh digunakan pada kanak-kanak.* |
| More than 3 000 000 people cross international borders each year. Many travel hopefully but come back ill, having encountered enterotoxin-producing *Esh. coli* or other organisms. Most infections are self-limiting and require only oral replacement of fluid and salt as detailed above, but loperamide reduces the frequency of passage of faeces and the duration of the illness. | *Lebih daripada tiga juta manusia menyeberangi sempadan antarabangsa setiap tahun. Ramai yang berharapan untuk menggembara tetapi kebanyakkannya kembali dengan membawa penyakit -sesetengahnya bertembung dengan Esch coli yang boleh menghasilkan toksin atau pun organisma lain. Kebanyakkan jangkitan adalah terhad dengan sendirinya dan hanya memerlukan penggantian cecair dan garam secara oral seperti yang diterpincikan diatas tetapi loperamide mengurangkan kekerapan laluan najis dan tempoh penyakit itu.* |

### 6.2.5.2 Translation Pattern Used by Case 5 for Translating Text 1

In Case 5, the translation pattern extracted from the translation sequence above and the TAP analysis and transcription (in **Appendix H 5**) are as follows:

a. planning and organising of translation task

b. reading and understanding of sentences in the source language

c. attending to one sentence at a time while translating

d. analysing and reasoning by pausing shortly and processing mentally

e. translating immediately after reading the source language sentences

f. making a statement denoting end of translation task

## 6.3 The Steps and the Translation Strategies Used by Participants

From the above five reports of the TAPs, it can be seen that the general sequence and strategies used in the internal process of translating scientific texts from English to Malay comprises **seven iterative steps** and this answers **research question 3** on page **251**. The steps followed and the strategies used are given below:-

1. Planning and organising the translation process. This is a metacognitive strategy. This involves making decisions and implementing them, like getting ready the translation tools such as the computer or writing materials, reference materials, terminology lists, bilingual dictionary etc. Some other examples taken from the TAPs are, "I'll read the whole passage first to get an understanding of what it is all about", "Now I'll type straight into my computer", "Now I'll read the first sentence" etc. Here we see how they make decisions first and then implement them.

2. Reading and comprehension of the source language text. This involves using visual sensory perception to read the source text aloud and comprehend the meaning conveyed. Summarising of the content of the text is done to ease comprehension. Most of the cognitive strategies are used here.

3. Attending to only one sentence at a time. Here, they concentrate on only one sentence at a time. This is a metacognitive strategy.

4. Analysing and reasoning of the information in the source text in English language. Here, the participants target the difficult keywords and phrases in the source text for each sentence and decide to paraphrase them first. Then they translate these difficult expressions into the target language first before translating the whole sentence. The cognitive and memory strategies are used in this step.

5. Translating. This is a cognitive strategy. Here, the actual process of translating the scientific texts from English language into the Malay language takes place. The participants use all the principal direct and indirect language learning strategies, their own beliefs on how to translate and carry them out, find their own solutions to the problem of complex sentences in the source language by dividing them into shorter sentences while translating and making sure that each sentence carries only one idea and finally using the discrimination strategy to find the closest, matching equivalent terms in the Malay language from two or three alternatives identified, based on the context of the situation (contextual meaning) in the scientific text and the culture of the target readers. This is to ensure that the target readers will be able to understand the translated text easily.

6. Checking and revising constantly using structured reviewing, repetition and production monitoring. This is a metacognitive strategy.

7. Performance evaluation. This is a metacognitive strategy. Upon completion of the whole translated task, the participants read their whole translated version in the target language against the original source language text to ensure that the meaning communicated is accurate and not ambiguous and that the target language that is used is natural. Revision is only done by the participants when

they discover that the meaning that is communicated in the target language text is inaccurate and not clear. In addition to this, if the target language text sounds awkward to them when reading, it is revised.

The only exception to the above sequence was Case 5 where the experienced part-time translator (the fifth participant) skipped the production monitoring, checking and evaluation stages because he had learnt a lot over a period of 17 years of translating. He could now translate automatically as he had mastered his subject so well that he did not need to hesitate long in finding matching equivalents in the target language. He took only nine minutes to translate a 220-word passage.

The other four less experienced part-time translators (the participants) spent more time thinking of the closest, matching equivalent terms in the target language.

From the above steps of the translation process, it is seen that the participants used a combination of metacognitive and cognitive strategies more than the other strategies. To realise the cognitive process, the core translation tool used by the participants were the cognitive strategies. According to Brown and Palincsar 1982 (in O'Malley 1990:8), "Cognitive strategies are more directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials". Here, the main task of the participants was to translate scientific texts from English into the Malay language. They used the above sequence in their translation process. The mental processing of the information in the source language text into the target language text is facilitated by the translation tools, of which the core are the language learning strategies and translation strategies which help the translator to understand the source text better and to reproduce it into the target language form.

The second most used strategies in the translation process were the metacognitive strategies. These strategies are important in the translation process, because they involve making and implementing decisions on how to manage the

translation task, monitoring and reviewing their translated work during translating and evaluating their performance after completing the translation task. According to Darwish (1999:3), data derived from empirical research pioneered by Jumpelt (1961), Levy (1967), Toury (1985, 1995), Seguinot (1991), Wilss (1994) and Lorscher (1995) and other researchers have "highlighted the significance of decision-making as the backbone of translation". Darwish (1999: 3) suggests, "there is now general agreement among translation researchers, educators and practitioners that decision-making plays an important part in both the translator's performance and the quality of the translation product". According to Darwish (1998:4), his **operational definition for decision-making** is that, "decision-making is the process of choosing a course of action from at least two possible alternatives". In this study too, the researcher's operational definition of decision-making is the same as Darwish's.

For a language task like translation to be successful, one needs a pairing of cognitive and metacognitive strategies. According to Brown et al. (cited in O'Malley 1990:8), research in metacognitive and cognitive learning strategies suggests that transfer of strategy training to new tasks (here, translation tasks) can be maximised by pairing metacognitive strategies with appropriate cognitive strategies. These two strategies were the most used in the TAPs, and from the background of the participants, it was seen that they are experienced, part-time translators and were able to come up with good translation products as they are subject specialists and are also good in both the source and target languages.

The fact that all the principal language learning strategies were used in the translation task supports Oxford's (1990:1) statement that, "strategies are especially important...because they are tools for active self-directed involvement, which is essential for developing communicative competence". In other words, it is important

for a translator to be a good communicator of meaning and to achieve this, he or she must use all the principal direct and indirect language learning strategies

## 6.4 The Translation Patterns Used by the Participants

From the above five reports of the TAPs and from the TAPs transcriptions (see Appendices H1-H5) it is found that the general pattern of the translation process used by the five participants is as follows:-

1. Planning and organising of the translation process, that is, making and implementing decisions pertaining to the translation process such as, having the translation tools readily beside the translator, deciding on what to do first and then implementing the decisions made.
2. Reading and understanding of the source language text, that is actually reading the whole text to be translated first, and then summarising its content before translating.
3. Selective attention, that is attending to only one sentence at a time. The difficult sentences were paraphrased into simpler language. Here, elaboration of difficult concepts was done as the translators were also subject specialists and this enabled them to understand the text further.
4. Analysing and reasoning of the source language sentences first before translating. Here, the translators (participants) actually thought over the difficult expressions and keywords in the source text and made a decision on choosing the best equivalent terms in the target language using the discrimination strategy to finally decide on the best choice of term from two or three alternative terms identified which best suited the context of the situation and the culture of the target readers.
5. Actually translating the sentences after first analysing the difficult keywords and phrases and choosing the closest, matching equivalent terms for these in the

target language, and then translating these difficult expressions first, before continuing with the translation of the whole sentence.

6. Stating own beliefs on how to translate and implementing them, such as, not believing in word-for-word translation, not believing in literal translation, translating as though explaining the message to someone, etc.

7. Production Monitoring. Reading the translated target language sentence against the original source language sentence to ensure that the meaning communicated is accurate and that the target language used is natural so that the target readers would have no problem in understanding the language.

8. Performance evaluation. Upon completing the translation of the whole text, the part-time translators who were the participants for this study read the whole completed translated text in the target language and matched it against the original source language text to ensure that the content communicated was accurate and the target language used was natural.

The above sequence and patterns were repeated for each source language sentence to be translated into the target language. It is seen that the translation process is cyclical, iterative and repetitive. In fact there is not much difference between the sequence and the pattern of the translation process. The internal translation process comprises major activities such as planning and organising involving making decisions on how to go about translating, reading and understanding of source language text using the cognitive processes in the brain, analysing and reasoning the difficult concepts in the source language sentences, finding matching equivalents for these concepts in the target language based on the context of the situation and the culture of the target readers, translating the whole sentence into the target language, monitoring the production of the target language against the source language text to ensure that the meaning communicated is accurate and presented in the target language naturally, and finally

evaluating the whole translated version against the original version and doing a revision if necessary.

## 6.5 Linguistic Units Processed by Participants

From the TAPs analysis, it was found that the participants analysed the difficult words, phrases and clauses in the sentences first before translating the whole sentence. **Table 6.7** on **page 290** shows the linguistic units analysed in sentences by the five participants who participated in the TAPs while translating.

