Cognitive Processing Capacity Management in the Teaching of Consecutive Interpreting

—

Proposal for a Conceptual Mapping Model

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To my grandfather Wang Wen-Da (王文达) and my grandmother Zhou Hui-Zhen (周慧珍), who have given me the best memory of my childhood, with love.

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Abstract

This study aims at reducing student interpreters' cognitive overload by optimizing their cognitive processing capacity management in consecutive interpreting. I analyze the causes of cognitive overload resulting from a conflict between cognitive requirements and interpreters' limited cognitive resources (i.e. memory and attention). Using Sperber and Wilson's (1986) Relevance Theory as a theoretical framework, I establish a conceptual mapping model to optimize student interpreters' memory operations and attention allocation in consecutive interpreting. In order to test the impact of applying my conceptual mapping model on student interpreters' performances, I carry out case study research in which the experimental group receives cognitive training via the learning of my model and the control group does not. The empirical findings of my case study show that with proper cognitive training on processing capacity management, student interpreters can improve their interpreting performances. Finally, based on my conceptual mapping model and case study, I propose teaching implications for the acquisition of cognitive competence in processing capacity management.

List of Abbreviations

AIIC	International Association of Conference Interpreters
BTI	Bachelor of Translation and Interpreting
CATTI	China Aptitude Test for Translators and Interpreters
CI	Conference Interpreting
CPCM	Cognitive Processing Capacity Management
DG-SCIC	European Commission Directorate General for Interpreting services and conference organization
EA	Error Analysis
EIC	English Interpreter Certificate
ELT	Experiential Learning Theory
EMCI	European Masters in Conference Interpreting
ESIT	Ecole Supérieure d'Interprètes et de Traducteurs
EU	European Union
GAM	Generated Abstract Memory
GSTI	Graduate Schools of Translation and Interpreting
IR	Interpreting Research
ISO	International Organization for Standardization
IT	Interpreted Text
LISA	Localization Industry Standards Association
LTM	Long Term Memory
MAITS	MA Interpreting and Translation Studies
MTI	Master of Translation and Interpreting
NAATI	National Accreditation Authority for Translators and Interpreters
NAETI	National Accreditation Examination for Translators and Interpreters

PGCertAdvInterp	Postgraduate Certificate in Advanced Interpreting
RT	Relevance Theory
SI	Simultaneous Interpreting
SIA	Shanghai Accreditation for Interpreters
SSLMIT	Scuola Superiore di Lingue Moderne per Interpreti e Traduttori
STM	Short Term Memory
T&I	Translation and Interpreting
TAC	Translator Association of China
UIBE	The University of International Business and Economic
WM	Working Memory

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Chapter One Introduction

Globalization has led to an increasing demand for qualified translators and interpreters across the world (Austermühl 2003; Amato and Mead 2002). One of the regions with the highest need is China. In recent years, due to the "large-scale transnational interaction in the field such as culture, business, information, technology and academic research", the translation and interpreting (T&I) market in China has been continuously expanding (Tang & Gentzler 2008:170). On one hand, a great number of translation activities have focused on translating foreign-produced publications, ranging from "languages, literature and life styles" in the first half of the 1990s to "academic research, technology, electronics, and finance and economy" during the second half of the 1990s (172). Screen translation is another important area in which a large number of films, audio-visual or multimedia products have been subtitled or dubbed (173). On the other hand, there has been a "rapid growth in demand for competent interpreters" and a "significant expanded need for interpreter training" (Fan 2010:261). As Tang and Gentzler report,

> the 60,000 full-time salaried language professionals can only handle 10% of the workload created by the translation market and less than 5% of the salaried professionals can act as consecutive or simultaneous interpreters for international conferences or symposiums. (2008:181)

China has started to professionalize interpreter training (section 1.1.2.1). Now nine universities in China have been granted permission to launch interpreting programs at the postgraduate level. Given the large population base, this small number of universities can hardly reduce the general public's "deep concern for the shortage of qualified candidates who have been trained to be liaison, consecutive or simultaneous interpreters" (Tang & Gentzler 2008:181).

The purpose of this study is to enhance the quality of consecutive interpreting from a cognitive perspective. Using cognitive overload as a point of departure, this study investigates how student interpreters could process information efficiently. It is assumed that if interpreters do not know how to use their limited memory capacity appropriately and balance their limited attention resource, cognitive overload will take place as there is too much information to be processed, finally leading to deterioration of interpreting (Gile 1995). In order to optimize student interpreters' cognitive processing capacity management

(CPCM), I have developed a cognitive model, which I refer to as 'the conceptual mapping model'. Its efficiency in information processing was observed in classroom settings.

Before describing the research design in detail, in this introductory chapter I will present an overview of the current state of interpreting in China, addressing its market, training and research (section 1.1). One of the reasons for doing so is that Interpreting Studies originated in the West. Language barriers have increased the difficulty for Western scholars to understand the situation of interpreting in China (Gile 2001a). Therefore, I want to provide up-to-date information in this area. More importantly, I want to highlight the importance of conducting research into consecutive interpreting, which is most needed to guide inexperienced interpreter trainers, but which has not been given sufficient attention in previous research. Section 1.2 illustrates the position of this study in the field of consecutive interpreting research. Section 1.3 explains the research scope of this study. Section 1.4 raises the research question and hypothesis. Section 1.5 briefly explains the research methodology that was adopted in this study. Section 1.6 presents the organization of this study.

1.1 Background of Interpreting in China

In the following section I will address the current state of interpreting in China from three aspects. Firstly, I will briefly analyse the need of the T&I market in China for professionals, especially professional interpreters (section 1.1.1). Secondly, in order to explain why, despite an increasing number of Chinese universities providing interpreter training, the increasing need especially for qualified interpreters is still not being met. I will address the pedagogical challenges in interpreter training in China (section 1.1.2). Finally, I will discuss the latest developments in China of interpreting research which calls for methodological guidance (section 1.1.3).

1.1.1 An Overview of the Market

It seems that the prosperity of the T&I market is closely associated with the state of the economic market. A survey on the relation between economic conditions and the interpreting industry was carried out by AIIC (the International Association of Conference Interpreters) between 2005 and 2006, involving a total of 2,754 AIIC members in more than 90 countries. The finding was that the global economic recovery seemed to benefit the

translation and interpreting market (Neff 2008).

That economic growth could stimulate the T&I industry can also been seen in the context of China. Its rapid and sustained economic growth has attracted many multinational corporations to move their operations to China (Piasecki & Wolnicki 2004: 309). A study by the U.S. China Economic and Review Commission in 2004 has found that in a three-month period, 58 U.S., 55 European and 33 Asian companies planned to move to China (Fishman 2005:8). For these multinational corporations, "even though the translation may be difficult, the Chinese market is extremely important" (Dong & Helms 2001:105). Foreign corporations' entry into China's market has increased the demands for translation and interpreting services. The increasing need for interpreters also comes from tourism, one of the traditional and primary industries in China. According to the 2006 report from China's Statistics Bureau, 46.1% of foreign tourists came to China for sightseeing/holiday. Interpreters are also needed for international conferences and international events, the organizers of which now tend to choose China as a popular venue e.g. the 2008 Olympic Games in Beijing, the 2010 Shanghai World Expo, and the 2011 Summer Universiade in Shenzhen, to name just a few. So far, there has been no research on the exact size of this growing translation and interpreting market. Quite often, the Ministry of Commerce of China and Chinese interpreting researchers (cf. Liu 2005) have cited a partial result of a survey on localization that was carried out by LISA (Localisation Industry Standards Association). This survey roughly estimates that the market capacity will reach 22.7 billion U.S. dollars in 2005 (see Chinese government website at www.fdi.gov.cn).

Currently, the interpreting market in China has revealed two striking phenomena: the changes in the identity of interpreters (section 1.1.1.1) and the challenges in recruiting qualified interpreters (section 1.1.1.2).

1.1.1.1 The Emergence of Freelance Professionals

Unlike Western countries in which freelance interpreters are not uncommon (Abdallah & Koskinen 2007:673), the hallmark of China's interpreting market is the emergence of freelance professional interpreters.

Before the implementation of its open-door reforms, the government monopolized the nation's T&I market. All the translators and interpreters were in-house government employees working in different ministries. The translation and interpreting services were

restricted to political propaganda and diplomatic meetings (Dawrant & Jiang 2001). The 1990s was a turning point when some in-house conference interpreters left their jobs to become freelancers. The first generation of freelance interpreters in China was a group of conference interpreters who previously worked only for the Chinese government. Nowadays, more freelance interpreters have appeared in both conference and non-conference sectors of the interpreting market in China (ibid.).

1.1.1.2 A Lack of Qualified Interpreters

As discussed earlier, the T&I market in China is huge. It seemingly never lacks translators and interpreters. According to Translators Association of China (TAC) (2005), it is roughly estimated that more than 540,000 employees are working in this industry, including those who do translation, or interpreting, or both. The question is how many of them are qualified for providing translation and/or interpreting services with a high level of quality?

In terms of qualified interpreters, Pöchhacker (2004) makes a distinction between professional interpreters and natural interpreters. Professional interpreters are those who have received formal and professional training, while natural interpreters are those who do interpreting merely on their bilingual knowledge. Using Pöchhacker's distinction to observe the T&I market in China, it can be seen that the number of qualified translators, and more particularly interpreters, is far from enough. TAC has stated that nearly 93% of the translators and interpreters available in the market have not received professional training. In addition to that, the proportion of high-quality interpreters is less than 5% (Translators Association of Dalian 2011:n.pag.). The number of qualified simultaneous interpreters is quite small. The 2005 member profile of the International Association of Translators and Interpreters (AIIC) has shown that among its total of 55 AIIC Chinese interpreters, the majority of them work outside of China. Only 26 of them are working in China (15 in Beijing and eleven in Shanghai). The rapid increase in demand for competent interpreters for economic activities (as mentioned earlier) and for international conferences[1] may well imply an urgent call for quality interpreter training.

[1] There has been an increased number of international conferences that have been or will be held in China. It is estimated that over 2,000 international conferences per year are held in China (Yu 2005:n.pag.), with about 5.5 international conferences per week in Shanghai alone (Lu 2004:n.pag.).

1.1.2 Interpreter Training in China

In China, formal training in translation and interpreting is thought to be carried out only at universities, although nowadays many private language schools also provide intensive courses to prepare their students for sitting national accreditation tests for translation and interpreting. Thus, in the following section, my focus on interpreter training in China will be on those at tertiary level. To start with, I will describe the historic shift from sole emphasis in translation training to an increasing attention to interpreter training (section 1.1.2.1). Then, I will pinpoint the main pedagogical concerns for interpreter training (section 1.1.2.2).

1.1.2.1 An Uplifted Status of Interpreter Training

The historical development of interpreter training in China has shown a process of gradual separation from the teaching of translation, winning more independence at tertiary level. Before the 1980s, when the teaching of English and translation was the dominant target in the English department of universities, there were no interpreter training programs across the nation. In the third and fourth year of their study, undergraduates who majored in foreign languages were required to take translation courses to enhance their acquisition of foreign languages. There were also postgraduate and doctoral programs in Translation Studies which exclusively focussed on written translation (Hung 1996:33).

China joining the United Nations (UN) was a political event that helped to make the first milestone in the history of interpreter training in China. In 1979, the Beijing Foreign Studies Institute (now 'Beijing Foreign Studies University') was commissioned by the Ministry of Foreign Affairs to set up a training centre – the UN Interpreter Training Centre - which was exclusively responsible for training conference interpreters who would work for the government in the UN. At that time, the graduates were not granted an academic degree, but a valuable certificate of study. Except for those who were chosen to work in the UN, the rest of the graduates were assigned to work in ministerial sectors of the government. In 1994, this UN project was terminated. Afterwards, the UN Interpreter Training Centre was renamed the Graduate School of Translation and Interpretation, Beijing Foreign Studies University. At present, their two-year postgraduate program in Conference Interpreter Training leads to an MA in Foreign Language Linguistics and Applied Linguistics.

Interpreter training has begun to attract nation-wide attention since 2000. Realizing the increasing need for qualified interpreters, in May 2000 the Ministry of Education regulated that courses on interpreting be compulsory for senior undergraduate English majors. In recent years, China has been active in collaborating with authoritative universities and international organizations for joint training or research in interpreting. These joint or commissioned training programs have mainly been offered as intensive training with a focus on conference interpreting (in particular SI). In the 1980s, in order to enhance communication and negotiations between China and the EU, the Directorate General for Interpretation of the European Commission (DG-SCIC)[2] helped China to offer an intensive course in conference interpreting every year. Between 1990 and 1993, Xiamen University was a pioneer in launching an interpreter training program in collaboration with Deakin University (Australia). In 2001, considering the fast expansion of the T&I market in China, the DG and The University of International Business and Economic (UIBE) jointly set up the Sino-EU Interpreter Training Centre, with a focus on conference interpreter training (see more details at its official website http://sis.uibe.edu.cn/zhaosheng/zs01.htm). In 2004, the Graduate School of Translation and Interpretation of the Monterey Institute of International Studies (USA) cooperated with China International Publishing Group (CIPG) to offer an annual two-week intensive training course called the Sino-US Advanced Translation and Interpretation Course.

Tertiary interpreter training in China has revealed a tendency to teach interpreting more independently. Over the past decades, the English department of universities was responsible for offering an interpreting course, a similar situation as found in some Western countries where, for a long time the teaching of translation and interpreting "was integrated into independent foreign-language institutes" (Pym 1998:34). Recently, interpreter training has been moving toward a more independent status, as many Chinese universities are engaged in expanding their size of student enrolment and upgrading their status. As a consequence, the English department has been upgraded to the School of Foreign Language studies, which continues to offer translation courses and interpreting courses. Some universities have even set up a Translation Department within the School of

[2] DG-SCIC is the European Commission's interpreting service and conference organiser. It manages the allocation of Commission meeting rooms and provides support for the smooth running of meetings in many languages that are held there. It also organises conferences for Directorates-General and departments of the Commission, typically in the range of over 40 main events per year.

Foreign Language Studies; a few have established a Graduate School of Translation and Interpreting (GSTI) outside the School of Foreign Language Studies. See Figure 1.1 below on the organizational structure of T&I training at China's universities.

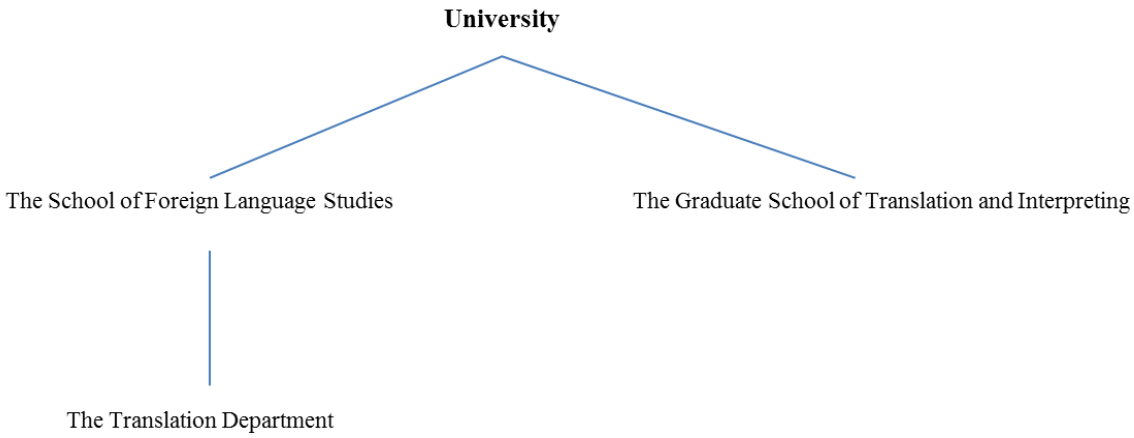


Figure 1.1 Organizational structure of T&I training in China's universities

As shown in the above Figure 1.1, compared with its past dependent status, the teaching of interpreting nowadays has begun to be more independent at some universities in China. With the permission of the Ministry of Education, a Translation Department has been set up in sixteen universities in Mainland China, while a GSTI was established in only three universities, namely, Beijing Foreign Studies University (in 1994), Shanghai International Studies University (in 2003) and Foreign Studies of Guangdong University (in 2005).

The latest development in interpreter training in China is its launch of BTI (Bachelor of Arts in Translation and Interpreting) and MTI (Master of Arts in Translation and Interpreting) programs. In the past decades, the teaching of interpreting had nothing to do with being granted a degree. Between 2006 and 2007, seven universities were able to grant BA and MA degrees to interpreting students who successfully completed BTI and MTI programs. In this four-year BTI program, the first two years focus on language learning and the next two years focus on the training of translation and interpreting skills. In 2007, fifteen universities were permitted to recruit students for MTI programs. In an MTI[3] program, which aims at cultivating conference interpreters, a Y-shaped training model is applied. The postgraduates start their theoretical and practical learning of both translation and interpreting in their first year of study. Then based on their performances, students

[3] See the MTI programs introduced by the Chinese government at www.cnmti.com.

specialize either in translation or in interpreting. In addition to the BTI and MTI programs, PhD programs in Translation Studies (covering both translation and interpreting) are offered at three universities: Shanghai International Studies University (in 2003), Foreign Studies of Guangdong University (in 2007) and Beijing Foreign Studies University (in 2009) (Wang & Mu 2009:267). Gile (2008) points out that China can provide "golden opportunities" for large-scale T&I training due to its large number of student enrolments, public enthusiasm and government support. On the other hand, he also stresses that the trainers should also arouse their trainees' interests towards doing academic research in translation and interpreting (n.pag.).

In terms of evaluating the competence of translators and interpreters, two types of accreditation tests are identified. The first type is internal examinations that are designed by China's universities exclusively for their own student interpreters.