From Table 6.7, we see that generally the **processing** of scientific texts in this study takes place at the linguistic units of the **word, phrase** and **clause levels**. For examples "space", "responsible", "inherited disorder", "carrier system", "large nucleus that very nearly fills it", "running down the centre of the middle piece" etc. This is a **new finding** from this study. It refutes Bell's (1991) theory that translators generally work at the clause level. In this study, it was found that many keywords had to be comprehended and elaborated first and their equivalent terms found in the target language first before the whole sentence could be translated.

The Case 5 participant had no difficulty with any keywords as he had 17 years of experience and knew the equivalent terms in the target language at his finger tips and managed to translate without any pause. He is a terminology committee member for DBP and is thus very knowledgeable where terminology in pharmacology is concerned.

## Table 6.7

### The Different Linguistic Units Processed First in the SL Text Sentences by the Participants while Translating

| CASES | LEXICAL ITEMS | LINGUISTIC UNITS |
|---|---|---|
| 1 | Significantly lower | Phrase |
| | Overlapping specificity | Phrase |
| | Space | Word |
| | Responsible | Word |
| | In | Word |
| | Inherited disorder | Phrase |
| | Defective | Word |
| | Cystinuria | Word |
| | Common | Word |
| | Carrier system | Phrase |
| | Most common genetic error | Phrase |
| | Stones | Word |
| | Which can block | Clause |
| | Urinary tract | phrase |
| 2. | Secreted | word |
| 3. | Emotional response | phrase |
| | Special | Word |
| 4 | Is concerned | Phrase |
| | Large nucleus that very nearly fills it | Clause |
| | Running down the centre of the middle piece | Clause |
| | Soldering | Word |
| | Brazed | Word |
| | Riveted | Word |
| | Welded | Word |

## 6.6 Translation Strategies Used by Participants

To investigate the translation strategies used by the five participants in this study, the researcher first analysed the transcripts of the TAPs and then mapped them on to Oxford's (1990) SILL to find out whether SILL was used by them and also to find out the other strategies used by them which were not given in Oxford's (1990) SILL. **Oxford's (1990) SILL** is described in detail in **Appendix G3** and here too examples from the TAPs are given to support the fact that these strategies are used by translators while translating. The strategies used by the five case studies as mapped on to Oxford's (1990) SILL model is presented in **Table 6.8 on page 292**. The strategies marked with an asterisk and highlighted are the **additional strategies** found by the researcher from this study. The key to Table 6.8 is explained in the box below.

**KEY to Table 6.8**

The first two columns represent the number and types of strategies used, that is both the direct and indirect strategies and the remaining five columns in **Table 6.8** represent the Cases while the rows represent the types of strategies used. A tick was put in the column next to the strategy if the strategy was used by the participants for this study, while a cross was put if the strategy was not used by them. The strategies used which are marked with an asterisk mark and bolded are the additional strategies found from this study of the process of translating scientific texts from English to Malay.

## TABLE 6.8

## The Strategies Used by Participants in their TAPs

| Strategies Used by Participants In This Study | | Case 1 | Case 2 (Two Texts) | Case 3 | Case 4 (Two Texts) | Case 5 |
|---|---|---|---|---|---|---|
| No. | DIRECT STRATEGIES | | | | | |
| A | **Memory Strategies** | | | | | |
| 1. | Using imagery | / | / | × | / | × |
| 2. | Reviewing | / | / | / | / | × |
| B | **Cognitive Strategies** | | | | | |
| 1. | Reading and comprehension | / | / | / | / | / |
| 2. | Summarising | / | / | / | / | / |
| 3. | Highlighting | / | × | × | / | × |
| 4. | Analysing and Reasoning – translating | / | / | / | / | / |
| 5. | *** Choosing equivalent terms based on the contextual meaning in the text (situation) and the culture of the target readers by using the discrimination strategy to choose the closest equivalent term in the target language from two or three alternatives identified.** | / | / | / | / | / |
| 6. | Academic Elaboration | / | / | / | / | × |
| 7. | *** Finding their own solutions to the translation problems and carrying them out.** | / | / | / | / | / |
| 8. | Repetition | / | / | / | / | / |
| 9. | Resourcing | × | × | × | / | × |
| C. | **Compensation Strategies** | | | | | |
| 1 | Overcoming limitation in writing – paraphrasing | / | / | / | / | / |
| 2. | Overcoming limitations in writing: switching to the source language. | × | × | × | / | × |
| II | INDIRECT STRATEGIES | | | | | |
| A | **Metacognitive Strategies** | | | | | |
| 1. | Planning and organisation – Making decisions | / | / | / | / | / |
| 2. | Selective attention – attending to one sentence at a time. | / | / | / | / | / |
| 3. | *** Stating own beliefs on how to translate – giving reasons to support the beliefs and carrying them out.** | / | / | / | / | / |
| 4. | Problem Identification | / | / | / | / | / |
| 5. | Comprehension monitoring | / | / | / | / | / |
| 6. | Ability evaluation | / | / | × | / | × |
| 7. | Self-monitoring/Production monitoring | / | / | / | / | / |
| 8. | Performance evaluation | / | / | / | / | × |
| B | **Affective Strategies** | | | | | |
| 1. | Encouraging yourself: making speech acts to denote end of a paragraph and end of a task. | × | × | × | / | / |
| C. | **Social Strategies** | | | | | |
| 1. | Empathising with Others | / | × | × | / | × |
| 2. | Asking questions | / | / | / | / | × |

From the data presented in Table 6.8, it is seen that altogether twenty-four strategies were used, that is, 13 direct and 11 indirect. All the six principal direct and indirect strategies mentioned by Oxford (1990), that is the memory, cognitive, compensation, metacognitive, affective and social strategies were used by the participants in their translation process, although not all the minor sub-strategies under these six strategies were used by the participants in this study. For example, there are four sub-strategies under the memory strategy: creating mental linkages, applying images and sounds, reviewing well and employing action, but for this study only two were used: using imagery and reviewing. Besides these, some additional strategies were also used which are marked with an asterisk and highlighted in Table 6.8. These comprised one metacognitive strategy, which was stating their own beliefs on how to translate and implement them; and two cognitive strategies, which were: using the discrimination strategy to find the closest equivalent matching term in the target language from two or three alternatives identified that best suited the context of the situation and the culture of the target readers and finding their own solutions to the problems identified and implementing them. Complex source language sentences carrying two or three ideas posed a problem to the participants. They solved this by dividing the complex sentence into two or three shorter sentences while translating into the target language so that each sentence carried only one idea.

### 6.6.1 Analysis of Oxford's (1990) SILL Used by Participants in their TAPs

From the TAPs analysis, the researcher also drew a table of the number and percentage of each of the direct and indirect strategies used by the participants in their translation process. The data obtained is presented in **Table 6.9** on **page 294**.

**TABLE 6.9**

**Percentages of Direct and Indirect Strategies used by the Participants from their TAPs Analysis**

| | DIRECT STRATEGIES | | | INDIRECT STRATEGIES | | | |
|---|---|---|---|---|---|---|---|
| STRATEGIES / CASES | Memory | Cognitive | Compensation | Meta-Cognitive | Affective | Social | TOTAL |
| Case One | 7<br>10.14% | 38<br>55.07% | 2<br>2.90% | 16<br>23.19% | 4<br>5.80 % | 2<br>2.90 % | 69<br>100% |
| Case Two<br>Text One | 2<br>4.0% | 21<br>42.00% | 1<br>2.00% | 23<br>46.00% | 1<br>2.00% | 2<br>4.00% | 50<br>100% |
| Text Two | 0<br>0% | 9<br>52.94% | 1<br>5.88% | 6<br>35.29% | 1<br>5.88% | 0<br>0% | 17<br>100% |
| Case Three | 1<br>4.55% | 7<br>31.82% | 0<br>0 % | 11<br>50.00% | 3<br>13.64% | 0<br>0% | 22<br>100% |
| Case Four<br>Text One | 1<br>1.72% | 31<br>53.45% | 1<br>1.72% | 20<br>34.48% | 1<br>1.72% | 4<br>6.90% | 58<br>100% |
| Text Two | 2<br>10.0% | 10<br>50.00% | 1<br>5.00% | 6<br>30.00% | 0% | 1<br>5.00% | 20<br>100% |
| Case Five | 0<br>0% | 28<br>68.29% | 0<br>0% | 12<br>29.27% | 1<br>2.44% | 0<br>0% | 41<br>100% |
| **Average Overall Use of Strategies** | 13<br>4.69% | 144<br>51.99% | 6<br>2.17% | 94<br>33.94% | 11<br>3.97% | 9<br>3.25% | 277<br>100% |

From the data obtained as given in Table 6.9, a case by case analysis of the strategies used in the TAPs is discussed below:

**Case One:** This participant used the highest total number of strategies, that is, a total of 69 compared to the rest. She used cognitive strategies a total of 38 times out of 69 (55.07%) which is the second highest among the participants, being an experienced translator and metacognitive strategies a total of 16 times (23.19%) out of a total of 69. She also used memory strategies 7 times out of 69 (10.14%), affective strategies 4 times out of 69 (5.80%) and social strategies 2 times out of 69 (2.20%) and compensation strategies 2 times out of 69 (2.90%). She was a very careful, accurate translator and took pains to think about how the target readers would perceive her translation, and she

tried her best to ensure proper understanding of the source language text in English language and performed a further meticulous task of communicating the information in the target language which is the Malay language. She used all the principal direct and indirect strategies mentioned by Oxford (1990) to help her play an active, involved and self-directed role in the achievement of a good translation of the original text. She did the task slowly and took 25 minutes to complete her translation of a text of 163 words, as the text was difficult and contained many scientific concepts which took time to understand, and then to translate to the target language.