The second type is external examinations that are open to the public. Among them, national accreditation exams include NAETI (National Accreditation Examination for Translators and Interpreters) and CATTI (China Aptitude Test for Translators and Interpreters). NAETI was the first national accreditation test in 2001 by Beijing Foreign Studies University under the commission of National Education Examinations Authority, Ministry of Education. It aims at evaluating the proficiency of in-house translators and interpreters who work for the government. Now it is being asked to assess the teaching quality of the newly established MTI programs (Zhong 2008:5). CATTI was launched in 2003 jointly by the Ministry of Personnel and China International Publishing Group. It is open to anyone who is interested in testing their competence in translation and/or interpreting. Recently CATTI has been making efforts to attract university students.

Local governments or local universities[4] offer regional accreditation exams aimed at helping employers to evaluate the English proficiency of their employees. Shanghai Accreditation for Interpreters (SIA) was launched in 1995 by Shanghai International Studies University, sponsored by the Shanghai Municipal Government and has been a great success. The SIA certificate is widely accepted by joint ventures in the Yangtze River Delta of China as reliable evidence in proving the candidates' foreign language skills. The EIC (English Interpreter Certificate) was launched in 2002 by Xiamen University. Compared with the SIA, the EIC is accepted in fewer limited regions, namely Fujian

[4] In the context of China, local universities refer to those which are located outside the capital.

Province, Hubei Province and Hunan Province.

1.1.2.2 Pedagogical Problems

The increasing number of students for either interpreting courses or interpreting programs has been accompanied with reflection on the quality of the teaching outcome. Currently, the main pedagogical problems have been identified in two areas: the entry level of enrolment and teaching competence.

Complaints have long existed concerning the low entry level of students for interpreting training programs. Ideally, students are supposed to have mastered their A and B languages before they enroll in an interpreting training program. In reality, however, it is not unusual that "students do get admitted to interpretation and translation schools even when one or more of their working languages are weak" (Gile 1995:211). In China, the low entry level is mainly due to the rapid increase in market demand for English-Chinese interpreters and the booming interpreter training in recent years (Fan 2010:162). It is not unusual to find that the enrolled students seem to be weak in their English language proficiency:

> They have only mastered the basics of English for daily conversation. They are not familiar with knowledge on subject matters and also they lack sufficient frequently-used vocabulary. They fail to understand the structures and main characteristics of genres that are often encountered in interpreting. (Fang 1998, cited in Mu 1999:38)

Student interpreters' low language proficiency may affect the teaching methodology in ways that the teaching of interpreting might turn out to be advanced language learning. In doing so, trainers have to spend more time explaining and revising the language problems (e.g. lexicon, grammar, syntax) rather than discussing the knowledge and skills of interpreting.

Additionally there is an urgent need for qualified interpreter trainers. The active collaboration with overseas universities and international organizations for training and research in interpreting is far from enough to deal with the increasing number of student interpreters across the nation. Most universities in China have to rely on their own staff to teach interpreting courses. Among them, many only have experience in teaching other language-related courses such as English literature, advanced English learning, and translation.

The underlying assumption is that teachers can automatically transfer their teaching competence regarding language teaching to interpreting teaching. However, according to the AIIC Training Committee (2002:15), qualified interpreter trainers, in a strict sense, should bear the following essential characteristics:

(1) The qualified trainer should ideally have had some teacher training specifically related to interpretation;

(2) The qualified trainer understands how to use the principles and methods drawn from interpreting studies research to prepare the next generation of interpreters; and

(3) The qualified trainer is a practising conference interpreter, which allows them to inform newly qualified interpreters, who were former students, about the markets and potential employers, and to mentor them as they start their careers.

The requirements for the qualification of interpreter trainers by AIIC (as listed above) show that, for purposes of providing systematic and structured interpreter training, AIIC has clearly expressed that knowledge on interpreting, interpreting experience and the experience of teaching interpreting are the three basic elements for the competence of interpreter trainers.

Against this standard for quality teaching, greater efforts are needed in interpreter training in China, as it is not unusual that teachers who are required to offer interpreting courses by their department may not have worked as interpreters nor received any formal training in interpreting theories, let alone interpreting pedagogy (He 1997; Mu 1999). As a result, those inexperienced interpreter trainers are much more likely to be incapable of distinguishing the teaching of interpreting from that of translation or advanced language learning. They tend to transfer their training strategy for translator training to interpreting training, in which more teaching focus is given to language refinement rather than interpreting skills (Sun 2002:45).

1.1.3 Interpreting Research at Different Developmental Stages

Except for the establishment of the UN Interpreter Training Centre in 1979, interpreter training in China at tertiary level only started in 2000 (section 1.1.2.1). However the early interpreting research (IR) can be traced back to 1980s. IR in China has been through two main stages: (1) translation of some Western interpreting theories (1979-1995); (2) IR by Chinese interpreter trainers and scholars (1996-present).

1.1.3.1 Stage 1: Translation of Western Books on Interpreting (1979-1995)

Interpreting research in China can be traced back to 1970s, when some Chinese translators translated a few books on interpreting by Western scholars. In 1979, Sun Huishuang translated Seleskovitch's (1969) *L'Interprète dans les conférences internationales: problèmes de langage et de communication*. Selection criteria in translating books on interpreting are unclear. Also, the translation purpose was unclear at that stage, i.e. whether it was to introduce interpreting theories to Chinese scholars or simply to complete a translation assignment. The translated books on interpreting from 1979 to 2001 covered interpreting skills and interpreting theories in particular in simultaneous interpreting.

Table 1.1 Translation of Western interpreting theories published in China between 1979 and 2001

Published in China	Original Books and Authors	Translators	Chinese Versions
1979	*L'Interprète dans les conférences internationales: problèmes de langage et de communication* (Seleskovitch 1968)	Sun Hui Shuang (孙慧双)	《口译技巧》
1982	*Manuel de l'interprète* (Herbert 1952).	Sun Hui Shuang (孙慧双)	《口译须知》
1984	*Manuel de l'interprète* (Herbert 1952).	Zhang Chen Jun (张晨君)	《高级口译手册》
1990	*Pédagogie raisonnée de l'interprétation* (Seleskovitch & Lederer 1989)	Wang Jia-Rong et al.（汪家荣等）	《口译理论实践与教学》
1992	*Interpréter pour traduire* (Seleskovitch & Lederer 1984)	Sun Hui-Shuang (孙慧双)	《口笔译概论》
1992	*Interpreting for international conferences: Problems of language and communication*	Huang Wei-Xin & Qian Hui-Jie(黄为忻、钱慧杰)	《口译技艺即席口译与同声传译经验

	(Seleskovitch 1978; S. Dailey & E. N. McMillan (Trans.))		谈》
2001	*La traduction aujourd'hui, le modèle Interprétatif* (Lederer 1994)	Liu He-Ping (刘和平)	《释意学派口笔译理论》

Table 1.1 clearly indicates that the number of translated books on interpreting is quite small and that the selection of topics is seemingly at random. However, these efforts by Chinese translators opened a window for the Chinese teachers and researchers to have a glimpse of interpreting theory and skills for conference interpreting.

1.1.3.2 Stage 2: IR by Chinese Interpreter Trainers and Scholars (1996-Present)

In 1996, the first national seminar on English-Chinese Interpreting Theory and Teaching became the first milestone in China's IR as it was the first time a group of university teachers gathered to discuss the problems in their teaching of interpreting. At that time, it was widely accepted among many universities in China that a teacher from the English department should be able to teach an interpreting course as well. These untrained interpreting teachers turned out to be the first group of people who showed interest in interpreting research, because they had encountered many methodological problems in their teaching. Later on, this national seminar became a regular international meeting held every two years in China. Nowadays, the participants include not only teachers and researchers in China, but also professional Chinese interpreters and local interpreting service organizations in China, as well as well-known overseas interpreting researchers and international organizations from the AIIC, the EU and the UN (Mu 1999).

This stage of preliminary research has witnessed a growth in the number of published papers as follows:

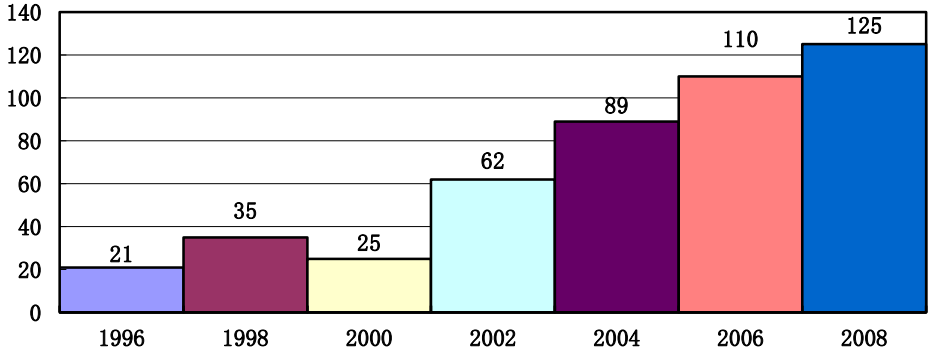


Figure 1.2 Statistical report of the number of the papers submitted for the National Seminar for Interpreting Theory between 1996 and 2008 (Mu & Wang 2009:21)

Figure 1.2 clearly shows that the number of submitted papers on interpreting for this national seminar has increased from a total of 21 in 1996 to 125 in 2008. This might imply an increasing interest in interpreting research among China's universities. As Wang and Mu (2009) analyse, "the main body of many of these articles consists of introductions, reviews or borrowings of theories or research results from the West", and covers "language transference in interpreting", socio-cultural factors and the cognitive aspect of interpreting (278). Teaching pedagogy is another focal point (279). The two authors also point out that "[d]espite the considerable progress made in recent years, however, interpreting research in China still suffers from some weakness, particularly in terms of methodology" (279). There still lacks an awareness of doing theoretical and empirical research.

1.2 The Position of this Study

Interpreting Research (IR) starts with non-theoretical discussions which are based on personal interpreting experiences (Herbert 1952; Rozan 1956). Later, numerous research studies have been made on interpreting with an overwhelming focus on simultaneous interpreting rather than consecutive interpreting. Two central research interests have been the cognitive process of interpreting (Gerver 1976; Seleskovitch, 1978) and socio-cultural contexts (Pöchhacker 1992; Wadensjö 1998; Alexieva 2002; Hale 2004, 2007).

In the study of simultaneous interpreting, many researchers have approached various aspects including the cognitive process (Goldman-Eisler 1972; De Groot 2000; Christoffels, De Groot & Waldorp 2003; Chernov 1996, 2004; Lambert 1988a; Bajo, Padilla & Padilla 2000; Petite 2005), directionality (Chang & Schallert 2007), quality

assurance (Pöchhacker 1994, 1995a; Schjoldager 1996, 2001; Collados 2002) and interpreting strategies (Alexieva 1992; Riccardi 1996, 2005; Pym 2008). By contrast, the studies into consecutive interpreting have been few. Besides the cognitive process of interpreting (Gile 1995; Russell 2005), time constraint (Gumul & Lyda 2007) and quality assessment (Dam & Engberg 2006), the central concern has been the issue of note-taking (Jones 1998; Gillies 2005; Nolan 2005; Dam, Engberg & Schjoldager 2005; Dam 2004, 2007).

Following the research paradigm of cognitive-psychology in which many scholars continue to highlight the cognitive nature of interpreting, I speculate that the optimization of interpreters' cognitive processing capacity management (CPCM) will offer fruitful thought for efficient interpreter training. In other words, since interpreters "always operate in the immediacy of a given situation where they are in a position of coping with contextual constraints" (Monacelli 2009:5), this can add more intense pressure on their limited cognitive processing capacity (i.e. memory and attention). If interpreters have not mastered the skill of processing information efficiently, their interpreting performance will deteriorate (Gile 1995). Therefore, enhancement in memory operation and attention allocation may be assumed to be important in strengthening student interpreters' cognitive abilities to process information accurately and promptly.

In previous research on cognitive tasks in consecutive interpreting, Gile (1995) depicts the efforts to fulfil the multiple tasks at the comprehension and reproduction stages. He (2000b) also points out that when the requirements of interpreting exceed interpreters' processing capacity, cognitive overload will arise from an overload of information to be processed during interpreting (91). Russell suggests that a monitoring mechanism is needed so that "the interpreter monitors internal and external feedback to check for errors or needed corrections" (2005:137). These approaches to interpreters' CPCM are reasonable, but lack explanatory power on the exact management of this monitoring mechanism and on how to reduce cognitive overload.

Given that deficiency in cognitive abilities has become a major challenge to novice interpreters and student interpreters (Mead 2002), the aim of this study is primarily to investigate how interpreters' memory and attention affect information processing, and thus to establish a cognitive model for optimizing student interpreters' CPCM with a focus on memory operation.

The value of this study lies in two aspects. Firstly, it makes a contribution to the study of consecutive interpreting. The issue of developing interpreters' processing capacity through proper training is "important but remains unsolved" (Gile 1995:187). In addition to that, empirical research on consecutive interpreting has been limited, mainly focusing on note-taking (as mentioned earlier). This study has developed a cognitive model for the optimization of student interpreters' CPCM. Moreover, it has carried out an empirical observation, investigating the training effect of the conceptual mapping model that it developed. The findings of this study could motivate future researchers and interpreter trainers in seeking effective pedagogical solutions so as to strengthen students' cognitive abilities.

Secondly, due to language barriers, there has long existed an imbalance in Interpreting Studies in research trends over different regions and countries. As a consequence, "interpretation theory remained very Eurocentric in the West" (Gile 1994:153). This study presents the latest development of interpreting in China (section 1.1). Thus, it offers Western academia an opportunity to understand what has happened and what is happening in China. Because of China's large population base it is becoming an increasingly active venue for economic, political and cultural exchanges.

1.3 Research Scope

The cognitive process of interpreting involves a combination of variables, each of which needs in-depth exploration. Interpreters' CPCM includes memory operation and attention allocation which are interwoven with each other in completion of cognitive behaviours. This study discusses memory operation and attention allocation in the construction of the conceptual mapping model. However, due to the limitations of space and the necessity of pursuing insights into interpreters' CPCM, the empirical observation of the training effects of the conceptual mapping model focuses on the optimization of student interpreters' memory operation. The underlying assumption is that even if student interpreters know that they should stop taking notes when note-taking is affecting their listening comprehension, without knowing what they should memorize and how to memorize efficiently, they cannot listen attentively and produce TL texts coherently. My emphasis on memory operation, however, does not mean that I undermine the role of attention allocation in consecutive interpreting. It is believed that the findings of this study would

provide a solid platform for future research on the optimization of attention allocation. It should also be noted that in this study, interpreting process does not merely refer to the actual interpreting. Rather, it also includes a very important stage, i.e. interpreters' preparation before actual interpreting (Kalina 2007).

In my observation of memory operation by student interpreters, I focus on doing consecutive interpreting from interpreters' A language into B language. Although in AIIC's glossary, consecutive interpreting is done from B language into A language in order to produce clear and fluent delivery of interpretation, in other social settings such as in liaison interpreting, consecutive interpreting is done in a bi-directional way. In this study, given that directionality could affect the quality of interpreting, the choice of doing consecutive interpreting from A language into B language is due to the aim of removing or reducing the potential non-cognitive factors that may affect interpreting quality. These non-cognitive factors may include linguistic difficulties, such as difficult words, complex syntax, extra-linguistic difficulties, such as a strong accent, or the fast speed of the original speech. I want to be certain that when interpreters fail to interpret accurately, it is not because they could not understand what has been said by the speaker, but because they lack efficient memorizing abilities to remember and re-organize the easy-to-understand information into the target language.

1.4 Research Question and Hypothesis

As mentioned in the above section, cognitive overload serves as a point of departure in my exploration of a cognitive solution to interpreting problems. Given that cognitive overload may result from the conflicts between cognitive requirements and interpreters' limited cognitive processing capacity, I formulated my research question as:

Can we reduce cognitive overload by using the proposed conceptual mapping model to optimize student interpreters' processing capacity management?

In this study, interpreting is treated *not* as a process of pursuing linguistic equivalence at the lower levels of lexicon, grammar and syntax. Instead, interpreting is seen as a process that interpreters (re)-scaffold the conceptual structure of the source text in their delivery of interpretation.

To save interpreters' time and energy for their scaffolding efforts, the conceptual mapping model aims at helping interpreters to clarify and restructure information according to their

degree of relevance to interpreting topics. The underlying assumption is that once student interpreters have acquired the cognitive competence to establish their own conceptual map as similar as possible to the conceptual structure of the source text, they could release more time and energy on conveying the meaning of the source text elaborately and coherently. The conceptual mapping model leads to the general hypothesis of this study as follows:

The application of the conceptual mapping model can help optimize student interpreters' processing capacity management and improve the overall quality of their interpreted texts

As mentioned in section 1.3, the empirical study of student interpreters' CPCM focuses on memory operation which includes long-term memory (LTM) and working memory (WM). For the feasibility of research, this general hypothesis is broken down into three sub-hypotheses:

Sub-hypothesis 1

The conceptual mapping model can help student interpreters activate their LTM with better recall of their theoretical knowledge of interpreting

Long-term memory (LTM) plays a vital role in recalling the previously processed information for the delivery of interpretation (section 3.3.1.1). It is assumed that without proper cognitive training on how to store and activate the stored information, the quality of recall would be adversely affected. My expectation would be that with the application of the conceptual mapping model, student interpreters' LTM would work more efficiently in recalling more stored information.

Sub-hypothesis 2

The conceptual mapping model can help student interpreters use their WM efficiently to produce better interpreted texts in terms of sense consistency and completeness of information

Working memory (WM) plays a central role in processing the ongoing information (section 3.3.1.1). My expectation would be that the conceptual mapping model could enable student interpreters to scaffold the conceptual structure of the source text quickly, producing better interpreted texts which not only maintain continuity of meaning, but also offer more details to each thematic aspect of the interpreting topic.

Sub-hypothesis 3

Student interpreters who have received cognitive training on the conceptual mapping model can provide more detailed and coherent interpreted texts than those who have not.

To further confirm the training effect of the conceptual mapping model, I set up the experimental group which received my cognitive training and the control group which did not. My expectation would be that student interpreters could provide better interpreted texts in terms of sense consistency and completeness of information.

1.5 Research Methodology

This study consists of two parts: theoretical and empirical. The theoretical part deals with the development of this cognitive model. Efforts Model for consecutive interpreting (Gile 1995) and Relevance Theory (Sperber & Wilson 1986) are used as theoretical bases for my construction of the conceptual mapping model. The merit of Gile's model is that it explains that the potential cause of cognitive overload could be the conflicts between cognitive requirements and interpreters' limited processing capacity. But it undermines the role of interpreters' long-term memory and attention at the reproduction stage of interpreting. It also does not clarify the exact management of interpreters' cognitive mechanisms. To further expand Gile's Effort Model, in this study interpreting efforts are differentiated from cognitive efforts so as to provide student interpreters with opportunities to isolate their cognitive strength and weakness in their interpreting performances. Relevance Theory (RT) is chosen for its fitness to meet up with the immediacy of interpreting, which requires interpreters to give prompt and accurate interpretation irrespective of their limited processing capacity. As a theory on human communication, the core of RT is using minimum effort for maximum communicative effect. While other researchers use RT in their study of written translation (Gutt 2000b), simultaneous interpreting (Setton 1999) and note-taking in consecutive interpreting (Albl-Mikasa 2008), I apply RT to the optimization of memory operation in the hope that student interpreters could use their limited memory capacity to reproduce interpreted texts that are elaborate and coherent.

The empirical part[5] concerns the training effect of the conceptual mapping model on efficiency in interpreters' CPCM with a focus on memory operation. A training session was given to a total of six postgraduate students of the Centre for Translation and Interpreting Studies at The University of Auckland that were equally divided into two groups: the experiment group which received my cognitive training via the conceptual mapping model and the control group which did not.

[5] Ethics approval for this study was granted by Human Participants Ethics Committee of The University of Auckland on 16 May 2007 (reference number: 2007/119).

To evaluate the training effect on student interpreters' LTM (as related to sub-hypothesis 1), a case study method was adopted. Before and after my cognitive training, a questionnaire with open-ended questions was given in order to observe how well student interpreters could recall their previous theoretical learning on quality interpreting.

Two questionnaires (Q1 and 2) were used and the outcomes of these two questionnaires were compared to examine whether student interpreters, after receiving my cognitive training, could show better recall of their theoretical learning on interpreting.

To evaluate the training effect on student interpreters' WM (as related to sub-hypothesis 2), the methodological challenge is the small pool of research subjects. In my case, it was very difficult to find a larger number of student interpreters in New Zealand. I had only the chance to observe those students enrolled at the Centre for Translation Studies at The University of Auckland. The validity and reliability of observation on a small-sized research pool could be at high risk. In this circumstance, a quasi-experimental method is considered suitable to meet the said methodological difficulty. The reason is that quasi-experiment is exclusively used for a type of research that has a very small pool of potential subjects. The aim of quasi-experiment is not for generalizability of the findings, but for reliability, which is the extent to which the same results would be obtained using the same research tool (Moore 2008). Thus, the findings of my empirical observation should be treated not as a confirmative conclusion of the cause-effect relationship between the application of the conceptual mapping model and the enhancement of interpreters' CPCM. Rather, the observational outcome could be treated as reporting the observed changes for further discussions in this field of research.

1.6 The Outline of the Study

As mentioned above, this study consists of theoretical and empirical parts. In the theoretical part, the development of the conceptual mapping model begins with reviews of interpreting quality and interpreter competence in Chapter 2. The aim is to have a better understanding of the role of cognitive sub-competence in interpreter competence. Chapter 3 illustrates cognitive overload as a major challenge to both novice interpreters and student interpreters. Cognitive processing capacity management is discussed in the context of consecutive interpreting. It is assumed that inappropriate use of CPCM could cause cognitive overload and thus lower the overall quality of interpreting.

Based on the above-mentioned theoretical discussion, a cognitive model, i.e. the conceptual mapping developed in Chapter 4. In this model, consecutive interpreting is treated as conceptual mapping throughout the interpreting processes, including documentary search and actual interpreting. To facilitate interpreters' CPCM (especially memory operation) in conceptual mapping, two operational constructs are designed as concept units and information units, the former dealing with the main thread of speaker's thought while the latter is handling supporting details on individual concept units. In addition, three working strategies are proposed to solve specific cognitive problems during interpreting processes.

Chapter 5 deals with the empirical part of this study. It justifies the research methodology in evaluating the training effect of the conceptual mapping model in cognitive training. Chapter 6 reports the findings of my cognitive training. Chapter 7 relates the findings to the teaching of consecutive interpreting so as to providing effective teaching suggestions on optimization of student interpreters' CPCM. Chapter 8, as a conclusive chapter, presents a synopsis of the current study. Furthermore, I reflect on the methodological limitations of this study. I also discuss the working directions to continue cognitive research on optimizing student interpreters' CPCM.

Chapter Two On Quality and Competence in Consecutive Interpreting

Before my exploration on how to improve the quality of consecutive interpreting and its teaching quality, I would like to provide an overview of the fundamental concepts of interpreting research so as to provide a theoretical basis for my current research. Therefore, in this chapter, firstly, I will introduce a typology of interpreting modes, in an effort to categorize types of interpreting (section 2.1.1). Particular attention will be given to consecutive interpreting with a discussion of its definition, classification as well as its changing role in socio-cultural contexts (section 2.1.2).

Secondly, I will address the nature of interpreting, a question which can lead to different approaches to two interrelated central concerns throughout interpreting research: (a) what is good quality interpreting? and (b) what competences are needed for quality interpreting? This literature review has revealed two major approaches to interpreting: the process-oriented approach and the product-oriented approach. In the process-oriented approach, interpreting is seen as a complex cognitive process of completing information tasks (section 2.2.1). In the product-oriented approach, interpreting is centered on the analysis of the target text (TT) (section 2.2.2). I believe that these two approaches are complementary, rather than contradictory, since a combination of them can provide a more comprehensive picture of interpreting when both the product (i.e. TT) and process (before and during the interpreting session) are taken into consideration.

Thirdly, in order to clarify the nature of interpreting (as mentioned above), I will investigate interpreting quality, a central topic not only for Interpreting Studies (Grbić 2008), but also for the professionalization of the interpreting industry. To begin with, I will examine the multi-layered nature of interpreting quality (section 2.3.1). Then I will offer insights into the notion of quality criteria in terms of categorization (section 2.3.2.1) and complexity in rating the degree of importance (section 2.3.2.2). Major surveys on the degree of importance of specific quality criteria will be reported along two dimensions: interpreter self-perception (section 2.3.2.3) and expectations or preferences of users of interpreting services (section 2.3.2.4). Based on the findings of interpreter-based surveys and user-based surveys, I will further discuss what might be the core of shared interpreting

quality criteria which could be used as basic guide lines for quality evaluation, in particular with relevance for interpreter training (section 2.3.2.5).

Finally, I will redefine the notion of the interpreter, with the purpose to make explicit the important role of cognitive sub-competence (section 2.4). To begin with, the term of 'interpreter competence' (as used in my study) needs to be clarified (section 2.4.1), due to (a) a common confusion of competence for translation and competence for interpreting in current interpreting pedagogical contexts (section 2.4.1.1); and (b) my emphasis on the active role of the interpreter, assuming that interpreting is more than a good command of interpreting skills (e.g. listening, public speaking, note-taking, etc.) (section 2.4.1.2).

Interpreter competence serves as an umbrella term covering all sorts of knowledge and skills that are involved in interpreting. On the assumption that interpreter competence is decomposable, I adopt a componential approach in which interpreter competence is considered as consisting of a set of sub-competences which interact with each other for successful completion of interpreting (section 2.4.2). Each individual sub-competence is clearly explained (section 2.4.2.1) with a focus on cognitive sub-competence (section 2.4.2.2), as my study focuses on student interpreters' cognitive abilities in efficient management of their limited cognitive resources.

2.1 A Typology of Interpreting Modes

Both translation and interpreting are thought to facilitate communication among people from different language and cultural backgrounds, the former in written form while the latter is in oral form. It is understandable that interpreting is one of the oldest professions in the world (Roberts 2002:157), since spoken language "clearly predates the invention of writing" (Pöchhacker 2004:21) The demand for interpreting services has never ceased due to the complexity of socio-cultural contexts which involve communication, interaction and conflict not only across nations (Bowen et al. 1995), but within the nations which have migrants "from a wide variety of cultural, ethnic, religious and linguistic backgrounds" (Crezee 1997:1).

Debates have arisen on the approach to classify the various forms of interpreting activities; one paradigm presents a general division of interpreting into conference interpreting, court interpreting and community interpreting. Roberts (2002) explains that conference interpreting covers exclusively interpreting services for any meetings, large or small; court

interpreting gains an independent status by dealing with the legal system of a nation, and community interpreting helps immigrants to get equal access to social services in their host country (157). Another paradigm for classification of interpreting activities offers a division of simultaneous interpreting, consecutive interpreting and liaison interpreting. Briefly, simultaneous interpreting refers to a non-stoppable delivery of interpretation at the same time as the speaker is giving the speech. Consecutive interpreting means that the speaker pauses after a few sentences, waiting for the interpreter to orally render what has just been said. Liaison interpreting refers to the scenario where the interpreter mediates in a dialogue between the speaker and the listener (Hatim & Mason 2002). In my opinion, these two paradigms are not contradictory, but complementary to each other by focusing on the nature of interpreting activities from different perspectives. The former emphasizes the social settings where interpreting activities take place, while the latter explains the delivery manner (whether non-stoppable as in SI or stoppable as in CI), as well as the triangular relationship among the three parties, i.e. the interpreter, the speaker and the client. For a clear overall vision of interpreting activities as well as the status of consecutive interpreting among these interpreting activities in the following section, I will first provide a typology of interpreting modes within a multi-parameter framework (section 2.1.1). Given the objective of the present study, I will then continue to examine the mode of consecutive interpreting more thoroughly regarding its history, subtype and current status in socio-cultural and pedagogical contexts (section 2.1.2).

2.1.1 Categorization

Existing research on interpreting classifies interpreting activities by using single parameters (Salevsky 1982; Phelan 2001) or multiple parameters (Alexieva 2002; Pöchhacker 2004). In the single-parameter approach, a single indicator could be used to categorize a variety of interpreting activities, for example, *delivery mode* i.e. consecutive and simultaneous interpreting, or *interpreting tools* i.e. consecutive with notes and consecutive without notes (Salevsky 1982, cited in Alexieva 2002:220), or *physical distance* between the interpreter and his/her client (SI in the booth SI out of the booth or as in whispered interpreting). It should be noted that social setting serves as an important indicator often used to designate the interpreting activities according to the specific working scenarios where they take place, for example, conference interpreting, court interpreting, medical interpreting, business interpreting, diplomatic interpreting, or military

interpreting (Pöchhacker 2004:14-5).

The single-parameter approach has a methodological problem in that interpreting activities might be treated as loosely connected or having no connection at all. A common practice in categorization has been to list these setting-related interpreting activities without showing their interrelationship. For example, in Phelan's (2001) term, simultaneous interpreting (SI) and whispered interpreting are treated in isolation, as if they are two completely different working modes fit for different settings (with the former used in international conferences while the latter is used in court proceedings). However, the fact is that whispered interpreting is another form of SI in where the interpreter sits behind his/her client and interprets simultaneously what is being said in the court.

The multi-parameter approach was developed by Alexieva (2002) and Pöchhacker (2004). With the aim of illustrating the complexity and interrelationships of interpreting activities, this type of approach uses a combination of typological parameters, namely, (1) *social setting*; (2) *constellations of interaction* (bilateral interaction in community interpreting versus multi-lateral interaction in international conference interpreting such as at the UN); (3) *language modality* (sign language for the deaf versus spoken language interpreting); (4) *working mode* (consecutive versus simultaneous interpreting); (5) *directionality* (into the interpreter's A language in conference interpreting or between the interpreter's A and B languages in retour interpreting); (6) *use of technology*[6] (the use of technology in remote interpreting); and (7) *professional status* (professional interpreter versus natural interpreter/ad hoc interpreter) (Pöchhacker 2004).

To overcome the loose categorization that results from the single-parameter approach, each type of interpreting is not viewed as in isolation, but as an integrated part of the interpreting family. In her prototype theory, Alexieva (2002) suggests that individual interpreting events should not be treated as "rigid categories", but as family members "with central members (prototypes) and peripheral members (blend-forms) being identified on the basis of their position on a scale or continuum" (221).

This leads to the concept that interpreting, as Pöchhacker (2001) depicts, is "a conceptual spectrum of different (proto)types of activity" (410) in which conference interpreting and

[6] In recent years, technical equipment has been used to overcome spatial distances during interpreting. Remote interpreting can be carried out in various forms, including telephone interpreting, videoconference interpreting, wiretapping (Sandrelli & de Manuel Jerez 2007).

community interpreting are centralized. In Pöchhacker's (2001) terms, these two types of interpreting expand "along a spectrum which ranges from interpreting in an international sphere of interaction" to "interpreting within an institution of a particular society or social community" (411).

In community interpreting using either sign language or spoken language, the interpreter serves as a mediator using a consecutive mode of interpreting in a bidirectional way. The purpose is to help indigenous people receive "full and equal access to legal, health, education, government, and social services in their host country" (Roberts 2002:161), or to facilitate the communication between people from different cultures and languages in their daily life (e.g. tourism, education and culture). Interpreters are required to be highly sensitive to their professional ethics particularly as regards accuracy, impartiality and neutrality. In reality, however, due to a lack of financial support, ad hoc interpreters are often used in healthcare interpreting and many other community-based settings.

Conference interpreting takes place in bilateral or multilateral international conferences and meetings for economic and political negotiations. It uses either of two working modes: simultaneous interpreting and consecutive interpreting. The reality is that the former has been exclusively used in renowned international organizations, e.g. UN and EU. It should be noted that SI, as AIIC suggests, is carried out from the interpreter's B language into his/her A language[7]; while CI is given in a bi-directional way. There has been bias against CI since SI has almost become an alternative term for conference interpreting in the mind of the public as well as for many researchers (cf. Kornakov 2002; Kalina 2007; Duflou 2007). There have also been claims that CI is inferior to SI because SI is more demanding for cognitive abilities such as split attention and that it is in decline in the European market, having been replaced by SI (Gile 2001a).

Bearing in mind the primary focus of my study of CI, in the following paragraphs, I will provide insights into CI in terms of its definition (section 2.1.2.1), classification (section 2.1.2.2) and changes in its role within socio-cultural contexts (section 2.1.2.3).

2.1.2 Consecutive Interpreting

2.1.2.1 Defining Consecutive Interpreting

[7] SI is occasionally given out of the interpreter's A language in retour interpreting (Jones 1998:134).

According to the working glossary of the AIIC, consecutive interpreting is defined as a process in which

> the interpreter providing consecutive interpretation sits at the same table with the delegates or at the speaker's platform and interprets a speech into the target language after the speaker speaks. The length of the speeches varies. For this purpose the interpreter may take notes. (AIIC 2011:n.pag.)

AIIC's definition, as shown above, has restricted the application of consecutive interpreting to exclusive use in conferences. This has incurred criticisms over the changing role in modern socio-cultural contexts (see section 2.1.2.3). In AIIC's definition, consecutive interpreters provide services to both speakers and delegates in international conferences. One of its defining characteristics is that the speaker pauses, allowing for the interpreter to transfer the message into the target language; the other is the opportunity to take notes. These two defining characteristics later have become the platform for a sub-division of consecutive interpreting.

2.1.2.2 Classification

Salevsky (1982) is the first to make an initial classification of consecutive interpreting. He pointed out that note-taking is not always needed in interpreting settings. Thus, he designates two types of consecutive interpreting: consecutive interpreting with notes and consecutive interpreting without the use of notes (cited in Alexieva 2002:220).

As mentioned in the previous section, in consecutive interpreting the delivery of the source text is paused, with varying intervals. This has led to discussion of how frequently the speaker might pause for interpretation. Pöchhacker (2004) assumes that "consecutive interpreting does not presuppose a particular duration of the original act of discourse". As a consequence, the chunks of speech to be interpreted could range "from the rendition of utterances as short as one word to the handling of entire speeches, or more or less lengthy portions thereof, 'in one go'" (18). Along this continuum, Pöchhacker suggests that consecutive interpreting is subdivided into *classic* consecutive and *short* consecutive.

In classic consecutive, the length of utterance to be interpreted is so long that note-taking is necessary in aiding the interpreter's memory. This is also the very type of working mode that is involved in this study. On the other hand, in short consecutive mode of interpreting, the length of utterance to be interpreted is so short that note-taking is not that essential (Pöchhacker 2004:19). For example, there is no need to note down a simple question like 'what is your name?" or a simple answer like "yes". This explains why consecutive

interpreting remains popular and important in current interpreting scenarios.