**Case Two:** For Text 1, the participant used more metacognitive than cognitive strategies for his translation task (46 % against 42%). This meant that the participant had problems in his task and actually revised his translation after thinking over it, and realising that the meaning was not conveyed accurately. Therefore, his metacognitve strategies were more numerous. He also used memory strategies 2 times out of 50 (4.0%), compensation strategies 1 time out of 50 (2.00%) and affective strategies 1 time out of 50 (2.00%) and social strategies 2 times out of 50 (4.00%). In other words, he was a meticulous translator and actually took pains to come up with a good translation. To accomplish his task, he used all the principal direct and indirect strategies. As such, he took 23 minutes to translate Text 1 comprising 111 words.

However, in Text 2, he used more cognitive than metacognitive strategies, that is 52.94% against 35.29%, as the passage was much simpler. For text 2, he used no explicit memory and social strategies, cognitive strategies 9 times out of 17 (52.94%), compensation strategies 1 time out of 17 (5.88%), metacognitive strategies 6 times out of 17 (35.29%) and affective strategies 1 time out of 17 (5.88%). Text 2 contained only 83 words and it was plain and straightforward. He faced no difficulty in translating Text 2 and did it in only 7 minutes as compared to 23 minutes for Text 1. Some of the memory and social strategies were not made explicit as he was automatically and

subliminally processing the information mentally as he said that this text was much simpler than the first one.

**Case Three:** Here, the participant used more metacognitive strategies, that is, 11 times out of a total of 22 times (50%) of strategies used for accomplishing the translation task. She used cognitive strategies 7 times out of a total of 22 (31.82%). She really made sure that the content conveyed in the target language text was correct and thought about it very carefully. She was very meticulous of her presentation even though she was not in the mood to translate. She used the highest number of affective strategies, that is 3 out of a total of 22 (13.64%), which was the highest when compared to the others. She also used memory strategies 1 time out of a total of 22 (4.55%) but she did not use any social strategies. Her text contained only 53 words, which was really short, and she only took 10 minutes to translate it. She kept mentioning that she was busy and had to attend to other matters and expressed her negative mood to translating and only agreed to translate a very short text.

**Case Four.** Here, the participant who was a PhD student in zoology, used more cognitive strategies than metacognitive strategies for both the texts that she translated. For Text 1, she used cognitive strategies 31 times out of a total of 58 times (53.45%) as against metacognitive strategies 20 times out of 58 times (34.48%) for her translation task. As she was not as experienced as the other participants, she had to use more cognitive and metacognitive strategies to manage and complete her translation. She also used social strategies 4 times out of a total of 58 (6.90%), memory strategies 1 time out of a total of 58 times (1.72%), compensation strategies 1 time out of a total of 58 times (1.72%) and affective strategies 1 time out of 58 times (1.72%). In other words, she used all the principal direct and indirect language learning strategies in accomplishing her translation task. She took 30 minutes to complete her translation of a

long text of 188 words. She spent a lot of time analysing some difficult scientific phrases to ensure a good translation.

For Text 2, she used cognitive strategies 10 times out of a total of 20 (50%) strategies used. The next most used strategies were the metacognitive strategies, which were used for a total of 6 times (30%) out of a total of 20. She also used memory strategies 2 times (10.00%) out of a total of 20, compensation strategies 1 time (5.00%) out of a total of 20, and a social strategy 1 time (5.00%) out of a total of 20. No affective strategies were used. She spent a lot of time analysing expressions, analysing contrastively between the two languages, and therefore spent more time on cognitive strategies than the "how to translate" or metacognitive aspect. As this text was short and contained only 70 words, she managed to complete it fast, that is, in 12 minutes.

**Case Five.** This participant performed his task almost effortlessly as he was a very experienced translator. He just translated automatically and therefore his cognitive strategies were very high, that is, 28 times (68.29%) out of a total of 41 as against metacognitive strategies only 12 times (29.27%) out of a total of 41 strategies used. He used an affective strategy only once out of a total of 41 (2.44%) but did not use any memory, compensation and social strategies. This was because he knew his subject matter at his finger tips and being a native Malay speaker, had a flair for the language and could deliver his translation without hesitation. Furthermore, he had 17 years of experience in translating. He was processing all the information in his brain and was translating automatically due to his experience of 17 years of translating.

From Table 6.9. it is seen that sometimes no memory strategy is being used, for example in Case 2, Text 2 and Case 5. It should be understood that memory strategies were used but they were not articulated as the processing was done silently even though the participants had been told to articulate their thoughts aloud. This is one of the **short-comings of the TAP technique** as experienced translators still fall silent because

the work they perform has become **automatic and subliminal** due to many years of practising it.

The types of strategies used vary with the experience of the translators. Less experienced translators use more strategies than more experienced translators. The less familiar the text, the more the types of strategies used. If the text is very familiar to the translator, then he or she can translate almost automatically without using many strategies. The most used average overall strategies were the cognitive strategies. From Table 6.9 on page 294, it is seen that the cognitive strategies were used a total of 144 times (51.99%) out of 277 times by the participants in their translation process. According to Darwish (1999: 24), "the internal translation process is in fact the cognitive process that takes place during the act of translating." This study has shown this fact to be true.

According to O'Malley and Chamot (1990: 1) :

> In cognitive theory, individuals are said to 'process' information, and the thoughts involved in this cognitive activity are referred to as 'mental processes'. Learning strategies are special ways of processing information that enhance comprehension, learning, or retention of information.

To realise the cognitive process, the core translation tool used by the translators were the cognitive strategies. According to Brown and Palincsar 1982 (cited in O'Malley, 1990: 8), "cognitive strategies are more directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials". Here, the main task of the participants was to translate an English language scientific text into the Malay language. The participants had to use cognitive strategies to help them in their translation process. These cognitive strategies include: receiving and sending messages, using resources for receiving and sending messages, analysing and reasoning difficult expressions, practising or repeating difficult words, translating and creating structure for input and output. The main task of the participants was to translate, and

thus it was seen that the most used average overall strategies were the cognitive strategies, as these strategies were the most needed in reproducing the English language scientific texts into the Malay language.

The second most frequently used average overall strategies as shown in Table 6.9, in their translation process were the metacognitive strategies which were used a total of 94 (33.94%) out of 277 times. These strategies were important in their translation process because it involved making decisions on how to manage the translation task, such as making decisions on planning and organising, monitoring and reviewing their translation process and evaluating their performance in the translation task. In other words, it involved making decisions and implementing them. According to Darwish (1999: 3), data derived from empirical research pioneered by Jumpelt (1961), Levy (1967), Toury (1985, 1995), Seguinot (1991), Wilss (1994) and Lorscher (1995) and other researchers have "highlighted the significance of decision making as the backbone of translation".

According to Darwish (1999: 3), "there is now general agreement among translation researchers, educators and practitioners that decision-making plays an important part in both the translator's performance and the quality of the translation product".

Thus, metacognitive strategies are very important in a translation task. For a language task like translation to be successful, one needs a pairing of cognitive and metacognitive strategies. According to Brown et al. (cited in O'Malley and Chamot, 1990:8), research in metacognitive and cognitive learning strategies suggests that transfer of strategy training to new tasks (here, translation tasks) can be maximised by pairing metacognitive strategies with appropriate cognitive strategies. These two strategies are the most used in the TAPs, and from the background of the participants, it was seen that all of them were experienced, part-time translators and were able to come

up with good translations. This supports the fact by Brown et al. (1983 cited in O'Malley and Chamot, 1990: 8) that a pairing of cognitive and metacognitive strategies results in a successful task – here, a successful completed translated version in the Malay language of an English language scientific text.

The third most used average overall strategies were the memory strategies. They were used a total of 13 (4.69%) out of 277 times. The participants had to resort to their memory for visualising certain concepts (in Case 1, the participant visualised kidney stones as corals, as their texture was such, to ensure accurate translation into the Malay language, that is, *karang* etc.), reviewing, elaborating, creating mental linkages etc. These memory strategies facilitated their understanding of certain complex terms and expressions presented in the English language scientific text and made translation into the Malay language a less arduous task.

The fourth most used average overall strategies were the affective strategies which were used 11 (3.97%) out of 277 times. Here, some of the participants were affected by their moods due to other commitments, and they thus expressed these feelings. Translation does not wholly involve direct dealings with human beings. It involves reproducing the ideas in a source language text into a target language text. It involves using translation tools such as a bilingual dictionary, thesauruses and terminology lists, and very seldom do translators actually deal directly with friends while translating – colleagues are approached only in rare instances, during the translation process when the translators could not find a term in the terminology list or generally after the translation task is completed, to review it, that is, if there is a need for clarification of certain concepts. Therefore, this strategy was not used to a great extent.

The fifth most used average overall strategies were the social strategies, which were used 9 (3.25%) out of 277 times. Here, the translators realised that they needed

help, and did some self-talking for confirmation of certain terms, by self-questioning themselves, empathising with the target readers etc.

Last came the compensation strategies, which were used a total of only 6 (2.17%) out of 277 times. These strategies comprised paraphrasing, using linguistic clues and the use of foreign words spelt phonetically to help them in their translation process. They had to resort to such strategies in an effort to understand the source language text. As all the participants in this study were subject specialists and were competent in both the source and target languages, they did not resort to using compensation strategies to a great extent. Therefore, in this context, these strategies were the least used.