2.1.2.3 The Changing Role of Consecutive Interpreting

Consecutive interpreting was first used in international conferences and later on was replaced by simultaneous interpreting. As the earliest form of conference interpreting, consecutive interpreting can be traced back to the First World War with the Paris Conference in 1919 as a cornerstone event. According to Jean Herbert, who was the oldest prominent conference interpreter of the first generation, "all the international meetings of any importance" at this time had "been held exclusively in French" and "worked mostly sentence by sentence" (1978:5). Later on, consecutive interpreting gradually lost its prestigious status in international organizations due to the use of the simultaneous mode of interpreting. Politics and new technology helped to endorse this replacement as it was used for quick judicial proceedings at the Nuremberg Trials and the Tokyo Trials (Siegfried 2007).

Nowadays, SI is almost exclusively used in international organizations (Phelan 2001:7). Some claim that the market for consecutive interpreting is shrinking, especially in Europe. However, I will argue that losing its traditional prestigious status in international organizations does not mean its extinction from the whole interpreting market. Kalina (2002a) adds that though having few opportunities in international organizations, consecutive interpreting still retains a wider range of application in other social settings (171). Gile (2006) agrees that conference interpreters have a much wider range of working settings, which are "not only in conferences, but also in other settings...[such as]… visits of personalities, meetings of boards of directors of large corporations, TV programs, arbitration proceedings" (9). Gile (2001a) further points out that consecutive interpreting still remains active in Asia. The main reasons for the remaining popularity of consecutive interpreting are as follows:

Firstly, consecutive interpreting is used where simultaneous interpreting is impossible or unwanted by the conference organizers. It is true that SI can save both the speaker and the audience waiting time for the source text to be interpreted, but it is not always the first choice of conference organizers. One of the main reasons could be that SI has high demands for technical equipment for quality booths (fixed or mobile), such as "a clear view of the meeting room and the speaker", meeting "ISO standards of acoustic isolation, dimensions, air quality and accessibility as well as appropriate equipment (headphones,

microphones)" (AIIC 2011:n.pag.). Another reason could result from a lack of SI interpreters. Globally speaking, the number of qualified simultaneous interpreters is limited (Sawyer 2004). When it is difficult to prepare high quality booths, or to find qualified simultaneous interpreters, or to save organizational costs, consecutive interpreting becomes an alternative working mode.

Secondly, consecutive interpreting can be more appropriate in some particular communicative settings. Although SI can save the waiting time as mentioned above, this is not what all the clients always expect, because some clients demand a high level of interpreting accuracy. As Seleskovitch (1978) argues, fast delivery at the cost of accuracy is not wanted in business, diplomatic, medical or legal settings in which accuracy is given the highest priority. Negotiators require faithfulness to the original message and also need time to digest the interpreted information and "think carefully in order to give careful comments or accurate expressions" (124). Accurate interpretation of the patients' needs and the physician's instructions are very important to the quality of medical service and the well-being of the patient. Legal interpretation requires accurate interpretation as it is vital to the correct implementation of justice. Therefore in those settings, any attempt to sacrifice accurate interpretation for the sake of saving time cannot be accepted. Thus simultaneous interpreting is not considered as an appropriate working mode because it does not render "all verbal messages, but only messages with an adequate degree of redundancy" (Chernov 1994:140). By contrast, consecutive interpreting fits for expectations of the clients as it is "not a summary" but "a complete rendition of the original speech in another language" (Phelan 2001:9) and thus may satisfy the clients' needs for understanding "what has been said rather that how fast it has been said" (125).

Thirdly, the pedagogical value of consecutive interpreting is so significant that the teaching of consecutive interpreting weighs heavily in almost all types of interpreter training programs. "It is still taught on all interpreting courses … partly because trainers believe that it is an essential part of interpreter training" (Phelan 2001:9). Even in SI training, the teaching of consecutive interpreting is an integral part of the training program. Seleskovitch (1975) stresses the importance of teaching consecutive interpreting, believing that a good consecutive interpreter could automatically become a good simultaneous interpreter. Although Gile (2001a) expresses his doubts about such transferability of competence, he also agrees that consecutive interpreting is "too valuable to dispense with"

in interpreter training, because it provides an opportunity for both trainers and students to "detect and correct their major weakness in terms of speed, technicality and logic" at listening and reproduction phases of interpreting (n.pag.). Thus it is clear that consecutive interpreting still retains a significant role in interpreting practice and interpreting training.

Due to the popularity and importance of consecutive interpreting in social contexts, as well as my interpreting experience and years of teaching observations as an interpreter trainer at university level, research in this field has interested me greatly. I would like to approach the study of consecutive interpreting from a cognitive perspective which deals with the cognitive difficulties for novice interpreters and student interpreters. In the following sections, I will analyze the nature of interpreting (section 2.2), interpreting quality (section 2.3), and interpreter competence (section 2.4), which, as mentioned earlier at the beginning of this chapter, forms a solid theoretical foundation for my cognitive approach to consecutive interpreting.

2.2 The Nature of Interpreting

People are very curious to know how interpreting is carried out and "what actually happens in the interpreter's mind as s/he goes about performing this unusual task" (Shlesinger 2000:3). To answer this question, over the past three decades various theoretical assumptions and models have been proposed, within which two main approaches can be identified: the process-oriented approach and the product-oriented approach.

Using a cognitive perspective as a point of departure, the process-oriented approach focuses on the mental process of interpreting. That is, an interpreting process is viewed as "the temporal flow of auditory information, beginning with the acoustic signal that arrives at the ear of the listener and ending with some form of mental representation of the message in the mind of the listener" (Massaro Model 1975, cited in Moser 1978:353). During this information processing, little concern has been given "to actual use of language in communication" (Pöchhacker 1995a:32). Much discussion centres on the cognitive steps involved (Gile 1995), including memory operations (Gerver 2002; Lambert 1988b; Mackintosh 1985), and other contextual variables (Shlesinger 2000; Kalina 2005, 2007).

The product-oriented approach centers on an analysis of the outcome of the interpreting

process, i.e. the target/interpreted text. Generally, the interpreted product is evaluated in terms of its semantic or pragmatic equivalence to that of the original source text (Dam 1998; Hatim & Mason 2002) in order to see whether the interpreted text fulfills the expected communicative purposes (Berk-Seligson 1988).

In the following two sections, I will discuss how interpreting is understood as process (section 2.2.1) and as product (section 2.2.2) with selected models from the interpreting literature. I will also address the pedagogical value of these theoretical findings on interpreting.

2.2.1 The Process-oriented Approach

In the process-oriented approach, interpreting is viewed not as "a direct conversion of the linguistic meaning of the source language to the target language", but as "a conversion from source language to sense, the intermediate link being non-verbal thought" (Mackintosh 1985:38). In other words, during interpreting, it is the meaning and sense, not the form, that the interpreter should focus on and make efforts to realize with the help of the strategy of deverbalization[8] (Seleskovitch 1978). In this circumstance, interpreting is seen as a cognitive process of information acquisition and reproduction. In this information processing, memory plays a significant role in storing, analyzing and reproducing the input message (Gerver 2002:64). Efficiency in information processing is important; otherwise less information may be obtained from the comprehension stage of interpreting "for recall for translation" (Gerver 2002:66). As a result, the overall quality of interpreting could deteriorate when "more omissions and uncorrected errors in output" (ibid.) are part of the TL reproduction. To make explicit the exact cognitive efforts involved in interpreting, Gile (1995) develops his Effort Models for SI and CI. In his terms, interpreting involves interactions among a set of three task-based cognitive efforts, namely, *listening* effort, a *memory* effort, a *production* effort. Gile agrees that these individual efforts could cause problems in disturbing the limited attentional resources. When interpreters can no longer distribute their attention appropriately to complete the multi-tasks involved in an interpreting process, the quality of interpreting will suffer. Gile proposes that a *coordination* effort is needed to balance conflicting cognitive efforts.

[8] The Interpretive Theory was developed by Seleskovitch (1978). In it she advocates de-verbalization, an interpreting strategy for the conveyance of meaning. This theory has influenced many theorists and interpreter trainers.

Other researchers have attempted to improve the efficiency of the interpreter's processing capacity for information processing. Assuming that in-depth processing could be a key to successful interpreting, Mackintosh (1985) approaches information processing from a text linguistic perspective. She criticizes overemphasizing the non-verbal feature of interpreting. Her argument is that as interpreting is "a three-phase operation in which the first phase is verbal (incoming discourse), the second is non-verbal and the third is again verbal (the interpreter's reproduction of the message in the TL" (37), that interpreting is a cognitive process which can be realized only through textual mapping. In her discourse-based processing model for both SI and CI, Mackintosh proposes that interpreting is a top down and bottom up process in which the verbal message of the speaker is abstracted into macropropositions and finally the acquired macropropositions are developed into a detailed and coherent target text (40).

In consecutive interpreting, at its comprehension stage, the interpreter applies the cognitive strategies of *deletion*, *generalisation* and *construction* to note down the gist of the speaker's message; and then at reproduction stage, based on these notes, the interpreter fleshes out the details by means *of addition*, *particularisation* and *specification* (ibid.). It is similar with simultaneous interpreting when it is assumed that "phonologically and semantically incoming segments of discourse has already completed the process of checking for relevance and coherence and stored in short-term memory" (ibid.).

Researchers in this area have also emphasized the importance of contextual factors that may affect the quality of interpreting. Shlesinger (2000) posits that information processing in the SI is more than analyzing the immediately preceding units of text. As she stresses, information processing should be placed into SI contexts, which include "the setting, the circumstances, and the interpreter's knowledge of the situation as a whole" (6). Kalina (2007) emphasizes the active role of the interpreter. She suggests that the interpreting process should also include "the phases before and after conference activity" (112). She also acknowledges the usefulness of interpreting strategies such as anticipation, segmentation of input, and inferencing. However, she argues that the successful completion of an interpreting assignment also needs other strategies that the interpreter can "apply as a function of situative and contextual conditions" (ibid.). Among those strategies, interpreters' communicative skills are highlighted by Thiéry so as to "act efficiently" (1990:42, cited in Kurz 2001a:395). Vuorikoski (1998) stresses that "collaboration is

needed between all the parties involved (organizers, primary addressors, addressees, interpreters) to reach a mutually satisfactory communication" (cited in Kurz 2001a:400).

In my view, the previous description of the interpreting difficulties caused by imbalance in the interpreter's processing capacity management and the argument for exploring the cognitive aspect of interpreting within a wide range of working contexts provide a good point of departure for the possibility of achieving in-depth information processing in interpreting practice and interpreting training. Keeping in mind that my study of consecutive interpreting is on the relationship between the interpreter's processing capacity management and the quality of his/her performance, in-depth information processing is what is needed.

Based on the evidence given by Lambert's research (1988b), it such in-depth information processing is more likely to be obtained in consecutive interpreting. In her comparisons of shadowing, SI and consecutive interpreting she used the retention rate and recall of information to mark differences. In her study, she selected sixteen interpreters, eight of whom were AIIC conference interpreters, while the remaining 8 were trainee-interpreters. Three recognition tests were given in which the subjects were required to do shadowing, simultaneous interpreting and consecutive interpreting of four French prose passages of equal length. The results of these three recognition tests showed that consecutive interpreting provided higher recall scores than simultaneous interpreting, followed by shadowing. Lambert concluded that the distinct characteristics of consecutive interpreting as such have made "the depth-of-processing" possible for better recall. The separation of its comprehension and reproduction sages, as well as the use of note-taking and note-reading strategies could be vital elements for quality information processing.

Mackintosh (1985) has presented a seminal idea on how to process information effectively through her text-based approach. That is, with the help of textual mapping rules, a top-down/ bottom-up process is carried out from abstracting the verbal message of the speaker towards reproducing the main ideas into a detailed and coherent target text. But the problem is that her text-based model has not answered the following questions on the actual application of the strategies she has proposed: (a) what kind of in-flow information should be deleted or retained; (b) as with the retained information, what should be noted down and what should not; and (c) how to expand the acquired mental propositions into a coherent and well-structured interpreted text.

I will thus use these unanswered questions as a point of departure for my cognitive research on improving the interpreter's processing capacity management for better interpreting performance in practice and learning (see a detailed explanation of my working model in Chapter Four).

2.2.2 The Product-oriented Approach

While the process-oriented approach focuses on the cognitive variables, i.e. memory, attentional resources, and cognitive efforts, all of which are involved in the mental process of interpreting, another research paradigm focuses on the analysis of the direct outcome of interpreting performance, i.e. the interpreted text. There has been a general consensus that it is meaning, rather than linguistic form, that the interpreter should pay more attention to for a quality interpreted text. This view corresponds to the core of the process-oriented approach on the cognitive aspect of interpreting (Dam 1998; Berk-Seligson 1988). In addition to that, it is also agreed that that contextual variables can have impacts on the formation of an interpreted text. Dam (1998), as one of the few noted researchers on consecutive interpreting, points out that the study of interpreted texts should not be carried out in isolation. She states that the nature of the source material, the mode and direction of interpreting, the languages involved, and the interpreters' level of experience "may influence the position of a target text on the form-meaning continuum" (275-76). Berk-Seligson (1988) adds the intended audience as another factor that may affect the quality of interpreted text. In an investigation of the court interpreter's impact on juror's perception of witness testimonies, she finds that (a) politeness in the testimony of a witness makes a difference, and (b) the interpreter plays a pivotal role as a powerful filter through which a speaker's intended meaning is mediated (284-88). Therefore, the interpreter needs to maintain the register of the source text so as to achieve equivalent pragmatic effect of communication. Regarding the defining characteristics of interpreted texts resulting from different working modes, Hatim and Mason (2002) examine the texts gained from SI, consecutive interpreting and liaison interpreting. These two authors propose a conceptual distinction among these working modes of interpreting in terms of three aspects: texture, structure and context. Regardless of the mode of interpreting, a quality interpreted text, they maintain, should be cohesive in texture, coherent in a particular structure and relevant to communicative intentions. It should also be noted that these three quality criteria are weighted differently in specific interpreting scenarios. Liaison interpreting relies more on

context while SI relies heavily on the texture of the input message so as to "[maintain] text connectivity through interacting with the various aspects of cohesion, theme-rheme progression" (265), and consecutive interpreting "entails the category of structure being utilized to best effect" (ibid.).

With regard to research methods adopted by the product-oriented approach, Dam (1998) has provided a useful analytic tool. She segments the target text into small and manageable units (a series of words grouped around a verb) and then compares them with those of the source text. Her aim is to find out (1) the ratio of the segments that parallel those of the source text by literal translation; and (2) the ratio of the segments that substitute those of the source text by rewording. In her study, she observed five professional interpreters doing consecutive interpreting from a Spanish speech into Danish (their A language). Interestingly, the findings have shown that lexical similarity seems to have a higher frequency than lexical dissimilarity in this corpus analysis. This may imply that interpreting is based more on form than on meaning. Dam concludes that the results still need careful consideration due to the limitation of such a small-scale research study.

Another technique Dam has used in her comparison method is to identify the semantic and syntactic patterns of length reduction of the source text (1996). Dam's comparison method has also been used to evaluate another by-product of consecutive interpreting, that is, the interpreters' notes. In her small-scale research on the choice of language used for note-taking (2004, 2007), she attempts to find out the effect of note-taking on the quality of interpreted texts. She arguably concludes that the more notes, and the more abbreviations, the better the quality of the target text. This result is contrary to my assumption on quality information: fewer concept units, better efficiency for interpreters' processing capacity management (see my discussion of the working strategies on efficient conceptual mapping at section 4.3.3.1).

Having described interpreting as both process (as discussed in section 2.2.1) and product (as discussed in section 2.2.2), in the following section, I will examine the quality issue of interpreting mainly from three perspectives: the definition of interpreting quality, quality criteria and quality assurance. The aims are (a) to understand what good interpreting is and (b) to strengthen my analysis of the source text and the interpreted texts that were involved in my experimental research (which will be presented in Chapters Five and Six)

2.3 Interpreting Quality

It is universal that quality service is needed in any industry. It is the same with the interpreting industry where the quality issue has long been a central topic in interpreting studies (Grbić 2008). Pöchhacker (2001) stresses that "interpreters as comprehensive service providers must clearly be interested in performance enhancement and in identifying key performance indicators" (394-95). The problem in deciding what performance indicators are vital has come from a variety of quality criteria gathered from a large quantity of related interpreting research. Criticisms have arisen on the "intuitive" and/or "subjective" nature of judgment provided by interpreters, interpreter trainers and the intended audience on the quality of interpreting (Kalina 2002:121; also see Kahane 2000). On one hand, interpreters and interpreter trainers are criticized for not being able to describe their experience-based judgments in an objective way, even though they may be sound and reasonable. Many interpreters and trainers feel that they can assess the quality of colleagues or trainees intuitively, on the basis of their experience and professionalism, but they may be unable to express their subjective judgments by objectively measurable standards (Kalina 2005:768).

Users of interpreting services, on the other hand, are often questioned on their ability to judge interpreting performance. In conference interpreting, it has been found that the delegates "tend to listen to only part of the presentations given at conferences", those parts which they are mainly concerned with (Gile 1995:38). They often base their evaluation on their personal taste. That is why their judgment of the quality of the interpreting service "often leads to a surprisingly favorable assessment of quality in conferences in which interpreters feel they have done a very poor job" (ibid.).

If we cannot understand what good interpreting actually means, it can affect our evaluation of interpreting performance. In addition to that, the quality of interpreting training can also be affected. Therefore, in the following section, I will address the basic assumptions and insights regarding the major aspects of issues regarding quality. In doing so, I will first discuss the definition of quality in interpreting in section 2.3.1.Then I will present an overview of the quality criteria from previous research along with theoretical and empirical paradigms (in section 2.3.2). Finally, I will explore the question of quality assurance in interpreting in section 2.3.3.

2.3.1 Defining Interpreting Quality

Despite the importance of quality issues in the professionalization of the interpreting industry, researchers "have not been able to agree on a universal, generally accepted quality model applicable to conference interpreting, or any type of interpreting at all for that matter" (Kalina 2005:768). Given the nature of interpreting as diversity and complexity, Garzone (2002) argues that there should not be a "single, unambiguous agreed definition of the concept of quality in interpretation" (108).

A wealth of research has explored the notion of interpreting quality within different contexts. A common practice is to compare the source text and the interpreted text. According to Shlesinger et al. (1997), interpreting quality refers to the equivalent effect between these two types of texts (128). To be more exact, an interpreter needs to

> provide a complete and accurate rendition of the original that does not distort the original message and tries to capture any and all extra-linguistic information that the speaker might have provided. (Moser-Mercer 1996:44)

Besides the quality indicators, completeness of information and information accuracy of being faithful to the source text, other researchers also emphasize the intrinsic quality of the interpreted text in its own right. Gile (1995) proposes a quality indicator as the package of information (26). This notion is concerned about how that message can be conveyed to the receivers through "the linguistic and peri-linguistic choices" in terms of the acoustic, linguistic and logical features (Shlesinger et al. 1997:128). In speeches, the package is made up of the words and linguistic structures of the speech, as well as the voice and delivery (and sometimes, especially in poetry, the actual combination of word sounds and rhythm), plus a non-verbal signal (ibid.)

According to Gile (1995), the packaging style, to a large extent, determines the degree of users' satisfaction of an interpretation service. In other words, good content delivered in poor packaging, e.g. monotonous delivery, with a poor voice, can incur negative feedback from the end users, whereas poor content in good packaging can "result in a distorted view of quality" in which a poor quality interpreting performance is assessed as very good by

delegates (33).

2.3.2 Quality Criteria

A major function of quality criteria is to make feasible the evaluation of whether an interpreting performance is successful and how successful this interpreting performance is. For that purpose, Kalina (2002) suggests that quality criteria should be clear and measurable, i.e. to be able "to state precisely what makes the difference between an outstanding and a modest performance" (120). In order to achieve a clear picture of the existing quality criteria gleaned from the related literature review, in the following sub-sections, I will first briefly summarize the major aspects that previous research on interpreting quality has respectively dealt with (section 2.3.2.1). What follows is a report of the results of empirical research in this area (section 2.3.2.2), in terms of interpreter self-perceptions (section 2.3.2.3) and user expectations (section 2.3.2.4).

2.3.2.1 Categorization

The literature review has revealed a variety of quality criteria which overlap or approach the quality issue from different perspectives. Kalina (2002) has attempted to categorize various quality criteria in her quality assurance model for both simultaneous interpreting and consecutive interpreting. In doing so, she points out three main aspects involved in the evaluation of interpreting performances. They are: *semantic content*, *linguistic performance* and *presentation,* as shown in Table 2.1:

Table 2.1 Evaluating standards for interpreters' output quality (Kalina 2002:125)

Semantic Content	**Linguistic Performance**	**Presentation**
consistency	grammatical correctness	voice quality
logic, coherence	adherence to TL norms	articulation
completeness	comprehensibility	public speaking
accurateness	stylistic adequacy	discipline
unambiguity	terminological adequacy	simultaneity

clarity	discretion	technical mastery
reliability	lack of disturbances	conduct

Table 2.1 clearly shows that under each category how different quality criteria have been touched upon in terms of content, language and delivery. Kalina's categorization can allow comprehensive and in-depth discussions of the quality issue in various interpreting contexts. However, it should be noted that in my application of Kalina's categorization to my current study, I prefer to rephrase the term 'semantic content' to 'cognitive content', because the word 'semantic' can easily mislead the readers to relate that particular quality criteria merely to semantic equivalence between the target text and the source text. Given that my study focuses on processing information involved in the source text and the interpreted text, what I am most interested in is how information is conveyed through the realization of logical connections, completeness, accuracy, unambiguity and clarity in expressions. Therefore, the term 'cognitive content' will be used in the following account of my study (especially in my data analysis in Chapter Five and discussion of my findings in Chapter Six).

2.3.2.2 The Rating of Quality Criteria

Faced with the many quality criteria indicated in Table 2 of the above section, a feasible quality evaluation is needed for interpreting practice and interpreting training. By 'feasible', I mean that only the essential or the most important quality criteria should be selected for a quick and reliable judgment of interpreting performances. The challenge, however, is that in the theoretical research on interpreting, there has been no "unanimous consensus on what the essential quality criteria to be followed should be" (Messina 2002:103; also see Kahane 2000). On the other hand, "there is no certainty in the ratings [of the degree of importance of quality criteria] given by respondents" (Pöchhacker 2001:109). As mentioned in section 2.3.1, due to intuitivism and subjectivity in quality-related judgments, the audience in different social scenarios may "attribute different weight to different criteria" for interpreting quality (Kurz 2002b:315). In conference interpreting, interpreters are expected to be a "neutral and faithful intercultural mediator" (Al-Zahran 2007:251). In community interpreting, interpreters are expected to be more active in flexibly applying the working principle of neutrality (Angelelli 2004), as quite

often their working settings are related to sensitive or emotional issues, such as death, birth, crimes, and refugees' experiences (Wadensjö 1998:285).

Interestingly, even for the intended audience who are from the same interpreting scenarios, there may be different ratings of the importance of quality criteria for interpreting. As Kurz (2001a) pointed out, for conference audiences, gender and the experience of using interpreting services and interpreting topics can affect the perception of important quality criteria. Female audiences are less tolerant of broken delivery in interpreting, filled with pauses and hedges (Moser 1995) and they care more about syntactic accuracy, while male audiences focus more on lexical accuracy and overall fluency (Ng 1992). Experienced conference audiences tend to stress the importance of content and terminological precision (Mack & Cattaruzza 1995). A diplomatic conference requires an oral translation of "all the nuances of words", while "in a gathering of scholars, technical accuracy will have greater importance; in a literary and artistic gathering, elegance of speech; and in a political assembly, forcefulness of expression" (Kurz 2001a: 395)

In order to gain a general idea of how interpreters and users of interpreting services give their priorities to a variety of quality criteria, in the following section, I will summarize and compare the existing surveys in terms of interpreter self-perceptions (Bühler 1986; Čeňková 1998; Chiaro & Nocella 2004; Zwischenberger 2009) and user expectations (Kurz 1989; Moser 1995).

2.3.2.3 Interpreter Perspective

Empirical research on rating the importance of quality criteria started with Bühler's (1986) pioneering survey among AIIC conference interpreters. On her assumption that professional interpreters' ranking of individual quality criteria could help to generate some important quality criteria for conference interpreting, in 1986, Bühler designed a questionnaire which listed 16 specific quality criteria involving linguistic and non-linguistic aspects of interpreting. 47 respondents, all AIIC conference interpreters, were asked to rate these criteria on a four-point scale ('highly important', 'important', 'less important', and 'irrelevant'). See the results of Bühler's survey as shown in Figure 2.1 as below:

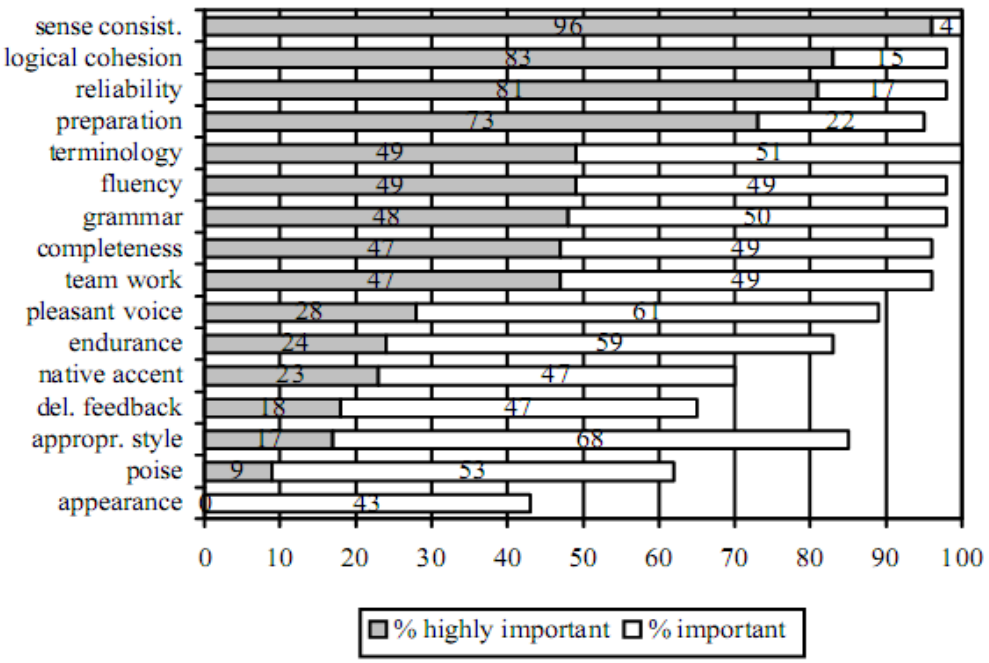


Figure 2.1 Expectations of interpreting quality from Bühler's empirical study in 1986

Bühler found that the quality criteria related to cognitive content were treated as highly important as shown in Figure 2.1 above. Sense consistency (96%) and reliability (81%) ranked the highest over all the other quality criteria. Completeness of information (49%) and terminological accuracy (49%) were regarded as being of equal importance. Compared with the quality criteria related to cognitive content, the quality criteria related to linguistic performance were not treated as highly important except one quality criterion that of cohesion. Grammar (48%) ranked as important whereas appropriate style (17%) received the second lowest mark. The reason for an exceptional emphasis on cohesion may be due to the importance of sense consistency, which is often realized through a set of linguistic connectors. The least important quality criteria are related to presentation manner. Except for fluency of delivery (49%) and appearance (43%), which were thought of as very important, a pleasant voice (28%) and a native accent (23%) were thought to be less important. In sum, the AIIC interpreters in Bühler's survey showed their preferences for quality criteria related to cognitive content, i.e. sense consistency, reliability, completeness of information, and terminological accuracy. The quality criteria related to linguistic performance and presentation manner (except for cohesion, fluent delivery and grammar) were not rated high.

Bühler's study "has inspired one of the most prolific and coherent lines of research on

quality in interpreting research" and the quality criteria she listed in her survey have become "the backbone of empirical research on quality in conference interpreting" (Zwischenberger & Pöchhacker 2010:n.pag.). Follow-up surveys have been carried out using adapted questionnaires for different groups of interpreters to rate the importance of the selected quality criteria for interpreting performances. In Čeňková's (1998) survey, which was carried out among professional simultaneous interpreters in Czech, similar findings have been found on the preferences for quality criteria on cognitive content and their corresponding quality criterion which she called 'cohesion' or 'logical linking'. Regarding the preference for the expected cognitive content, unlike Bühler who reported a preference for both sense consistency and completeness of information, Čeňková found out that those SI interpreters in Czech had discrepancies in sense consistency and faithfulness to the original message, i.e. to convey everything included in the message. 50% of the respondents "prefer accuracy of content and its completeness", while 50% "prefer focus on essentials of the message" (166).

Čeňková's (1998) survey showed a very low rate of response. Of 226 questionnaires, only 34 were returned. To improve the rate of response for a more accurate analysis of interpreters' self-perceptions on the degree of importance of quality criteria, Chiaro and Nocella (2004) initiated a web-based survey in this field. They emailed their questionnaire to 1000 "interpreters belonging to several professional associations" (284). Their questionnaire adopted Bühler's quality criteria. In addition to that, they also designed questions of their own on the identities of the respondents in the hope of gaining more detailed information about the background of the respondents. These questions included age, place of birth, qualifications, and experience, because they believed that the respondents' identities could influence their perceptions on what quality interpreting should be like. Based on the feedback from a total of 286 conference interpreters across five continents, the emphasis of the quality criteria again related to cognitive content in which 'consistency with the original', 'completeness of information' and 'logical cohesion' were reported as being the three most important factors involved. Also, only some of the quality criteria selected related to linguistic performance and delivery manner were considered to be important. 'Fluency of delivery', 'correct terminology' and 'correct grammatical usage' were rated as "the second most three important factors", while 'appropriate style', 'pleasant voice' and 'native accent' were rated as "the least important".

The latest web-based survey has been carried out by Zwischenberger (2009), and is part of a larger research project on "Quality in Simultaneous Interpreting" at the Centre for Translation Studies at the University of Vienna. 2523 emails were sent out and 704 AIIC conference interpreters completed the questionnaire, in which they were asked to rate a one-minute simultaneous interpretation against 11 quality criteria: fluency of delivery, correct terminology, correct grammar, sense consistency with original, lively intonation, native accent, logical cohesion, pleasant voice, synchronicity, appropriate style and completeness.

Like the previous surveys referred to above, the author found that the quality criteria relating to cognitive content were given top priority. Regarding the controversial issue of sense consistency versus completeness of information, the two authors found that priority was given to the criterion of 'sense consistency' which received the highest rating (88.3%), leading to the importance attributed to the criterion of 'logical cohesion' (74.8%) while the AIIC conference interpreters were also specifically demanding 'correct terminology' (61%). By contrast, comparatively less importance was attributed to the criterion of 'completeness' (47.7%). Differing from the previous surveys referred to above, those AIIC interpreters were also more demanding in 'appropriate style' (36.2%), a sharp contrast with 17% in Bühler's survey, and 'fluent delivery' (70.7%). This is another sharp contrast with 49% in Bühler's survey. The increasing attention to appropriate style and fluent delivery among AIIC conference interpreters corresponds with Gile's conclusion that the quality of information packaging is somewhat more important than the quality of informational content in the eyes of the conference audience (see previous section 2.3.1). I am not entirely sure as to the causes behind the changes of AIIC conference interpreters' attitudes towards the quality criteria related to packaging their conveyance of the speaker's message. However it at least implies that currently, content is not the sole concern for judging the quality of interpreting performance, particularly in conference interpreting.

An overview of the selected interpreter-based empirical research on important quality criteria for quality interpreting has implied two issues: first, three main aspects of interpreting quality (discussed in section 2.3.2.1) helped to form a set of specific quality criteria. Second, regarding these three main aspects, i.e. cognitive content, linguistic performance and presentation manner, the specific quality criteria for cognitive content were consistently given the highest rating throughout the related empirical research

referred to here. The controversy about sense consistency versus completeness of information came to three results: some preferred sense consistency (see Zwischenberger 2009); some preferred completeness of information (see the discrepancies among the respondents in Čeňková's survey 1998), while others maintained that both quality criteria were important for quality interpreting performance (see Bühler 1986; Chiaro & Nocella 2004). In my opinion, before we can come to a decision on the essential quality criteria, we also need to listen to another group of participants, i.e. the audience, who play a vital role in the whole interpreting event. Their expectations of interpreting service can enable us to form a more comprehensive understanding of what a quality interpreting performance should be like. For that purpose, in the following I will present an overview of the empirical research on quality interpreting which has been undertaken from a user-expectation perspective.

2.3.2.4 User Perspective

As mentioned at the beginning of section 2.3, there have been doubts about the reliability of users' subjective judgments on interpreting performance. Many researchers, however, argue that user expectations and preferences could be a determining quality criterion, as the purpose of interpreting is, above all, to satisfy the audience's communicative needs (Gold 1973; Stenzl 1983; Seleskovitch 1986; Pöchhacker 1994). Kurz points out that

> even though our clients may not always know what is good for them, we cannot prevent them from having expectations. As service providers interested in client satisfaction, conference interpreters should try to meet their clients' expectations to the best of their ability. Whenever these expectations or demands are unreasonable, members of the profession and professional organizations should convincingly show why they cannot be met. (2001:404)

Given the tradition of conducting empirical research on quality criteria on the basis of interpreters' self-perception, a new paradigm of quality-related research has been adopted, showing increasing interest in the expectations of the users who have used interpreting services. In doing such user-related research, generally, Bühler's quality criteria were used as the basis in design of a set of specific quality criteria for the users to rate the degree of importance or preference. Kurz (1989), in 1989, carried out a pioneering work by asking 47 delegates at a medical conference to rate the first eight of Bühler's quality criteria for interpreting. Table 2.2 as below presents a comparison of user-expectations (Kurz 1989) and interpreter self-perception (Bühler 1986):

Table 2.2 Degree of importance of quality criteria from Kurz's (1989) survey

	User Expectations (Kurz 1989)
Sense consistency	84%
Logical cohesion	74%
Correct terminology	45%
Completeness	37%
Fluency	30%
Pleasant voice	17%
Correct grammar	11%
Native accent	11%

Table 2.2 (as shown above) has revealed that quality criteria on cognitive content of interpreting performances were highly preferred by the users, in which 'sense consistency' was given the highest rate of 84%. Among the quality criteria related to linguistic performance, 'logical cohesion' (74%) and 'correct terminology' (45%) were rated high. By contrast, 'correct grammar' was rated only 11%. The quality criteria related to presentation manner seemed to be treated as the least important ones. Among this type of quality criteria, 'fluency' (30%) was rated high, while 'pleasant voice' (17%) and 'native accent' (11%) were rated rather low.

In 1995, Moser carried out a much bigger user-based survey and is the only survey funded by the AIIC Committee. Between autumn 1993 and spring 1994, Moser employed 94 AIIC interpreters to conduct over 200 interviews at 84 different meetings around the world, investigating audience expectations and how audiences in different conferences evaluated interpreting performances. Moser listed six quality criteria. Three of them were related to the content of the interpreted text, namely, completeness of rendition, terminological accuracy and faithfulness of meaning. The remaining three criteria focused on the aspect of language, i.e. rhetorical skills, and presentation manner, including synchronicity and

voice.