All these strategies are operations employed by the learner (in this study, the translators) to aid acquisition, storage, retrieval and use of information (Oxford, 1990: 8). These strategies are "specific actions taken by the learner (in this study, the translators) to make translating easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations" (Oxford, 1990: 8).

Darwish (1989: 2) and Houbert (1998: 1) suggest that translation can be seen as a communication process which involves the transfer of a message from a source language to a target language. The translator is a message conveyer. The work of the translator is essentially of conveying the meaning expressed by the original writer. According to Oxford (1990: 6), the word "communication" comes from the Latin word for "commonness", including the prefix "com-" which suggests togetherness, joining, cooperation and mutuality. Therefore, she defines communication as "a mutual exchange between two or more individuals which enhances cooperation and establishes commonality". A good translator must have communicative competence so that he or she can deliver a good translation. According to Oxford (1990:7), "communicative competence is competence or ability to communicate". It concerns both spoken or written language and all the four language skills (listening, speaking, reading and

writing). One very useful model provides a comprehensive four-part definition of communicative competence which is as follows:

1. Grammatical competence or accuracy is the degree to which the language user has mastered the linguistic code, including vocabulary, grammar, pronunciation, spelling, and word formation.
2. Sociolinguistic competence is the extent to which utterances can be used or understood appropriately in various social contexts. It includes knowledge of speech acts such as persuading, apologising and describing.
3. Discourse competence is the ability to combine ideas to achieve cohesion in form and coherence in thought, above the level of the single sentence.
4. Strategic competence is the ability to use strategies like gestures or "talking around" an unknown word in order to overcome limitations in language knowledge.

(taken from Oxford, 1990:7)

According to Oxford (1990:9), all appropriate language learning strategies are oriented towards the broad goal of communicative competence. Development of communicative competence requires realistic interaction among learners using meaningful, contextualised language. Here, the researcher has used her concept of communicative competence in a translation context. The researcher feels that these language learning strategies also help a translator in accomplishing his or her task of being a message conveyer. Learning strategies also help translators participate actively in authentic communication. It is easy to see how language learning strategies stimulate the growth of communicative competence in general. Metacognitive (beyond the cognitive) strategies help translators regulate their own cognition and to focus, plan and evaluate their progress as they move forward towards communicative competence. Affective strategies develop the self-confidence and perseverance needed by translators

to involve themselves actively in understanding both the languages required for their translation task, a requirement for attaining communicative competence. Social strategies provide increased interaction and more empathetic understanding, two qualities necessary to reach communicative competence. Certain cognitive strategies, such as analysing, and particularly memory strategies, like the keyword technique, are highly useful for understanding and recalling new information that is, important functions in the process of becoming competent in using the target language. Compensation strategies aid translators in overcoming knowledge gaps and in continuing to communicate authentically; thus, these strategies help communicative competence to blossom.

As the translator's competence grows, strategies can act in specific ways to foster particular aspects of that competence: grammatical, sociolinguistic, discourse and strategic elements. For instance, memory strategies, such as using imagery and structured reviewing, and cognitive strategies such as reasoning deductively and using contrastive analysis, strengthen grammatical accuracy. Social strategies such as asking questions, cooperating with native speakers and peers, and becoming culturally aware, powerfully aid sociolinguistic competence. Many kinds of strategies – compensation strategies, such as cooperating and asking questions, and cognitive strategies, like recombination and use of common routines – encourage greater amounts of authentic communication and thus enhance discourse competence. Compensation strategies – guessing when the meaning is not known, or using synonyms or gestures to express meaning of an unknown word or expression, are the heart of strategic competence.

According to Oxford (1990: 9), the key features of language learning strategies in any task are that they:

a. contribute to the main goal, that is, communicative competence

b. allow learners to become more self-directed

c. expand the role of teachers

d. are problem-oriented

e. are specific actions taken by the learner

f. involve many aspects of the learner, not just the cognitive

g. support learning both directly and indirectly

i. are not always observable

j. are often conscious

k. can be taught

l. are flexible.

m. are influenced by a variety of factors.

From the above analysis of the language learning strategies used in a translation task, the researcher feels that they are very important in helping the translators to communicate the original message into the target language. Through this study, it was seen that all of the experienced translators actually used these strategies unconsciously in their translation task. As they are important in solving problems and helping one to accomplish a translation task, the researcher strongly feels that they should be taught in all translation training institutions.

## 6.7 Language Strategies Used by Participants in TAPs

The researcher investigated the strategies used by the participants (see Appendices H1 to H5 for analyses of TAPs by researcher) and then analysed the strategies used and matched them against the language learning strategies put forward by Oxford (1990) and found that all the main Direct and Indirect Strategies in SILL by Oxford (1990) were used by the participants in their translation of English language scientific texts into the Malay language. All these strategies were used by the participants to achieve communicative competence so that the original message in the

English language scientific text could be conveyed accurately and in a natural flow of the Malay language. This is shown in Tables 6.7 and 6.8.

The Direct Strategies used were as follows:

### 6.7.1 The Direct Strategies Used by Participants in TAPs

The Direct Strategies (see Appendices G1, G2 and G3) used by the five participants in this study in their TAPs (see Appendices H1 to H5) were as follows:

1. Memory Strategies: creating mental linkages, applying images, semantic mapping, grouping, using keywords, and reviewing well
2. Cognitive Strategies: practising, receiving and sending messages, analysing and reasoning, creating structure for input and output, translating, using routine formulas and patterns and recombining
3. Compensation Strategies: guessing intelligently and overcoming limitations in speaking and writing and coining words

### 6.7.2 The Indirect Strategies Used by Participants in TAPs

The Indirect Strategies (see Appendices G1, G2 and G3) used by the five participants in this study in their TAPs (see Appendices H1 to H5) were as follows:

1. Metacognitive Strategies: centring your learning, arranging and planning and evaluating
2. Affective Strategies: lowering your anxiety, encouraging yourself and taking your emotional temperature
3. Social Strategies: asking questions, cooperating with others and empathising with others.

## 6.8 Language Strategies Not Used by Participants

Nearly all the main direct and indirect language strategies were used by the participants in this study. However, the direct and indirect language strategies that were not used by the participants in their TAPs were as follows:-

### 6.8.1 The Direct Strategies Not Used by Participants in TAPs

Some of the direct strategies that were not used from the main memory, cognitive and compensation strategies are mentioned below.

1. Memory Strategies: employing action which is using physical response and using mechanical techniques.
2. Cognitive Strategies: formally practising with sound systems.
3. Compensation Strategies: using mime and selecting the topic

The above direct strategies which were not used by the participants in the process of translating are of use to beginners who are learning the source and target languages and who greatly lack the repertoire of vocabulary in speaking and writing. In this study the participants were advanced language learners and therefore, these strategies were not necessary and were not used by them in accomplishing their translation task.

The researcher thinks that future research using inexperienced translators may show that even these strategies may be used by them while translating.

### 6.8.2 The Indirect Strategies Not Used by Participants in TAPs

All the principal metacognitive and social strategies were used by the participants while translating and this was found from the analyses of their TAPs. However, only some affective strategies were not used by the participants, who were experienced part-time translators. They did not need many affective strategies to lower their anxiety as translating is a familiar task to them. The following were not used:

1. Affective Strategies: lowering your anxiety via using progressive relaxation, deep breathing or meditation, using music, rewarding yourself, using a checklist and writing a language learning diary.

The researcher suggests that these are time-consuming activities and part-time translators have to bear in mind that they are working under time constraints.

## 6.9 Additional Strategies Used in TAPs by Participants

From the TAPs analysis using the inductive method (see Table 6.8), the researcher matched her analyses of the TAPs transcriptions to Oxford's (1990) SILL, and found some additional strategies used by the participants. These were not present in Oxford's (1990) SILL. The researcher has added them to their taxonomies as **new findings** for **translation tasks**. Future researchers in the field of translation can also use these translation strategies for their research. The new findings comprised one metacognitive and two cognitive strategies. These are explained below as follows:

**1. Stating own beliefs on how to translate and giving reasons for supporting them (Metacognitive strategy)**

From this research via TAPs of the translation process, it was seen that the participants had their own mindset or schema about how to go about translating. They verbalised aloud this preconception or the design of the expected completed version or virtual blueprint of their translated product. While translating, they reminded themselves that they should abide by these beliefs which were arrived at from past experience and training in translation. Some examples of the participants' beliefs taken from the TAPs analysis (see Appendices H1 to H5) were as follows:

**Case One**: "Translation should not be literal, it should be more of understanding, so that the Malay version would not sound funny".

**Case Two:** "Now that I know the meaning in my head, I shall translate it using my own words in Malay so that the original meaning is not lost. I do not believe in word-for-word translation as this is not good. I never translate word-for-word as it is bad. I prefer understanding first before translating".

**Case Three:** "I don't translate word-for-word. Being a Malay, I have the intuitiveness of the language and upon further reading, I always refine my translated work".

**Case Four**: "Usually after translating, I read the whole passage twice again to ensure that the language flow is right. I always translate as though I am explaining something to someone".

**Case Five:** "Now, I'm going to translate line-by-line into *Bahasa* "what I'll do is I will look at the English text and straightaway do my translation in *Bahasa*" (Bahasa means the Malay language).