Moser (1995) reported that there had been marked preferences for clarity (80%), completeness of rendition (70%), terminology (over 60%) and conveyance of meaning (over 55%). This is although the users' expectations and preferences could be influenced by both intrinsic factors including age, gender, and experience of using interpreting services, and external factors like the types of topics, whether it was a general meeting or a technical meeting and the size of conference. Moser concluded that in conference audiences' minds, an ideal interpreting performance would feature regular delivery, absence of hesitation, completeness, grammatical sentences, and clarity of expression.

Both Kurz (1993b) and Moser (1995) found marked user-preferences for cognitive-content quality criteria in their respective surveys. The differences in their findings lie in the situation that users in Kurz's survey (1989) gave their top priority to sense consistency in interpreting, while users in Moser's survey (1995) gave more weight to completeness of information and clarity of expression.

In the following section, based on the findings of interpreter-based surveys (section 2.3.2.3) and user-based surveys (section 2.3.2.4), I will discuss the main quality criteria, which are shared by interpreters and users.

2.3.2.5 Shared Quality Criteria by Interpreters and Users

I agree that it is not possible or necessary to set up quality criteria which could fit every specific interpreting context. However, I maintain that serious consideration should be given to the most fundamental quality criteria, which could be applied to specific interpreting contexts with reasonable modifications and expansions. The rationale is that we should provide, not 'empty' theory, but 'practical' theory, which can provide practitioners, interpreting trainers and student interpreters with an analytical tool, which is manageable and efficient.

In comparison with the user-based survey (Bühler 1986) and the interpreter-based survey (Kurz 1989) (as shown in Table 2.3), besides 'logical cohesion' , 'correct terminology'and 'fluency', the other two quality indicators are 'sense consistency' and 'completeness of information'.

Table 2.3 Relative importance of quality criteria between the surveys of Kurz (1989) and Bühler (1986)

	User Expectations (Kurz 1989)	Interpreter Self-perception (Bühler 1986)
Sense consistency	84%	96%
Logical cohesion	74%	83%
Correct terminology	45%	49%
Completeness	37%	47%
Fluency	30%	49%
Pleasant voice	17%	28%
Correct grammar	11%	48%
Native accent	11%	23%

It is clear that both users and interpreters seem to give their preferences for cognitive-content quality criteria, though with somewhat different weightings. Despite the controversy of sense consistency versus completeness of information among interpreters (see the previous section 2.3.2.3), Table 2.3 shows that interestingly the performance level expected by users seems to be lower than that by interpreters. In other words, professional interpreters appear to be more demanding on their own interpreting performance than users.

In my view, both sense consistency and completeness of information should be emphasized. Equal priorities for these two quality criteria result from treating interpreting not simply as an interpreting task/assignment, but as a type of service. To narrow the gap between interpreters' self-perception of quality interpreting and users' expectations and preferences of interpreting services, Kurz (2001a:405) expresses her understanding of what is a quality interpreting service in the following formula:

Quality of service (customer satisfaction) = service quality delivered – service expected

In this formula, Kurz proposes that quality interpreting service should take customer

expectations into consideration. The key to successful provision of interpreting service is to exceed the customers' service-quality expectations. In other words, when there are discrepancies about which is more important, sense consistency or completeness of information among interpreters users seem to show lower expectations of interpreting performances than interpreters. Therefore a professional interpreter should be able to give the users not only what they expect in terms of sense consistency, and logical connections, but also what is important for the accuracy of interpreting, i.e. being faithful to the original message through completeness of information. Therefore, in my exploration of optimizing the interpreter's processing capacity management and data analysis (Chapter Five), I will use consistency and completeness of information as two fundamental quality criteria. In my cognitive approach to information processing and production in the context of interpreting, quality interpreted texts should be organized in an elaborate and coherent way.

In order to achieve quality interpreting performances, in the following section I will give an account of what kind of knowledge and capabilities is needed for the notion of interpreter competence using the criteria I have established.

2.4 Interpreter Competence

In an interpreting situation, people expect a good interpreter to have acquired all the knowledge and skills that are necessary for the successful completion of the interpreting task. But what is interpreter competence? In academic terms, there has been no consensus on the definition of this notion. As Pym (2003b) points out, the competence needed for "translational work, to all intents and purposes" is "non-existent and probably also nondefinable" (482). But at least agreement has been achieved as to what interpreter competence is not. In her study of bilingual competence and translation (oral and written) competence, Presas (2000) concludes that interpreter competence is definitely not bilingual competence which "is not in itself sufficient to guarantee translation competence, at least not in the academic sense of the term" (19). Kermis (2009) points out the similarities and differences between translation competence and interpreter competence (see Table 2.4). Kalina (2000) defines interpreter competence broadly as "the competence to process texts within the scope of a bi-or multilingual communication situation with the aim of interlingual mediation" (7). Such communicative goals, as Pöchhacker (2004) stresses, could be achieved through "the congruence between task demand (performance and

standards) and qualifications" (166). Therefore, in my understanding, interpreter competence is more than a matter of producing interpreted texts. I would like to redefine the notion of interpreter competence as follows: first of all, interpreter competence is basically seen as an underlying system of knowledge, abilities and skills that are involved in helping interpreters to transfer messages across languages and cultures. More importantly, interpreter competence also involves (a) the interpreters' efficiency in time and work management before, during and after the actual interpreting sessions; and (b) the interpreter' sensitivity in cooperation with other participants (e.g. speaker, target audience, organizer, colleagues in the same interpreting team) of the whole interpreting event. Furthermore, interpreter competence is assumed to be composed of a set of interrelated sub-competences, which could be further specified and/or expanded to fit for specific social demands (see section 2.4.2).

Before I illustrate the individual components of interpreter competence, I feel it a necessity to clarify the confusing or mixed terminological usage related to the notion of interpreter competence. For that purpose, I will explain the fundamental differences between two groups of terms: interpreter competence versus translator competence (section 2.4.1.1), and interpreter competence versus interpreting competence (section 2.4.1.2). The aim of doing so is to construct a platform for my exploration of a model for interpreters' cognitive processing capacity management (Chapter Four) and for my own discussion of efficient interpreter training (in Chapter Seven).

2.4.1 Terminological Clarification

2.4.1.1 Interpreter Competence versus Translator Competence

The necessity of making a clear distinction between interpreter competence and translator competence lies in the pedagogical problems of using similar methods to train student interpreters and translators. Commonly, students are given source texts for interpreting in interpreting courses or translating in translation courses (see section 1.1.2.2.). However, my literature review has found that it is difficult to make a clear-cut distinction, because translation and interpreting have so many shared characteristics, mainly due to the fact that both of them serve to convey the message from the source text into the target text, in a spoken or written form, to achieve communicative goals. Kermis (2009) states that the core sub-competences shared by interpreters and translators are: linguistic competence,

comprehension competence, production competence, subject area competence, and cultural competence. Furthermore, he points out that interpreters and translators differ in terms of sub-competences as shown in Table 2.4 as follows:

Table 2.4 Specific sub-competences for translators and for interpreters (Kermis 2009:n.pag.)

SPECIFIC COMPETENCE FOR TRANSLATORS	SPECIFIC COMPETENCE FOR INTERPRETERS
Translational Competence	General Knowledge
Instrumental Competence	Memory Skills
Attitudinal Competence	Public Speaking
Communicative Competence	Moral Competence
Assessment Competence	Stress Tolerance

Table 2.4 shows the sub-competences that differ between interpreters and translators according to Kermis (2009). In the distinctive sub-competences for translators (as shown in the left column above), translational sub-competence involves the abilities to transfer and re-express the ideas of the source text into the target text. Instrumental sub-competence is related to encyclopedic knowledge and the ability to do research. Attitudinal sub-competence is concerned with the psycho-physiological factors. Communicative sub-competence is literally about the ability to communicate. Finally, assessment competence refers to the ability to make right judgments on the translation work. By contrast, the distinctive sub-competences for interpreters (as shown in the right column of Table 2.4) show an involvement of general knowledge, memory skills, public speaking skills, moral competence and stress tolerance.

My argument against the above-mentioned distinctive sub-competences for translators and interpreters comes from one question: which sub-competence listed in Table 5 is not needed by their opposite group? From my point of view, all the so-called distinctive sub-competences for translators are also needed by interpreters. Interpreters also need to be able to convey messages across languages and cultures (as shown in 'translational sub-competence'), do their search jobs for good preparation (as shown in 'instrumental sub-competence'), cope with nervousness and fatigue (as shown in 'attitudinal sub-competence') and make correct strategic decisions (as shown in 'assessment sub-

competence'), so as to achieve communicative goals (as shown in 'communicative sub-competence'). This is almost the same with translators, who also need most of the sub-competences for interpreters. For quality translation, translators should equip themselves with a wide range of knowledge, and professional working ethics. Of course they need memory skills, the ones that are inevitably involved in any human information processing behavior. In addition to that, translators also suffer from time pressure for submission deadlines. It seems that only one sub-competence for interpreters might be called distinctive, i.e. public speaking skills. Translators do not have to speak to the public.

As discussed above, there is no clear-cut distinction between the sub-competences that are respectively needed by interpreters and translators, except for the public speaking sub-competence for interpreters. However, it should be noted that interpreters are expected to have higher levels of stress tolerance, partly because they can get direct feedback from their audience, and partly because they are required to efficiently manage their limited memory and attention for accurate and prompt delivery of interpretation. Section 2.4.2 provides more details of my illustration of the individual components of interpreter competence.

2.4.1.2 Interpreter Competence versus Interpreting Competence

In interpreting literature, the competence for interpreters has been named as "interpreting competence" (Kalina 2002). In my study, I prefer to use the term as 'interpreter competence'. As far as I am concerned, interpreting competence appears to give a misleading presumption that interpreting skills are of central concern in pursuit of quality interpreting. My argument against basing quality interpreting merely on acquisition of so-called interpreting skills is that interpreting skills may vary to fit for different requirements within specific interpreting settings. Furthermore, I would like to emphasize the significance of the role of interpreters in socio-cultural settings, because the external factors that may affect interpreting performance could be sometimes predictable, but more often unpredictable. What is important is the flexibility of interpreters in working out efficient strategies to solve potential interpreting challenges. Based on that assumption, throughout my study, I will use 'interpreter competence' to highlight the decisive role of the interpreter in the hope that trainers would not treat their students as machines which cannot think, but that interpreter trainers should see arousing students' awareness of being proactive as the first and foremost task, before the students are exposed to the practice of

various interpreting skills (see more discussion in Chapter Seven).

In the following section, I will further explore the notion of 'interpreter competence'. In doing so, I will adopt a componential approach, in which this notion is divided into a set of sub-competences. It is assumed that the interactions of individual sub-competences are of importance in the completion of interpreting tasks.

2.4.2 The Componential Approach to Interpreter Competence

Discrepancies arise on labeling and identifying those sub-competences. Kalina (1994) uses "sub-competences". Pöchhacker (2004) uses "knowledge and skills" (166), while Van Hoof (1962) uses "physical, intellectual and mental qualities" (cited in Pöchhacker 2004:166). Based on Kermis' (2009) review of the main areas of research on interpreter competence over the past three decades, I will explore the basic components of interpreter competence.

The rationale for a componential approach to the notion of interpreter competence is that there has been a consensus that interpreter competence is decomposable. In other words, interpreter competence is thought to consist of a hierarchy of sub-competences interacting with each other at different levels. With regard to these involved sub-competences, in order not to reinvent the wheel, I base my discussion on the PACTE Model (2003) of translation competence, which consists of five sub-competences and one mechanism. The main reason for doing so is the shared characteristics between interpreting and translation (see detailed comparison of interpreter competence and translation competence in section 2.4.1.1). Therefore, my model of interpreter competence, similar to the PACTE Model (2003), also involves individual sub-competences (section 2.4.2.1). However, it should be noted that necessary changes and modifications have been made accordingly (section 2.4.2.2), due to the defining characteristics of interpreter competence (also see section 2.4.1.1).

2.4.2.1 A Model of Interpreter Competence

In my model, interpreter competence is composed of six sub-competences. They are initially *linguistic sub-competence, extra-linguistic sub-competence, instrumental sub-competences*, which are similar to those corresponding sub-competences in the PACTE Model (2003). However they are completed by *knowledge about interpreting sub-competence, cognitive sub-competence* and *psychological sub-competence,* which are

modified due to considerations of the defining characteristics of interpreting.

With regard to the shared sub-competences with the PACTE Model (2003), it is common sense that *linguistic competence* is a prerequisite for quality interpreting. Interpreters should be able to understand what has been said and then interpret it in the target language. Listening and speaking skills thus are essential.

Extra-linguistic sub-competence is related to all sorts of knowledge "both implicit and explicit, about the world in general and special areas" (PACTE 2003:57). It includes: (1) bicultural knowledge about the source and target cultures, (2) encyclopedic knowledge about the world in general and (3) subject knowledge in special areas (ibid.).

Instrumental sub-competence involves the ability to use "documentation sources" with the help of "information and communication technologies" such as "dictionaries of all kinds, encyclopaedias,…electronic corpora, searchers, etc." (58).

The fundamental difference between this interpreter competence model and the PACTE Model (2003) on translator competence lies in my modifications of the remaining components of the PACTE Model, which are, namely, knowledge about translation sub-competence, strategic sub-competence and psycho-physiological competence.

Among them, my first modification is on knowledge about translation sub-competence into *knowledge about interpreting sub-competence.* Both of them are related to knowledge on translation as in the PACTE Model (2003) or interpreting as in my model, as well as "the profession" (PACTE 2003:57).

It includes two areas: (1) knowledge about how interpreting according to my modification functions: types of interpreting units, processes required, methods and procedures using strategies and techniques, and types of problems; (2) knowledge related to professional interpreting practice according to my modification: knowledge of the work market with its different types of briefs, clients and audiences (ibid.).

My second modification is replacement of the strategic sub-competence in the PACTE Model (2003), which deals with problem solving in the translation process. The reason for my replacement is that this notion is not practical enough in the context of interpreting pedagogy. What trainers and student interpreters badly need is how to use efficient strategies to find out prompt and appropriate solutions for successful completion of interpreting tasks.

The third modification is based on my assumption that theoretical discussion on interpreting should be pedagogy-oriented. I have replaced the strategic sub-competence with another two constructs of my own: *cognitive sub-competence* and *psychological sub-competence*. As a matter of fact, these two constructs or sub-competences stem from the 'psycho-physiological component' in the PACTE Model (2003) which mixes cognitive factors and psychological factors in relation to translation (see PACTE 2003:58). To facilitate interpreters' decision-making and problem-solving efforts, my argument is that it is necessary to highlight the role of the cognitive processing competence, which governs the interactions of all the other sub-competences that have been identified above (see section 2.4.2.2).

It is also necessary to highlight the role of psychological sub-competence, which focuses on pressure release in interpreting. As Nolan (2005) writes,

> the reader will never notice how difficult a translation was, but will only read the final product. In interpreting corrections are mostly noticed by listeners; they may disturb them and reduce the credibility of the interpreter. (3)

Naturally, interpreters may have stage fright when speaking in public. Imagine an interpreting assignment for a televised interview with Saddam Hussein in 1990 which was broadcast by the British television channel 1TN "under the watchful eyes of an estimated 3.5 million viewers in Britain alone" (Baker 1997:112). As Riccardi, Marinuzzi and Zecchin (1998) point out, even for "the most experienced, efficient and skilled interpreter", at the very beginning of a conference, he may also feel nervous (97),

> because he is aware that there may be some unknown elements he will have to cope with: new concepts or technical words, a difficult accent or pronunciation, technical defects, somebody not talking into the microphone, an unscheduled paper read at impossible speed. (Riccardi, Marinuzzi & Zecchin 1998:97)

Interpreters may also suffer from criticisms from those who are "not linguistically handicapped and are therefore potentially subject to a high level of monitoring" (Baker 1997:114). Besides these psychological constraints, interpreters may feel dissatisfied with their job due to their working conditions, as frequent travelling and long working hours take their toll (Cooper & Cooper 1983). Therefore, in screening for potential interpreters, the psychological-related criterion for testing covers the examination of assertiveness, resilience and the ability to cope with stress (Moser-Mercer 1985:98).

2.4.2.2 Cognitive sub-competence

As a review of the relevant literature has shown, cognitive abilities have been thought to be related to expertise in interpreting. Cognitive abilities are defined as a set of specific information processing skills including creativity, logical reasoning, analysis and synthesis (PACTE 2003:93). Furthermore, cognitive abilities are considered to account for performance differences among professional and novice interpreters (Liu, Schallert & Carrol 2004; see also Padilla et al. 1995; Liu 2008).

While it is undisputed that cognitive abilities are important in information processing during interpreting, they have not been given an independent status in previous research on competence for quality interpreting. Implicitly explained in the psycho-physiological components of the PACTE Model (2003), cognitive components were thought to include memory, perception, attention, emotion and critical spirit (58). From a pedagogical perspective, I would like to argue that mixing requirements for cognitive performance with those for psychological performance (i.e. emotion) would confuse student interpreters and make it impossible to isolate their cognitive strengths and weaknesses in interpreting. As a consequence, they would not be able to monitor their interpreting performance.

In my model of interpreter competence, cognitive sub-competence is an independent element, which involves the skills for efficient memory operation and attention allocation. With its relations to other sub-competences, the cognitive sub-competence replaces the traditional component of the strategic sub-competence, since it impacts on interpreters' abilities in language processing and in the storage and recall of all sorts of knowledge. Moreover, I also assume that a strong cognitive sub-competence might, to a certain extent, help interpreters to build up their confidence in challenging the psychological constraints related to the psychological sub-competence. Therefore, from a pedagogical perspective, an awareness of the significant role of the cognitive sub-competence is essential in pursuit of an effective solution to reduce cognitive burdens in information processing (see my discussion of the notion of cognitive overload in section 3.2).

2.5 Summary

In this chapter, interpreting is considered as both process and product, which means that on one hand it involves information processing before and during the actual interpreting session, and on the other hand, the interpreted text as the direct product of interpreting.

Interpreters' notes, as the by-product of interpreting, could demonstrate how well the interpreters could follow the speaker and convey his/her message smoothly and accurately into the target language. Quality evaluation is thus undertaken following three dimensions: cognitive content, linguistic performance and presentation manner. According to Kurz's (2001a) suggestion for providing something more than what users of interpreting services expected, my study focuses on the cognitive content of interpreted texts, a highly rated area by both interpreters and interpreting users in the available surveys. Adopting a discourse-based cognitive approach, I intend to explore how an improved management of the interpreters' processing capacity could help produce better interpreted texts which might be more elaborate and accurate.

In the following chapters, I will first clarify the fundamental cognitive issues related to processing capacity management (Chapter Three) and then develop a working model to achieve more efficiency in information processing (Chapter Four).

Chapter Three Cognitive Overload and Cognitive Processing Capacity Management in Consecutive Interpreting

Interpreting competence consists of a set of sub-competences involving language skills, knowledge about the world, culture and subject matter, cognitive abilities and psychological maturity (see section 2.4.2.1). Ideally, interpreter training is one which takes care of each sub-competence so as to achieve a high quality interpreting performance. Realistically, in actual interpreting teaching, not every sub-competence can be treated equally, partly due to limited training hours, partly due to different understandings of the degree of importance of individual sub-competences among trainers, and partly due to the differences in student interpreters' learning status. In my study, assuming that cognitive sub-competence needs sufficient pedagogical attention, my argument is that admitting the importance of all the other sub-competences, cognitive sub-competence should be given top priority throughout interpreter training. The significance of doing research on cognitive sub-competence lies in that

> the question remains whether it is possible to develop this [processing] capacity (and if so to what extent) through proper training or otherwise. The issue may be a crucial one to investigate, but to my knowledge no such study is in progress, and methodological obstacles may be formidable. (Gile 1995:187)

In this chapter, I will emphasize the necessity of cognitive training in interpreting since cognitive problems have been reported as a major challenge both to practitioners and student interpreters (section 3.1). In order to tackle cognitive challenges that arise in the process of interpreting, I use cognitive overload as a point of departure. Cognitive overload takes place when interpreters fail to comprehend and reproduce information accurately and promptly. In discussing cognitive overload, I begin with distinguishing cognitive efforts from interpreting efforts (section 3.2). Then I explore the cognitive mechanisms, i.e. cognitive processing capacity management (CPCM) (section 3.3) in terms of its two components: memory (section 3.3.1) and attention (section 3.3.2). After that, I discuss how memory and attention affect interpreters' interpreting efforts and cognitive efforts in the formation of cognitive overload (section 3.4).

3.1 Cognitive Problems as a Major Challenge to Interpreting Quality

The quality of interpreted texts can be affected by a combination of factors, among which linguistic difficulties are considered as a major barrier to the completion of interpreting assignments. It is understandable that if the interpreters do not understand what is being said, they cannot do their interpreting job. As Jones points out,

> [o]bviously, you cannot understand ideas if you do not know the words the speaker is using to express or if you are not acquainted sufficiently with grammar and syntax of the speaker's language to follow the ideas. (1998:12)

For interpreters, the worry of lacking sufficient knowledge of terminological equivalence and subject matter pushes them to focus their preparation on setting up glossaries and searching for as much background information as possible on interpreting topics.

Admitting the importance of terminological vocabulary and knowledge of subject matter, I nonetheless argue against overemphasis of linguistic competence and extra-linguistic knowledge and a corresponding negligence of cognitive competence. In other words, for successful documentary presentation and actual interpreting, what matters is *not only* the quantity of the information interpreters can have access to, *but also* the quality of information processing, i.e. how to structure and activate such information.

Nowadays, thanks to the rapid development of information technology, it is not *that* difficult to get instant access to a great deal of information relevant to interpreting topics. When interpreters sit back to sort out the collected information, the challenge is how to *quickly* digest this large amount of information so as to (a) get a deeper understanding of the subject matter, and (b) accurately remember the most important background knowledge and terminological vocabulary for instant retrieval during their interpreting process.

In actual interpreting, "there are times when [interpreters] do not know a word or an expression" (Jones 1998:13). In such circumstances, cognitive competence plays a vital role in "deduc[ing] meaning from context" (ibid.). On the other hand, it should be noted that understanding the source text does not necessarily guarantee successful production of the interpreted text. The delivery of interpreted texts is demanding, because it is more than simply giving all the information into the target language:

> Many a poor consecutive is sub-standard even though 'everything is there', since everything is given the same weight and no particular elements or threads are highlighted, making it difficult for the

listener of the interpretation to know what the speaker is really trying to say. (Jones 1998:24)

In previous expert-novice comparisons, expert interpreters have appeared to demonstrate stronger cognitive abilities for in-depth information processing. They focused more on how to express the ideas of the source text more coherently (Mead 2002). They seemed to allocate more attention to "integration of information" (Ivanova 2000:41) and were more flexible balancing their attention to tackle competing interpreting efforts, such as "taking notes and subsequently reading from them" (Mead 2002:74), while the attention of the novice interpreters seemed to be easily distracted by 'their personal experience of frustration when they were not up to the task, which was in many cases responsible for subsequent break-downs in performance (Ivanova 2000:45).

The observation of student interpreters shows that student interpreters, especially beginners, have appeared to be weak in their cognitive competence. In his comparison of consecutive interpreting performances among professional consecutive interpreters, advanced interpreters and beginners, Mead (2002) finds that student interpreters seemed to waste too much of their precious mental energy on the linguistic problems, when their actual interpreting challenge had come from their lack of interpreting skills and cognitive abilities. He points out that the grammatical mistakes actually were "the reflection of the constraints caused by time, note taking and memory" (74-76). Similarly, in her follow-up investigation of a long-term SI training project, Moser-Mercer (2000) discovers that cognitive sub-skills cause "significant and consistent problems for the novice on the way to acquiring expertise" (89). These problems involved "concentration, or the ability to sustain attention for any length of time and to filter out noise, such as interference from the language (poor suppression)" (ibid.). Thus Mead (2002) suggests that the acquisition of interpreting expertise is a process towards more cognitive consideration.

In my opinion, to facilitate interpreters' documentary search and actual interpreting, in-depth cognitive information processing should be given central attention. The underlying assumption is that human beings' time and energy are so limited that efficient information-processing solutions are required to digest a vast amount of information and to activate the information that is most needed in the comprehension and production efforts. For that purpose, in the following section, I will review how memory and attention management have been treated in previous research on consecutive interpreting (section 3.2) and what the essence of this set of cognitive mechanism known as cognitive processing capacity

management (CPCM) actually is (see section 3.3).

3.2 Review of Gile's (1995) Effort Model for Consecutive Interpreting: Memory and Attention

The most renowned theory on cognitive overload is Gile's (1995) Effort Model for consecutive interpreting. Gile lists the tasks that are involved in the process of interpreting. He proposes that when the cognitive requirements of the multi-tasks exceed interpreters' memory and attention capacity, cognitive overload arises and thus the quality of interpreters' performances deteriorates.

In his Effort Model for consecutive interpreting, besides three core efforts or tasks shared by all simultaneous and consecutive interpreters, Gile includes: (1) "*a listening and analysis component*"; (2) "*a speech production component*" and (3) "*a short-term memory component*" (1995:162), Gile labels three additional efforts for consecutive interpreters: (4) the note-related *effort* (including *note-taking*, *note-reading*); (5) "*a coordination effort*" and (6) "*a remembering effort*" (1995:179).

Gile visualizes these effort models in the following equations:

Phase One: listening and note-taking

Interpretation = L+N+M+C

L Listening and Analysis

N Note-taking

M Short-term Memory operations

C Coordination

As indicated above, Gile suggests that successful comprehension of the source text depends on the coordination of a set of competing cognitive efforts. Interpreters are required to balance or move swiftly and efficiently among the following efforts: (a) listen to the source text actively: (b) analyze the inflow of information; and (c) take down notes which contain relevant or the most important information.

Phase two: speech production

Interpretation= Rem+Read+P

Rem Remembering

Read Note-reading

P Production

Here, Gile suggests that successful production of the target text needs interpreters to remember "the successive parts of the original speech" aided by note-reading (1995:179).

Gile's Effort Model has long been treated as a milestone in research on the cognitive aspect of interpreting. To further expand his theory on the efforts that are involved in consecutive interpreting, I would like to discuss some questions that have not been answered in his model regarding memory operation and attention allocation. In his model, Gile gives a brief outline of how interpreters' memory and attention interact for the completion of listening, note-taking and speaking. He does not discuss in depth the exact operations of interpreters' memory and attention systems.

My first argument is that it is necessary to make a clear distinction between cognitive effort and interpreting effort, since these two types belong to different conceptual categories. I assume that interpreter training is far more than giving instructions like 'focus on meaning' and 'note-down important information', because effective training guides student interpreters to find solutions on how to focus on meaning and how to judge the importance of information. In interpreter training, student interpreters often show great interest in how to listen attentively, how to take down notes, and whether they need to continue note-taking when comprehension problems arise, or how to interpret well. In my point of view, trainers should, first and foremost, make students understand it is not interpreting effort but cognitive effort that determines the quality of their interpreting performances. Interpreting effort is related to the completion of multiple tasks involved in interpreting, including listening, note-taking at the comprehension stage, and note-reading and producing at their reproduction stage (as shown in the second column in Table 3.1). Cognitive effort is closely related to interpreters' cognitive processing capacity management (CPCM), i.e. manipulating one's cognitive resources or memory and attention to complete the said interpreting. As shown in the third column of Table 3.1, cognitive effort needs to use memory and attention systems for information analysis and coordination of interpreting efforts that compete against each other for limited processing capacity.

Table 3.1 Interpreting efforts and cognitive efforts in consecutive interpreting

	Interpreting Efforts	Cognitive Efforts
Phase One	listening	analysis
	note-taking	short-term memory operations
		coordination
Phase Two	note-reading	remembering
	producing	

While it is impossible to make a clear-cut distinction between interpreting efforts and cognitive efforts, my distinction could help student interpreters to monitor their cognitive efforts in their interpreting performance.

My second argument is that both working memory (WM) and long-term memory (LTM) play a vital role in information processing. In his model, Gile gives a vague description of how WM operates during consecutive interpreting:

> In consecutive, it [the memory effort] is associated with the time between the moment information is heard and the moment it is written down, or between the moment it is heard and the moment the interpreter decides not to write it down, or again between the moment it is heard and the moment it disappears from memory. (1995:179)

He undermines the function of LTM, simplifying it as 'remembering' that aids interpreters' delivery of interpretation.

My third argument is that attention allocation does not matter only at the comprehension stage of interpreting. Gile states that interpreters' attention is important in coordinating listening efforts and note-taking efforts. He does not feel attention allocation is that important at the reproduction stage of interpreting, because he assumes that interpreters are familiar with what the speaker said and have control in their delivery of the interpreted text. Gil's assumption stands only when interpreters have a good mastery of note-taking skills and note-reading skills so that they have no need to recall the missing information and to rearrange information for coherent delivery.

3.3 Cognitive Processing Capacity Management (CPCM)

There have been many often confusing definitions of cognitive capacity. Some see it as a property, i.e. memory or attention, both of which are in limited supply. Some see it as a mechanism with numerous intrinsic and extrinsic constraints affecting its operation. Irrespective of it being a kind of property or an operational mechanism, there is consensus that when the requirements for information processing exceed what an interpreter can do with his/her memory and attention, the interpreter's cognitive processing capacity has reached "saturation" (Gile 1995:171). Consequently, his/her interpreting performance will deteriorate. In cognitive science, as a central topic, cognitive processing capacity management (CPCM) considers the operation of a person's memory and attention system (Baddeley 1997:85). The notion of CPCM has been discussed sparsely in a few pieces of interpreting research. Given that CPCM is a central topic in my study on how to improve student interpreters' interpreting performance through enhancing their memory system, in the following section I will firstly examine the nature of CPCM in terms of memory and attention systems (section 3.2.1). Secondly, I will focus my discussion on the role of the memory system in consecutive interpreting (section 3.2.2).

3.3.1 Memory Operations

3.3.1.1 Working Memory and Long Term Memory

It is self-evident that for interpreters, a good memory is as important as good mastery of language skills. With regard to the nature of memory, assuming that "memory is multifaceted", Daro suggests that plural forms should be used to describe the notion of memory, since "there is no such a thing like [sic] "a" memory" (1997:627).

In cognitive psychology, memory refers to a system that involves encoding, storing and retrieving the stored information from the memory system (Eysenck 2001:157). To complete these cognitive efforts for information processing, two types of memory are involved: short-term memory (STM) and long-term memory (LTM). Short-term memory (STM) is assumed to have a *central executive* governing two interacting and competing task-based operating systems: *a phonological loop* to retain speech-based information and *a visuo-spatial sketch pad* to process spatial and/or visual images (Baddeley 2003:830). STM processes the on-line information and transports it to LTM to store for later use. LTM

makes use of "a complex skill to meet the particular demands of future accessibility" (Ericsson & Delaney 1999:257).

In the context of interpreting, memory does not simply mean remembering the information that interpreters are exposed to, such as "dates in history, names, telephone numbers, vocabulary" (Jones 1998:33). Jones argues that memory is a cognitive mechanism with which interpreters "must order ideas in their brain so as to be able to recall them and reproduce them in a significant way" (ibid.). Related literature on interpreting has shown a terminological confusion regarding the notion of STM and LTM (cf. Timarová 2008).

Different labels for STM/WM

- 'operational memory' (Gerver 1976, cited in Timarová 2008:12)
- 'generated abstract memory' (GAM) (Moser 1978, cited in Timarová 2008:14)
- 'verbal memory' (Daro & Fabbro 1994:365)
- 'short-term memory' (Lambert 1988a)
- a mixed use of 'short-term memory' and 'working memory' (Gile 1995)
- 'working memory' (Christoffels, De Groot & Waldorp 2003:202)

Different labels for LTM

- 'long-term memory' (Lambert 1988b:377)
- 'remembering' (Gile 1995:176)

In this study, I will use the term 'working memory' (WM) to replace the term 'STM'. WM was coined by Baddeley and Hitch in 1974 (Baddeley 2000a:129) in modern cognitive-psychology. It was used to modify STM since STM is mainly concerned with "the storage capacity" for passive recall, while WM is more task-specific, i.e. doing online language comprehension and language processing for active recall. Ericsson and Delaney (1999) define WM as a type of memory that maintains "efficient selective access to information that is needed to complete a given task" (257).

As discussed above, interpreting by itself is a task-based cognitive behavior, which needs in-depth processing of information (section 2.2.1). WM is thus considered an appropriate term for my study in which interpreters are encouraged to be proactive in information processing. Thus interpreting is viewed as processing information through the interactions between WM and LTM. It is assumed that WM is responsible for digesting new information based on previous knowledge along with the following steps: (a) "retain new information"; (b) "transform and use that information"; (c) "retrieve knowledge from long-term memory to integrate with the new information" (Thompson and Madigan 2005:12).

Compared with the more explicit operation of WM, LTM operates implicitly, i.e. as backup support. First, it provides background knowledge in helping the WM to integrate new information. Second, it stores the newly processed information by WM for later use. It should be noted that the interactions between WM and LTM are not done in a linear way, but rather as a complex cognitive activity, whereas information processing is done "between top-down and bottom-up processes" (Craik & Lockhart 1990, cited in Eysenck & Keane 2000:168).

3.3.1.2 Their Deficiencies

In cognitive science, it is assumed that human memory capacity is not perfect. This imperfection may be manifested in three aspects. First, we cannot remember as much as we want. The reason for this is that human memory has a limited working capacity "on the amount of information that can be stored" (Timarová 2008:n.pag.). Second, we cannot remember for as long as we would like to. We can only remember the latest information and the old information tends to be forgotten very quickly. This phenomenon is called the "recency effect" (Cowan 1999:81). The literature on the recency effect has shown that in free recall experiments in which the subjects were required to recall the items in any order, "the last few items in a list are usually much better remembered in immediate recall than are the items from the middle of the list" (Eysenck & Keane 2000:154). Third, there could be conflicts between memory efforts and in-depth processing of information. A number of experiments by cognitive psychologists has shown that "the more digits the subjects were required to remember, the less working memory capacity should be left for any other task such as reasoning or comprehension" (Baddeley 1996:7). Last but not least, failure in activating the information that has been processed by the WM and stored in the LTM could be attributed to distance of time, aging, and "interference from other information that has been learned" (Eysenck 2001:164).

3.3.2 Attention Allocation

In cognitive science, the notion of attention, defined as "a concentration of mental activity" (Matlin 1994:43) has long been a central topic in research on human behavior (Posner & Petersen 1990).

Attention involves two interrelated cognitive tasks: divided attention and selective

attention. In divided attention tasks, "people must attend to several simultaneously active messages" and "pay equal attention to several tasks" (Matlin 1994:44-45). In selective attention tasks, "people are confronted with two or more simultaneous tasks and are required to focus their attention on one while disregarding the others" (ibid.). Consecutive interpreting is a typical task-oriented cognitive process which requires both divided attention for the completion of listening to the speech and delivering the interpreted text, but which is also challenged by the requirements of selective attention, as inadequate note-taking and note-reading could distract interpreters' attention from their comprehension and reproduction. As Gile explains,

> the interpreter may be devoting too much processing capacity to the Production Effort, trying to be particularly eloquent, and therefore ends up with insufficient processing capacity for the Listening and Analysis Effort. Alternatively, the interpreter may be devoting too much processing capacity to the Memory Effort. He or she therefore has little capacity left for the incoming segment, and may miss it. (1995:175)

The above discussion clearly shows the internal distractors in the management of selective attention. That is, one message is processed at the cost of another message, which is thus left behind. Another type of internal distracter is what Tijus calls "false alarms", which refers to the situation that wrong interpretations would distract interpreters' attention, since interpreters have to correct the mistakes by adding supplementary sentences, "e.g. hum, sorry, by saying 'bank', the speaker was talking about a river, not a financial organization" (2002:46). In the context of interpreting, external distractors could be the presence of a large audience, interruptions by a speaker or the audience, noise in the working environment, or fatigue.