**2. Finding own solutions to the problems identified and carrying them out (Cognitive strategy)**

Problem identification comes under the metacognitive strategy, but here, the participants moved one step forward in coming up with a solution to their problem. Here, they used the cognitive strategies to solve their difficulty. All the five participants, using the TAP technique, found that some sentences in the English language scientific texts were very long and confusing and they voiced this problem. They found such complex sentences very difficult to translate into the Malay language, which has a different pattern of grammar. If they were to maintain the complex sentences in the Malay language translation, the target readers might become confused. In an effort to overcome this problem, they found a solution. They decided to divide the complex sentences into two shorter sentences for easier analysis and comprehension. In this way, the translation process became more manageable and simpler. The meaning was communicated much more easily and accurately and the participants were satisfied with their completed translated version in the Malay language.

3. **Using the Discrimination Strategy to choose the closest equivalent term from two or three alternatives identified in the target language based on the context of the situation (contextual meaning) and the culture of the target readers (Cognitive strategy)**

A word has many meanings in different situations, so, the participants had to decide on choosing the closest, matching equivalent terms in their target language translation for the terms given in the English language source scientific text. For this, they had to choose the closest matching appropriate term from a number of alternatives identified, using the discrimination strategy. The equivalent term which is finally chosen must also be based on the context of the situation or contextual meaning of the text and the culture of the target readers so that the target readers of their translated versions will not get confused. Some examples taken from the TAPs analysis of the five cases were as follows:

**Case One:** For the word "responsible", the participant had to decide between the two terms *tanggungjawab* and *berperanan;* she chose *berperanan* as it suited the context in science whereas *tanggungjawab* is used for people in a social sense.

**Case Two:** For the term "steel", the participant had to decide to choose between *besi keluli* or just *keluli;* she chose the latter which suited the current context of the situation or contextual meaning of the passage.

**Case Three:** For "emotional response", the participant had to decide to choose between *gerakbalas* or *tindakbalas;* she chose the former as it suited the context of the situation or the contextual meaning of the text, whereas the latter, is used in a chemical reaction and was thus not suited to the text.

**Case Four:** The participant had difficulty in the plurality, that is whether to use the term "flagella" or *banyak flagellum* in the context of the situation given in the text; she chose the former but decided that she needed to confirm by resourcing later.

As these additional strategies are not mentioned in Oxford's (1990) SILL, the researcher is of the opinion that these must be translation strategies. These additional findings are thus translation strategies, which the researcher strongly feels, should be used in tandem with the language learning strategies, by translators, as they are the core translation tools to facilitate the translation process, to ensure the completion of a translation task successfully.

## 6.10 Proposed Translation Strategies Taxonomy

The transcriptions of the TAPs by the five participants were analysed by the researcher on her own and matched against Oxford's (1990) SILL. The translation strategies as shown in **Table 6.10** on **page 311** were used by the participants in their translation process of English language scientific texts into the Malay language. The one metacognitive and two cognitive strategies that have an asterisk and are highlighted in grey in Table 6.10 are the **additional strategies** found from this study. The researcher recommends that her proposed direct and indirect translation strategies taxonomy based on the findings from this study, be experimented by translators using other pairs of languages in a translation task, besides English and Malay. By using these strategies in their translation process, the researcher is of the opinion that their translation task will become easier, faster and more systematic.

The researcher's **Proposed Translation Strategies Taxonomy** shown in **Table 6.10** is derived from the direct and indirect language learning strategy taxonomy or SILL proposed by Oxford (1990) and the additional findings from this study. The descriptions of these strategies are given in the third column of Table 6.10. This description is based on the data derived from the TAPs analysis of the five participants from the University of Malaya. Chesterman's (1997) proposed classification of the syntactic, semantic and pragmatic translation strategies which are described in Chapter

**Table 6.10**

| NO | TRANSLATION STRATEGIES | DESCRIPTION |
|---|---|---|
| | ***DIRECT STRATEGIES*** | |
| **A.** | **Memory** | |
| 1 | Using Imagery | The participant explains why kidney stones are translated as "*karang*" and not "*batu*" because she has actually seen these stones and know that they are in the form of corals and not pebbles as she can visualise them in her memory. Some of the participants actually first visualise the process or the set up of the scientific concept which the source text is explaining before translating for example, "I can picture that the hormones are released into the blood without the means of any channel". |
| 2 | Reviewing | Constantly examining the translated version and changing it if it seems inaccurate and unclear. |
| **B.** | **Cognitive** | |
| 1 | Reading and comprehension | Actually reading the source text in English language and understanding its content before translating. |
| 2 | Summarising | Interpreting the content read from the source language text in their own words to get the gist of what the original author of the source language text is trying to convey. |
| 3 | Highlighting | Here they highlight the title by either bolding it or underlining it when translating in the target language so that it stands out from the other sentences in the text. |
| 4 | Analysing and reasoning - translating | Analysing and dividing the source language text sentence into its clauses for reasoning the meaning and then only making a decision of translating into the target language. |
| [redacted] | [redacted] | [redacted] |
| 6 | Academic Elaboration | Here, they elaborate the concepts in the source language text showing that they are specialists in their fields for example a participant explains the term "cystinuria" and "urinary tract" in more detail than that specified in the source language text so that she can translate the word or term accurately. |
| [redacted] | [redacted] | [redacted] |
| 8. | Repetition | Re-reading the source language text for clarification, or re-confirming the equivalent term used in the translation. |
| 9. | Resourcing | When a translator is not sure of a term, he expresses it for example," I have to check in the terminology book." Or "I'll call up Dewan Bahasa dan Pustaka" for clarification. |
| **C.** | **Compensation** | |
| 1. | Overcoming limitation in writing – Paraphrasing | Paraphrasing terms where there is no single equivalent term in the target language so that the target readers will be able to understand the terms for example "overlapping specificity" is translated as "*mempunyai kekhususan yang bertindihan.*" |
| | **INDIRECT STRATEGIES** | |
| **A.** | **Metacognitive** | |
| 1. | Planning and Organising – Making Decisions and Carrying them out. | Making decisions such as, "I shall read the whole text first to get an understanding of the whole passage", "I shall now translate sentence by sentence," "Now, I shall type everything into the computer" etc. and implementing the decisions made. |
| [redacted] | [redacted] | [redacted] |
| 3. | Selective attention – attending to one sentence at a time. | Deciding to attend to one sentence at a time so that the attention span will be there and they can concentrate on the meaning conveyed in that sentence and thus translate it accurately. |
| 4. | Comprehension monitoring | Hesitating at a term to think on how it should be translated so that the target readers will be able to understand it. Checking, verifying or correcting one's understanding. |
| 5. | Self monitoring – production monitoring | Here, they constantly move backwards and forwards in their translation checking against the source language text to ensure that the meaning conveyed is accurate and clear in their translated sentences. Where the target language sounds awkward, correction is made. |
| | Problem Identification | This normally occurs when the source language sentence is very long as they say, "it's really a mouthful" and they find it difficult to translate it as a whole. They find it a problem to handle very long sentences. Sometimes they come across terms which are difficult to translate and which are not found in the terminology lists provided by Dewan Bahasa dan Pustaka. This is a problem for them as it slows down their translation process. |
| 7 | Ability Evaluation | They give themselves confidence in proceeding with their translation saying that they can translate and are confident about it. |
| 8. | Production or Performance Evaluation | Here, the translators read their translated text in the course of the process of translating and then compare it with the source language text to ensure that the meaning is communicated accurately and clearly. It is a constant and on-going check of their translated version to ensure that the content has been accurately conveyed in a clear and natural target language. |
| **B** | **Affective** | |
| 1. | Encouraging yourself: making speech acts to denote accomplishments | The translators feel a sense of achievement after having completed translating a paragraph and they actually say it out, "I've completed translating a paragraph." Sometimes, they encourage themselves by saying that the sentence to be translated is easy. By praising themselves, they encourage themselves to continue the translation task with more confidence and with a sense of achievement that they can complete the translation task well. |
| **C.** | **Social** | |
| 1. | Asking questions | They quiz themselves by questioning aloud of their problems for example "Now, what is "soldering" in Malay?" This is followed by trying to recall this word from their memory. |
| 2. | Empathising with others | While translating, they constantly keep in mind their target readers to ensure that the way they express the scientific terms in the target language can be understood by the target readers. Furthermore, they ensure that the proficiency level of the target language used can be understood by the target readers. |

Two on pages 94-98 were also used by the participants while translating to ensure that their translation product in the target language met with the expected needs of the university students who were their target readers.

From the data given in Table 6.10, it is seen that the cognitive strategies were the most used, that is a total of 9, by the participants while translating, supporting what Darwish (1999:24) said which is, "the internal translation process is in fact the cognitive process that takes place during the act of translating". To realise the cognitive process, cognitive strategies were used by the participants to understand the source language scientific texts in the English language and to reproduce them into the target language texts in the Malay language. According to O'Malley and Chamot (1990: 1), two fundamental principles underlying the theory of cognitive information processing view of human thought and action are:

a. that behaviour can best be explained by reference to how individuals perceive and interpret their experiences, and
b. that the way in which individuals think and reason has parallels with the manner in which computers process information (Shuell 1986).

O'Malley and Chamot (1990:1), suggest that in cognitive theory, individuals are said to "process" information, and the thoughts involved in this cognitive activities are referred to as "mental processes...Learning strategies are special ways of processing information that enhance comprehension, learning, or retention of the information". In this study, the cognitive strategies were used the most, that is 51.99%. The second most used strategies were the metacognitive strategies that is, 33.94%. A total of eight strategies were used which involved making decisions, thinking about them and implementing them etc which again supports Darwish's (1999:19) claim that, "translation is basically a decision-making process under constraints". The participants

were working within the major constraints of time, as they had other assignments dealing with their main job as professionals, to meet.

## 6.11 Steps in Translation Process

From the analysis of the TAPs of the five cases, it was seen that the seven major iterative steps in the participants' internal translation process of English language scientific texts into the Malay language were the same as discussed in **Section 6.3 on pages 283-284**.

From the steps, the translation process is seen to be in essence a combination of the metacognitive and cognitive strategies. If translators use these two major direct and indirect strategies in their translation process, they can produce a good translated version in the target language. The metacognitive strategies ensure that the translators have a direction. Thus, they plan their task, monitor their own progress during the translation process and review it. The cognitive strategies play a very vital role in the cognitive processing of the source language text and in the production of the target language text. The mental processing of the information in the source language text into the target language text is facilitated by the translation tools, of which the core are the language learning strategies and translation strategies which help the translator to understand better the source text and to reproduce it into the target language form.

## 6.12 The Approaches Used while Translating Based on the Translation Models by Bell, Sager and Darwish

The approaches used by the participants in their translation process based on the translation models by Bell (1991), Sager (1994) and Darwish (1989, 1995 and 1999) will be discussed in this section. The basic approaches (research question 4) used in the translation process by the participants from the TAPs showed that they actually followed the major aspects of what have been put forward in the translation models by Bell (1991), Sager (1994) and Darwish (1989, 1995 and 1999). The syntactic, semantic

and pragmatic approaches put forward by Bell (1991) were used by the participants when they were translating. The approaches used were the syntactic, where the participants worked at the word, phrase and clause levels; the semantic, whereby the participants tried their best to convey the meaning found in the source text as accurately as possible and finally the pragmatic or communicative, whereby the participants ensured that the translated product suited the needs of the target readers. The participants not only worked at the linguistic level of the clause as proposed by Bell, (1991) which is a translation unit that is manageable and can be retained in the short-term memory and which yields meaning on the syntactic, semantic and pragmatic levels, but also at the word and phrase levels as found from this study. The TAPs prove what is said by Bell (1991) to be true, but from this study it was found that sometimes they worked at the keyword and phrase levels too to really understand the meaning – they analysed and paraphrased the difficult words and phrases first and then only proceeded to analyse the clauses and finally complete their translation of the sentence. Bell (1991) says that the translation process contains three major stages acting in a cascaded form, that is in a technical sense as used in cognitive psychology and not in the normal common-sense way. The three stages are the syntactic, semantic and pragmatic, and these co-occur roughly with the five stages of parsing, expression, development, ideation and planning. The whole translation process is best conceived of as cascaded and interactive; and the three macro functions, which are the ideational which expresses cognitive meaning, the interpersonal which expresses speech functional meaning (cognitive and logical content of sentences) and the textual which expresses discoursal meaning in a cohesive and coherent way and which suit the context of situation of the communicative act. The translation process proceeds in both a bottom-up and a top-down manner and it integrates both these approaches by means of a cascaded and interactive style of operation (Bell, 1991: 229). The participants used the

three levels together, in an effort to comprehend what the original writer was trying to say. In other words, "analysis or synthesis at one stage need not be completed before the next stage is activated and revision is expected and permitted" (Bell, 1991:44). It was clearly seen how the participants, being native Malays, made sure that the sentences that they constructed were not awkward, were semantically accurate, and pragmatically served the function in the context of situation given, which meant an apt equivalent term had to be chosen based on the discrimination strategy. The participants actually targeted the difficult keywords and phrases in the source language sentence first, before translating the whole source language sentence. These difficult expressions were first elaborated and paraphrased using their expertise in the subject area. After this, an equivalent term in the target language that suited the context of the situation was chosen from two or three options identified. Once the most difficult expressions were translated, only then was the whole sentence translated into the target language. In other words, the participants used the four approaches which are the cognitive, linguistic, communicative and pragmatic as put forward by Sager (1994). This is seen very clearly in the TAPs analysis (see Appendices H1 to H5). According to Sager (1994), the translation process comprises two phases which include four approaches: cognitive, linguistic, communicative and pragmatic, where the translator comprehends the text in the source language and then reconstructs it in the target language (here, the Malay language). In the TAPs it is clearly seen how the participants while translating deverbalise and then reverbalise, decode and then encode, decompose and then recompose the source language scientific text into the target language (see Appendices H1 to H5 for TAPs transcriptions and you will realise that all these are used). In translation, translators need to be subject specialists, be competent in both the source and target languages, be sensitive to their target readers and must render a natural translation. In the process model of translation by Sager (1994:136), he emphasises the

specifications a translator must bear in mind while translating, that is, the content, form, text type and intention of the translation. According to Sager (1994:212), translation is best described as a forward and backward looking mental operation, meaning by this, as shown in this study, that translators move forward in the text they are translating, keeping in mind what they have dealt with and go back, when and if required and this is seen in their TAPs. Darwish (1999) uses the term iterative to refer to these kinds of activities. Sager (1994:215), calls these activities forward-looking, such as: more detailed reading to confirm previously acquired knowledge, looking up a lexical unit for confirmation or clarification and testing a temporarily chosen form against a form occurring later in the source language document about which there is greater certainty; and backward-looking such as: testing a temporarily chosen form against the continuity of already translated units, verifying conformity with a syntactic pattern previously chosen, checking conformity with a lexical unit previously established as being mandatory and verifying that there is no unwanted repetition or redundancy. In this study, these approaches were used to further improve the translation product.

For example, in Case 1 for the source language sentence: "At least seven different transport systems are known that have overlapping specificity for different amino acids". The participant first targeted the phrase, "overlapping specificity" and said that it was difficult. Secondly, she paraphrased the meaning of the phrase: that means the same one may carry more than one type of amino acids. Next, she translated the phrase "at least" and said "at least" is *sekurang-kurang*. Only after this, did she translate the whole sentence as: *Sekurang-kurangnya tujuh sistem pengangkutan yang berlainan diketahui yang mempunyai kekhususan yang bertindihan untuk asid amino yang berlainan.*

Darwish's cognitive translation model (1999: 25) shows that the translator first uses his or her visual sensory perception to comprehend the source language text using

his or her short and long-term memory. Then a translator deconstructs the source language text and during this process has to solve the problem of finding equivalents, making decisions and finally reconstructing or producing the translated target language version. During this translation process, which is bi-directional, the translator, who has two sets of parallel linguistic and cultural repertoires, will experience these two repertoires, move constantly to match and replace lexis, grammar, stylistics, phonology, cultural and situational equivalents, and give universal concepts, language properties. The travel path is bi-directional, even when translation occurs in one direction, and the process according to Darwish (1989: 4) is a 3-dimensional activity consisting of text analysis – meaning, register, style, rhetoric etc, translation and rearrangement. In the translation process in this study using TAPs, Darwish's (1989) model was seen to have been applied in the translation process, as the participants tried their best in presenting the ideas from the original text into the translated target language text in as natural and target-reader-friendly an approach as possible. The target language used in the translated version, as seen in the TAPs analysis, was accurate, clear and natural and at a level which could be easily understood by the target readers, as the participants had the *skopos* or the aim of the translation in their minds during the process of translating.

From the findings, it was seen that the cognitive strategies were the most highly used strategies in all the five Case Studies shown through the TAPs analysis -see **Table 6.9 on page 294**). This finding supports what Darwish (1999:24) suggests: "The internal translation process is in fact the cognitive process that takes place during the act of translating." The participants were actually involved in the cognitive processing of the source text first and then in the production of the target language text. From Darwish's cognitive translation model (1999:25), the cognitive process consists of visual sensory perception which involves active reading, comprehension, analysing and reasoning, processing, monitoring and production or translating. In reading for

comprehension, the translator sees the text, reads it, and comprehends it. In reading for production or translation, the translator sees the text, comprehends its content, analyses it and then reproduces it in the target language from the source language, keeping the content as accurate as possible. To realise the cognitive process, the participants had to use the cognitive strategies, which were their translation tools which helped them in the understanding of their translation task and then helped them to realise it in the form of writing out the production or translation.

According to Darwish:

> Ideally, the translator reads the text and translates at the same time. The time lag between comprehension and production is determined by the translator's proficiency and also the efficiency of his or her mental processes as well as the degree of translatability of source language text (1999: 26)

This is shown to be true where in Case Five, the Malay translator (the participant) took only nine minutes to translate 220 words as he had 17 years of experience in translating, was a native Malay and a subject specialist.

The participants also used the discrimination strategy whereby they chose the closest, matching equivalent term in the target language from among two or three alternatives identified that best suited the context of the situation (or the contextual meaning in the text) and the culture of the target readers. The translation process was also seen to be iterative and interactive i.e. analysis at one stage need not be completed before the next stage is activated and revision is expected and permitted (we see the participants doing repetitions, performing structured reviewing, identifying problems, and finding solutions in their translation process). The participant in Case 2, revised his translation after having completed his whole translated version of the source language scientific text into the target language as he was not satisfied with it.

The participants in this study did not believe in word-for-word or verbatim translation and while translating, they kept in mind these beliefs which they had

obtained from past experience in translating or from their training such as, not to translate word-for-word so as not to produce an unnatural, awkward translation etc. All of them believed in communicative competence and tried their best to convey the original source language message as accurately as possible in good, natural-flowing target language.

The findings also support the work of another authority on translation, Newmark. Newmark (1988: 19) emphasises the four levels in the process of translating, which are the textual, the referential, the cohesive and the natural. Here too, the participants in this study kept to the level of the target readership, the level was kept to the right level here university students - the participants wrote at a linguistic level in the target language where they tried to achieve the greatest possible correspondence referentially and pragmatically with the source language, kept the translated text cohesive and finally the translated product was natural in that it made sense and read naturally in the target language rendition. All these four levels were adhered to by the participants and they produced good translated versions of the original source language scientific texts.

As a conclusion, the researcher feels that Sager's (1994:135) approaches - cognitive, linguistic, communicative and pragmatic, best describe the findings from this study although Bell's and Darwish's translation models too discuss these approaches implicitly. The participants kept the level of their target language to suit the language proficiency of their target readers and while reading they had this *skopos* or aim of their translation in their minds and they empathised with their target readers. Their sequence or stèps in their translation process did follow, to a large extent, the nine major iterative activities put forward by Darwish (1999:6), which were planning, analysing information, translating, editing, proofreading, reviewing, completing translation and delivering translation. The approaches used in the translation process of all the five case

studies using TAPs were consistent to a large extent, with the major aspects in the translation models described in detail in Chapter Two, Section 2.6 by well-known writers in the field of translation such as Bell (1991), Sager (1994) and Darwish (1989,1995 and 1999). The researcher wishes to reinforce the idea that to realise these vital approaches, that is the cognitive, linguistic, communicative and pragmatic in the translation process, language learning strategies and translation strategies, which are missing in all these translation models, must be applied by translators for the successful execution of a translation task. These strategies are vital translation tools to realise the approaches and they form the core of the translation process, of which the cognitive and metacognitive strategies are the most important. All these are shown in **Table 6.11** on **page 321.** These translation strategies also form the main link between the theory and practice of translating as suggested by Honig and Kussmaul in 1982 (cited in Munoz 2000:129). The researcher agrees with their view.

## 6.13 Similarities between Writing and Translation

Language learning involves the four skills of listening, speaking, reading and writing. When discussing the parallelism between language learning and translation, the researcher feels that the most similar would involve writing and translation. The researcher suggests that language learning and translation share similar approaches and features. The researcher thinks that the closest of these skills to the translation process is the writing skill. Both writing and translation have similarities in approach and features and the researcher agrees with Sager's (1994:169) opinion on this.

Sager's (1994:169) **Figure 6.1** on **page 322** shows a detailed set of the decisions taken before writing which are contrasted with the specification and preparation phases of translation to show the similarities of features between the two activities.

## Table 6.11

## Translation Approaches and Activities in the Translation Models by Bell, Sager and Darwish Used by the Five Participants in their TAPs

| Translation Models | Translation Activities and Approaches used by Five Participants | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 |
|---|---|---|---|---|---|---|
| Bell (1991) | Syntactic | / | / | / | / | / |
| | Semantic | / | / | / | / | / |
| | Pragmatic | / | / | / | / | / |
| | Top-down, bottom-up, bi-directional, iterative, communicative process | / | / | / | / | / |
| Sager (1994) | Process of establishing and expressing equivalents. (psycholinguistic) | / | / | / | / | / |
| | Purpose-oriented | / | / | / | / | / |
| | Using cognitive, linguistic, communicative and pragmatic approaches | / | / | / | / | / |
| | Bi-directional, iterative process involving revision | / | / | / | / | / |
| Darwish (1989,1995, 1999) | Making and Implementing Decisions | / | / | / | / | / |
| | Active Reading | / | / | / | / | / |
| | Comprehension | / | / | / | / | / |
| | Production | / | / | / | / | / |
| | Bi-directional, dichotomous, iterative,cumulative cognitive process involving language, rhetorics, communication, linguistics and culture | / | / | / | / | / |
| | Involves iterative activities (planning, analysis, translating etc.) | / | / | / | / | / |

**Figure 6.1**

**Specification Analysis in Writing and Translation (Stages 1 – 4)**

**Preparation for Writing and Translation (Stages 5 – 12)**

**(taken from Sager 1994:169 and 186)**

| Writing | Translation Stages |
|---|---|
| Determine the general content of the message (What?) | 1. Identification of SL document |
| Determine the general purpose of the message (Why?) | 2. Identification of intention |
| Define the recipients (Who?)<br>Define the function, i.e. the expected reaction of the recipient.<br>Plan the amount and order of content (What is presupposed?)<br>Plan the realisation (What is assumed?)<br>(What is expressed linguistically, what by other means?) | 3. Interpretation of Specification and<br>4. Cursory Reading |
| **Preparation for Writing and Translation** | |
| Choice of text type | 5. Choice of TL text type |
| ↓<br>Consider external constraints<br>(format, publication, circulation, presentation, Where, When, How?)<br>Consider alternative modes of communication | |
| | 6. Choice of translation strategy |
| | 7. Reading-comprehension |
| | 8. Research/Dictionary look-up |
| Determine structure, chapters, headings, paragraphs | 9. Search for equivalents<br>10./11. Matching/Compensation |
| Message production | 12. Document production |
| ↓<br>Evaluation<br>Revision and Modification<br>Presentation | |

The specification phase according to Sager (1994: 168) serves the purpose of identifying the task and becoming familiar with two aspects: the document to be processed and the task description. According to him translators have to go through a process of analysis and reflection. Sager suggests that this phase introduces the different communicative situations. It places he thinks, translators in the middle of the

situation of speech acts which they must perform in their professional roles, and involves them already in their dual role which is:

1. as readers when they are faced with receiving a message, and
2. as writers when they are faced with a need to re-produce a message.

Sager (1994:168) suggests that this initial assessment can be expressed as a number of questions (nos. 1- 4 below), the answers to which have to be found by the translators themselves or by consulting the other role players in this situation (see **Figure 6.1**):

1. Identification of SL Document: What type of document is it?
2. Identification of Intention: Who is the document for?
   What is the document for?
3. Interpretation of Specifications: What type of document is to be produced?
4. Cursory Reading: What is the document about?

Sager (1994:168) suggests that these questions can be broken down further. In Figure 6.1, a detailed set of the decisions taken before writing are contrasted with the specification phase in translation to show the coincidence of features. In a regular systematic process of translation production these questions are divided into several steps of identification and analysis. Some of the answers can be provided by the analysis of the source language document, the rest have to be elicited from the task specifications translators, like other technical writers work to. Sager (1994:169) suggests that the answers to these questions permit translators to decide whether they are qualified to undertake the task, whether they have the proper resources to carry it out, what translation strategy to adopt, possibly including the use of tools provided by information technology, and what detailed technique to use. These questions are discussed below:

1. Identification of source language document: Before reading a document, Sager (1994:169) suggests all readers to form an impression of the text and the topic they are dealing with in order to tune their cognitive processes to the right attitude of receptiveness; otherwise they lack a stimulus for making the effort for looking at it in the first place. Translators according to Sager, receive documents which in some way have already been pre-selected for this activity by someone, and therefore look at such documents only from a professional point of view, but nevertheless need to identify it more closely and this needs text analysis. They also have to identify the text type (that is whether it is a letter, novel etc) and topic. Bell (1991:205) divides texts according to the dominant function and envisages further subdivisions, each of which is realised in a number of text forms such as:

   a. Exposition: narrative, descriptive, conceptual

   b. Argumentation: overt, covert

   c. Instruction: with option, without option

2. Identification of Intention: Sager suggests that translators want to know the intention of the source document, that is, whether they have to acknowledge the circumstances of the message or whether they can treat the document like a text to which a new intention has to be attached.

3.and 4. Interpretation of Specification and Cursory Reading: Sager (1994:172) suggests that the translator's next step is to define the task to be performed on the basis of the explicit or implicit instructions received e.g. "for information"(of an official or group of officials); "working document"; "document for discussion" (in a meeting of committees, working parties etc). According to him, the situation of the translation process will include situational factors such as time, cost and direction. In addition, he suggests that the personal factors

which will affect the translation process include the translator (single/multiple), initiator (writer,agent,reader), authorship (single,multiple), readership (primary, secondary; mode of reading) and awareness (writer/reader awareness of translation). The overall time required for producing a translation is according to Sager (1994:173) theoretically and practically relevant. It is theoretically relevant, he suggests, because it distinguishes translation from simultaneous interpreting and, in practice, a time gap is required both for the task itself and revision; however, an excessive time gap may make a translation irrelevant. Sager feels that the time interval between the source document production and delivery of the completed translation to the end reader can also have a direct effect on the translated document because it may require changes in the temporal references in the text. Another factor that has to be considered according to Sager (1994: 175) is the condition of the translator. He feels that translators must assess their own competence in the light of the task in hand. Too many translators tackle too wide a range of jobs and therefore are slower in their work and earn less than they could if they specialised more. He points out that highly successful translators, like technical writers, specialise because this permits them to develop their skills in particular areas to the highest degree. As proven in this study, Sager feels that translators must establish whether they can do the job alone or whether for technical or time reasons they need help. He further suggests that translators must find out whether they are dealing with a document from a single author or whether they are translating a composite document, whether the text has been edited to conform to a particular style or to previous documents which have also been translated. In addition to this, Sager suggests that translators must know whether the readers of the translation are primary or secondary readers, i.e. whether they are directly addressed or whether they are

incidental readers. Also important he feels is the user expectation of the translation.

Sager (1994:185) suggests that as soon as the general feasibility of a translation task is established, in the sense that the specifications are realistic in terms of time, cost and textual factors, and translators have confirmed their personal capability of performing the task, the process can progress to the next phase. This is the preparation phase where the main emphasis is in producing a target language text based on instructions, notes or, as in most cases, an existing document in the source language. According to Sager (1994: 185), the first pragmatic decision is that of choosing the text form of the new product, followed by the choice of an appropriate strategy of translation which might consider the use of all machine aids to translation. Also a translator has to do a detailed reading of the document and where necessary, some separate research, usually confined to dictionary look-up. From Figure 6.1, we see the two sets of decisions involved in the writing process being contrasted with the translation process in order to show their great similarity. Sager (1994:186) suggests that what distinguishes the process of translation from that of writing is that it involves a **transformation of code** which is based on the search of pragmatic, cognitive and linguistic equivalents at the various levels appropriate for the particular act of communication that is to be mediated. He suggests that the translation task can also be described as a process of establishing and expressing equivalents. Sager (1994:186) suggests that in the same way as technical writers must first decide the text type they have to write in, translators, assuming that the same range and functions of text types are available in the target language, have to decide, on the basis of the specifications, whether to replicate the source language text type or not. The search for equivalents begins at the level of the text type and if there is no direct equivalent, there is then the choice of different target language text type or the possibility to adopt a translation text type. Sager (1994: 189)

suggests that the translation strategies chosen by translators are affected by a large number of factors such as:

1. By textual characteristics: literary, biblical, non-literary (include scientific, technical and legal)
2. By relation of source to target document: autonomous, dependent, derived
3. By intention: same content plus same intention or new intention
4. By content: same intention plus same content or some different content (include reduction, addition, modification)
5. By precedent: documents in a sequence which will initiate a series or which continue a series of related documents, documents which are likely to remain isolated occurrences
6. By number of translations required: documents translated into one language only or into several languages at the same time
7. By degree of revision required: documents in definitive original form, documents likely to undergo stages of re-writing, hence requiring re-translation, documents used for scanning only and of which a fuller translation may be required later
8. By user requirement: documents for superficial reading, "for information only", documents for detailed reading, filing and future reference for a known reader, documents used as drafts for other documents, documents for publication, texts with the force of legal documents

Sager (1994:190) thinks that some of these factors overlap. He suggests that not all of these possibilities are exploited in practice, but the combination of factors in even the small number of final products for which there is practical evidence of identifiable strategies so translation can be seen to be founded on a very complex range of requirements. The next stage of preparation consists of a detailed reading of the text.

According to Sager (1994:198), the cognitive process of understanding begins with reading/comprehension, a single or an iterative process of varying intensity. There are many techniques of reading, according to the degree of familiarity with the topic and the subject knowledge of the translator. The technique adopted must permit the identification of the cognitive units of the text while at the same time – according to the pragmatic equivalent of the text type chosen earlier – retaining sufficient perception of the linguistic structure so that the translation can show the degree of recognisable linguistic relationship with the source document decided upon in the strategy decision. According to Sager (1994:204), dictionary look-up and other forms of consultation of reference works begin at this stage of the process and continue from then on with varying intensity and purpose. He suggests that in the reading comprehension phase, consultation is oriented towards the source language; in the translation phase the orientation is bi-directional according to the nature of the problem; in the revision phase the orientation is towards the target language, unless there appears to be a need to go back to an earlier phase. Thus, he suggests look-up is initially supportive of comprehension, then it becomes concerned with equivalences and moves finally towards control of expressions. The final stages involve evaluation and editing where revision is done to the translation to meet the requirements set by the commissioner of the translation. The last stage is when the translated product is submitted for presentation to be published by the assigned publishing company.

Thus we see from figure 6.1, that writing and translating involve similar features. The translation stages have been discussed above. The specification of the writing stages involve determining the message content (what?) and general purpose of the message (Why?), defining the recipients (Who?) and function (expected reaction of the recipients), planning the amount and order of content (What is presupposed) and the realisation (what is assumed and what is expressed linguistically, what by other means).

The preparation phase for writing involves the choice of text type (letter, novel, literary, non-literary, expository, informative, argumentative etc). Here the writer has to consider the format, publication, circulation, presentation involving the questions – where?, when? how? and the writer also has to consider the alternative modes of communication. The writer according to Sager (1994:186) besides considering the above, has also to determine the structure, division of the written material into chapters, headings and paragraphs. This will lead to the message production. Finally, Sager (1994:186) suggests that the writer has to evaluate, revise, modify and finally present his written work for publication.

### 6.14 Summary

In this chapter, the researcher answered and discussed the four research questions on page 251 based on the internal translation process via findings from the five case studies using the TAP technique. All the participants used the main direct and indirect language learning strategies proposed by Oxford (1990) in their translation process. The strategies that were not used were also listed. It was found that the most used strategies were the cognitive and metacognitive strategies. Some additional strategies that were not present in Oxford's (1990) SILL were found from this study. As the additional findings were not language learning strategies, the researcher suggests that they may be the translation strategies. These translation strategies were used in tandem with the language learning strategies by the participants for the successful execution of the translation task. From these findings, the researcher proposed her own **Direct and Indirect Translation Strategies Taxonomy in Table 6.10 on page 311** which is derived from Oxford's (1990) SILL and from the three additional translation strategies found from this study. The researcher suggests that this translation strategies taxonomy be experimented by translators and researchers using other texts besides scientific texts, and with other pairs of languages used in the world besides English and

Malay which was used in this study. This proposed translation strategies taxonomy is open for further improvement and experimentation by future researchers and translators in the field of translation.

The steps used in the translation process were in line with the major iterative activities put forward by Darwish (1999:6). It was found that the processing of lexical items occurred mostly at the linguistic units of the word, phrase and clause levels. The translation approaches used by the participants in their TAPs were the cognitive, linguistic, communicative and pragmatic. The approaches used were to a large extent consistent with the translation models proposed by Bell (1991), Sager (1994) and Darwish (1989,1995,1999) and this is shown in **Table 6.11** on **page 321**. Table 6.11 shows the translation approaches and activities in the translation models by Bell, Sager and Darwish which were used by the five participants in their TAPs in this study. What is missing in these translation models are the language learning strategies and translation strategies, which the researcher strongly feels should be incorporated in them, as these strategies are vital translation tools to realise these approaches and are necessary for the successful execution of the translation task. Based on this, the researcher will propose her own translation model in the next chapter.

In conclusion, based on the findings from this study, the researcher has **inferred that language learning strategies can be extended to translation which she suggests is a problem-solving task.** Both second language learning and translation share similar approaches and features such as learners and translators often resort to looking up the meanings of difficult words in a dictionary to make sure that the meaning fits the context of the text, discussing language items with friends, resourcing grammar books for correct usage of the language and practicing the language that one is learning always so as to be communicatively competent. Furthermore, in language learning, students need the language learning strategies to facilitate their learning process. Likewise in

translation, translators need these same strategies too to facilitate their translation process. Thus, the researcher suggests that language learning strategies can be used to model translation. From the TAPs analysis, the researcher is of the opinion that language learning and translation are parallel activities as they involve iterative activities such as planning and organizing, information analysis, translating/comprehending the source message, reviewing, proofreading and submitting the final draft to the teacher/commissioner of the learning/translation task. The theories used in learning languages are also applicable to the translation process as translation involves two languages besides using other disciplines such as linguistics, communication, culture etc. The cognitive, linguistic, communicative and pragmatic approaches advocated by translation authorities such as Bell, Sager and Darwish are used by translators while translating. Similarly, students learning a foreign language too use these approaches to be communicatively competent and intelligible.

The researcher agrees with the idea proposed by Robinson (1997: 49-51) that translation is a learning task when he writes that, "translation is an intelligent activity involving complex processes of conscious and unconscious learning..." The researcher's formal analysis of the think-aloud protocols of the translation process of scientific texts from English into Malay of the five participants in this study confirmed her intuition that language learning and translation have similarities in approach and features. This study proves Robinson's (1997:49-51) suggestion that the translator is a learner and that translation and language learning are parallel activities as they share similar approaches and features.

In section 6.13 on page 320, the researcher agrees with Sager's (1994) suggestion that writing and translation share similar features and this has been discussed by the researcher. In fact, the researcher is of the opinion that of the four skills in language learning, writing seems to come closest to translation. From the TAPs

analysis, it is seen how translators make and implement decisions regarding the closest, natural equivalent in the target language and here they share the same experience with students learning a foreign or second language where these students make revisions, imitate, use imagery, and all the language learning strategies proposed by Oxford (1990) to be intelligible to the other party with whom they are communicating. Both learning a second language and translation are iterative, cumulative, dichotomous, integrative, interactive, forward and backward-looking mental operations involving revision.

The in-depth analysis of the think-aloud protocols (see Appendices H1-H5) clearly showed to the researcher that there are parallels between second/foreign language learning and translation processes. The translation process via TAPs also revealed that the participants used the major activities in the translation models by Bell, Sager and Darwish.

The researcher will propose her own translation model in the next chapter which explicitly emphasizes the use of translation strategies from the start to the end of the translation process which the translation models by Bell (1991) and Sager (1994) did not explicitly show in their translation models.