Attention is considered as being "part of the human memory system" (Liu 2008:171). There is no clear-cut distinction between attention allocation and memory operation. Both of them are interwoven in the formulation of human behavior. Memory storage takes place automatically. It should, however, be noted that explicit, direct recall of the stored material is possible only with the presence of attention both at the time of encoding and at the time of recall (Cowan 1995:44).

In the context of consecutive interpreting, as briefly mentioned in section 3.2, Gile (1995) suggests that attention allocation is important only at the comprehension stage, but not at the reproduction stage. He argues that the comprehension stage involves listening and

note-taking, the two interpreting efforts competing for limited attentional resource. The speaker has control of the content and speed of delivering the source text (181). These two factors require coordination efforts for quality comprehension. With regard to the relationship between attention allocation and delivery of interpretation, Gile states that interpreters have "much more capacity and time for speech production" since they are generating the interpreted text based on the information that has already been processed (180).

My argument is that like note-taking, note-reading could diminish an interpreters' memory efficiency if the noted information is poor in quality and incoherently organized. If that is the case, interpreters have to use extra energy and time to recall what information is missing or vague or inaccurate, and to provide impromptu reorganization during their delivery of the interpretation. All these problems could adversely affect both the accuracy and fluency of their interpretations.

3.4 Cognitive Overload in Consecutive Interpreting

To my knowledge, cognitive overload has not been systematically explored in the literature on the cognitive aspect of interpreting. In some research, it has been treated as a cause for the interpreters' psychological stress (Kurz 2003:52) or the effect of failure in cognitive processing capacity management (Gile 1995:172). There has been no interpreting research on the structure of cognitive overload. In-depth examination of its causes and solutions has not been found in research on consecutive interpreting. The core of Gile's theory is that when the interpreter's attention capacity has reached saturation, i.e. is failing to meet the ongoing requirements to complete the multi-tasks of interpreting, the interpreting performance will deteriorate.

3.4.1 Definition of Cognitive Overload

In cognitive psychology, cognitive overload or information overload is related to an inability in processing information promptly and appropriately. When the information to be processed is at "relatively easy levels and usually has not explicitly challenged or exceeded the capacity limits" of human beings, information processing can be undertaken smoothly (Jaeggi et al. 2007:76). However, when the volume of information begins to exceed the limits of human processing capacity, people begin to suffer from "information anxiety", an

"overwhelming feeling one gets from having too much information or being unable to find or interpret data" (Kirsh 2000:22).

In understanding the specific conditions for the occurrence of cognitive overload in task-oriented human behavior, previous research on computer science has revealed a set of factors that might bring about cognitive overload. These are: the main task that one currently performing; any other tasks(s) one may be performing concurrently, and distracting aspects of the situation in which one finds him/herself (Berthold & Jameson 1999:2).

The said factors could well explain why cognitive overload could be much more likely to take place in interpreting, because during consecutive interpreting, interpreters are expected to complete multiple tasks at the comprehension and reproduction stages. All these tasks compete against each other.

In my study of consecutive interpreting, cognitive overload is defined as failure in (1) processing the in-flow and out-flow of information in the interpreting process; and (2) effectively allocating the interpreter's attention to balance his/her competing efforts for the completion of multiple tasks involved in the comprehension and reproduction stages of interpreting.

3.4.2 Causes of Cognitive Overload

Cognitive overload is assumed to result from the intrinsic deficiencies of interpreters' CPCM. As mentioned in section 3.2.1.2, human's memorizing power could be restrained by information content, length of time, or the distraction of other concurrent tasks. The defining characteristics of consecutive interpreting make the situation worse. In the following section, I will illustrate how the requirements of each individual task at the comprehension and reproduction stages add cognitive burdens and or distractions to interpreters during consecutive interpreting.

3.4.2.1 Active Listening

From an interpreters' point of view, interpreting starts with listening. As mentioned earlier, Gile (1995) emphasizes the importance of listening with analysis. This may well imply that for quality interpreting, interpreters should listen *actively* rather than *passively*. Here, active listening refers to real understanding of what is being said. It is more than just

memorizing information without digesting it. The supporting evidence is that, although translation machines have a great advantage by storing large amounts of information, they cannot replace human translators, because real understanding is essential in translation to enable decision-making and anticipation possible as "no amount of memory can completely replace understanding" (Melby 2002:47). In order to listen actively, efficient memory operation is needed for in-depth comprehension. Jones suggests that

> [t]he interpreter must not pay attention to individual words as words, but must listen to the overall sense of a speech, identifying the ideas that are expressed through the words (which are mere vehicles for meaning, and intrinsically of no interest for an interpreter). (1998:18-19)

Focusing memory on the overall sense of a speech is important especially when interpreters are working in a negative situation in which an imperfect speaker causes the interpreter many cognitive burdens by (a) having confusing thoughts; (b) illogical structure of the presentation; (c) not being faithful to their own outline, e.g. announcing that there are three reasons and then presenting four; (d) failure in using linguistic devices to provide an explicit structure of the speech (Jones 1998:17).

Cognitive overload in memory operation may also come from linguistic differences. Riccardi (1996) finds that in interpreting from German into Italian, student interpreters suffer from cognitive overload because of the verb-final structure in the German source text. Consequently, the student interpreters "could not anticipate the right verb…[in the German source text]…even though they had been informed about the event" (217). In addition to that, Riccardi (1996) also finds that "different word order of the phrases" (218) and words with "different semantic-pragmatic value" (219) can also increase cognitive overload which "blocks a correct interpreting performance or leads to omission of parts of the source-text" (221).

Another major source of increasing the interpreter's already overloaded STM capacity is note-taking. It is understandable that "concurrent listening and writing of notes might well interfere" (Daro 1997:627). When the divided attention for listening and note-taking is not distributed in a balanced way, cognitive overload will be increased and thus weaken the interpreter's overall cognitive processing capacity.

3.4.2.2 Note-taking

Note-taking is a defining characteristic of consecutive interpreting, in particular classic consecutive (section 2.1.2). It is totally free from the "rule of linguistic acceptability-

lexical, syntactic, stylistic, or otherwise" (Gile 1995:181). According to Gile (1995), WM plays a vital role in deciding what ought or ought not to be jotted down (179). If used properly, note-taking is thought to be able to facilitate the interpreter's LTM operation in activating the previously processed information at the reproduction stage (ibid.)

Gile argues against the seemingly advantageous nature of note-taking, pointing out that taking notes *per se* "tends to overload working memory" (Gile 2001:12). He explains that first of all, writing itself is energy-consuming. The "slowness of writing (as compared with speaking)" can take away a certain amount of attention (ibid.). Secondly, note-taking is more than noting down the numbers, place names, dates or randomly choose information to be jotted down. Rather, it is highly demanding in that interpreters should know both how to identify the information that is worth being written down and how to format the written information properly so as to facilitate note-reading at the reproduction stage.

Third, the interpreters' skills for note-taking can directly affect the quality of the target text. A number of studies on interpreters' notes show that the quality of notes can affect the quality of reproduction of the target text:

> [A] (too) large quantity of notes may result in a poor-quality performance overall for the simple reason that too much of the interpreter's energy is vested in the note-taking component. (Dam, Engberg & Schjoldager 2005:250)

On the other hand, if the interpreter attempts to reduce the quantity of notes, it does not necessarily lead to the reduction of cognitive overload. On the contrary, there could be a higher risk of loss of information in the delivery of interpretation when interpreters

> decide not to note some speech elements which they view as unimportant but which take a long time to note (writing without abbreviating is often 5 to 10 times longer than articulating the same words), such as relatively unimportant modifiers and digressions (comments made and information given outside the speaker's main line of reasoning). (Gile 1995:12)

Achieving quality note-taking may affect actively listening to the speaker. It is not uncommon that interpreters focus on listening and thus have no time for taking notes, or interpreters are too busy noting down what has been said and thus miss what is being said by the speaker. Gile (1995) uses a small experiment to evaluate the role of note-taking in consecutive interpreting (182). In his experiment, one group of student interpreters is allowed to take notes while the other group is not. The comparative result is that the "student who did not take notes heard the names better than the ones who did" (189). He

concludes that "note-taking took away some of the processing capacity initially for listening" (ibid.).

3.4.2.3 Speaking while Note-reading

In Gile's opinion, in consecutive interpreting, the reproduction stage involves fewest memory operations. He explains that the interpreters have already been familiar with the content of the source text and that the interpreters' remembering effort can be facilitated by notes that have been written down at the comprehension stage. Therefore, "much more capacity and time are available for speech production" (1995:180).

My argument is that memory operation continues to play an important role at this reproduction stage and that inefficient use of LTM could lead to cognitive overload. The reasons are as follows: firstly, at the reproduction stage, familiarity with the content of the source texts does not guarantee successful delivery of interpreted text, because the interpreters should master strong information processing abilities in retrieving and (re)structuring the comprehended information quickly and accurately. Secondly, inappropriate note-taking could not facilitate, but increase cognitive burdens to interpreters' memory operations. During note-reading, poor notes force interpreters to use more energy for recall and/or for restructuring the processed information into logical sequences.

Gile supports that speech production by interpreters could be more difficult than that by the speaker:

> [I]nstead of being free to speak their own mind, and therefore to bypass possible production difficulties by rearranging the sequence of information and ideas or by dropping or modifying some of these, interpreters have to follow the path chosen by the source-language speaker. (1995:166)

If interpreters have not mastered mature cognitive skills in note-taking and in splitting their attention for note-reading and speaking, cognitive overload can also arise when notes with poor quality make the interpreters spend more attention on recalling the missing information.

3.5 Summary

Among many other sub-competences of interpreter competence, cognitive sub-competence has become a major challenge that may impede student interpreters from acquiring

interpreting skills. It is mainly due to student interpreters' lack of cognitive abilities to use their limited memory and attention for attentive listening, efficient note-taking and coherent speaking. In cognitive science, it is assumed that memory and attention interact with each other to complete human behaviors, but that this cognitive processing capacity is limited. There is a limited time span for WM. Moreover, the more information to remember, the less in-depth information processing is possible. With regard to LTM where the information that has been processed by WM is stored, without appropriate cues, it would be difficult, even impossible, to activate the previously stored information. Another cognitive challenge comes from the limited attentional resource. The split of attention for multiple tasks could affect the quality of cognitive efforts. In the context of consecutive interpreting, interpreters are required to listen attentively, note down important information and speak coherently in the target language. All these interpreting efforts compete with each other for the limited processing capacity. If this cognitive problem is not solved, student interpreters would be troubled with cognitive overload when there is too much information to be processed. In order to ease "the enormous tension to keep up with the rapid flow of spoken language" (Nida 2001:9), Kornakov (2002) suggests that the interpreters "mentally translate, compress and edit the message from SL into TL" (182). But the question is how can an interpreter compress and edit the said message.

Developing interpreters' cognitive processing capacity has been considered a crucial issue to investigate, but it has hardly been dealt with in classroom settings (Gile 1995). Therefore in this study I have established a cognitive model which is intended to strengthen student interpreters' information processing abilities by optimizing their cognitive processing capacity management, in particular their memory operation (see Chapter Four).

Chapter Four The Conceptual Mapping Model for Consecutive Interpreting

4.1 The Aims of the Model

In his Effort Model for consecutive interpreting, Gile (1995) suggests "a strong correlation between task difficulty and task implementation" in the competition for interpreters' limited attentional resources (154). It does not "postulate a particular mental structure and information-processing flow" (ibid.).

Given that training hours are always limited, the primary aim of constructing a cognitive model for consecutive interpreting is to provide a cognitive tool that can be used in classroom settings. This model does not stay at the level of describing the negative effects when interpreters' cognitive capacity reaches saturation. Rather, being pedagogy-oriented, this model attempts to set up the best route for in-depth information processing. A *best* cognitive thinking route is the one that enables interpreters to focus their limited cognitive processing capacity on the most important or relevant interpreting efforts and cognitive efforts (see more details in section 4.4 on the operation of the model).

Gile criticizes that "to date, few authors have attempted to design theoretical components as training packages for direct use in the classroom" (1995:13). In the context of cognitive training in interpreting, the literature review has shown that a variety of interpreting strategies have been sporadically proposed to reduce the cognitive load of information processing. Bacigalupe (2010) proposes "minimax strategies" in that interpreters are recommended to (a) segment a long sentence into short sentences; and (b) use "the direct and automatic exchange of short linguistic units in their reproduction of the source text" (41). Gile (1995) suggests that when faced with cognitive overload, simultaneous interpreters may choose to omit some "insignificant" information in their target language speech so as to retain the information which is comparatively more important (200). These strategies sound practical on the grounds that it is better to deliver something of importance to the audience, than interpret nothing.

My doubt is whether segmenting at sentence level could fundamentally reduce cognitive overload throughout the whole interpreting process. While interpreters may feel at ease changing individual long sentences into shorter ones, interpreting by itself is not sentence-

by-sentence translation. The core of interpreting is to understand and produce the ideas that are entailed implicitly or explicitly in the source text. If interpreters have formed the habit of focusing on sentence units rather than on meaning units, they would find themselves struggling with remembering sentences, which could add more cognitive load to their already limited memory span. Omission can be used as an emergency tactic, but should not be taken as a regularly used interpreting strategy; otherwise, the quality criterion of fidelity would be affected. Based on user expectations and researcher expectations on interpreting quality (see section 2.3.2.5), qualified interpreters should be able to produce interpreted texts that are elaborate and coherent, taking care of both quality criteria of fidelity and sense consistency. I seek to reduce cognitive overload by means of optimizing interpreters' cognitive processing capacity management (CPCM) and develop a cognitive model which could help interpreter trainers to do cognitive training systematically.

In the following section, I will firstly illustrate the theoretical foundations for the model (section 4.2). By comparing Scene-frame theory (Fillmore 1977) and Relevance Theory (RT) (Sperber & Wilson 1986), I will explain why RT is thought to fit the cognitive study of the optimization of interpreters' memory management. Secondly, within the relevance theoretical framework, I will discuss the fundamental concepts that are involved in the development of the model (section 4.3). In doing so, I will explain the broad sense of the interpreting process which is applied in my study (section 4.3.1), followed by a comparative analysis of the term of segmentation, which is the first and foremost task for information processing in both translation and interpreting (section 4.3.2). Next will be the comparison of two important graphic tools for the organization of thoughts: mind mapping and concept mapping. This helps to clarify the search for a practical teaching tool to enhance student interpreters' critical thinking in information comprehension and reproduction (section 4.3.3).

As an illustration of the conceptual mapping model (section 4.4), I will discuss the nature of consecutive interpreting as conceptual mapping (section 4.4.1). I will also make explicit how its two operational constructs of concept units and information units (section 4.4.2) and three working strategies (section 4.4.3) help to facilitate student interpreters' conceptual mapping during their preparatory work for interpreting assignments and during their actual interpreting.

4.2 The Theoretical Framework for the Model

Starting from the assumption that human translation and interpreting are complex cognitive tasks for information processing, Scene-frame theory (Fillmore 1977) and Relevance Theory (Sperber & Wilson 1986) have been applied to the study of translation and simultaneous interpreting (see sections 4.2.1 and 4.2.2), respectively. The Scene-frame theory focuses on the translation process (section 4.2.1). RT focuses on the relationships between cost and efficiency in human communication (section 4.2.2). In the following paragraphs, I will compare these two theories to explain the rationale for my choice of RT as a theoretical basis for my construction of the conceptual mapping model.

4.2.1 Scene-frame Theory (Fillmore 1977)

In his study of the cognitive process of reading comprehension, Fillmore (1977) assumes that "[t]extual coherence cannot be determined on the basis of single sentences" (65). He sees reading comprehension as a cognitive process resulting from interactions of scenes and frames (61). A frame refers to the textual meaning that is constructed by a system of linguistic choice or grammatical structures. It helps the reader to set up a scene, "a segment of beliefs or experiences or imaginings in the mind (Fillmore 1977:63). Thus reading comprehension goes beyond understanding the literal meaning of linguistic forms to involve cognitive reactions towards linguistic stimuli.

Snell-Hornby (2005:194) applies Scene-frame theory to her study of the translation process. She depicts translation as a frame-scene-frame process in which the translator (a) receives linguistic frames from the source text; (b) sets up the translator's scenes and (c) reproduces linguistic frames into the target text. She highlights the significance of the construction of the translator's scene, a process of cognitive framing. In her opinion, this cognitive framing is based not only on the linguistic stimuli from the source text, but also on the translator's personal experience. Therefore, the translator's comprehension may not always follow the intention of the writer. Linguistic and cultural differences can be another kind of interference at the comprehension stage of translation:

> [D]epending on his/her proficiency in and knowledge of the source language and culture, the translator might well activate scenes that diverge from the author's intentions or deviate from those naturally activated by native speakers of the source language. (Snell-Hornby 2005:195)

Based on the scene that the translator establishes through cognitive framing, the translator

begins to translate by setting up frames which suit the target language and culture.

In the application of Scene-frame theory into interpreting, Gile (1995) carried out the experiment in that students were asked to write down the meaning of a road sign (50-58). Different sentences were generated. Gile argues that the variety in the target text cannot simply be attributed to linguistic and cultural interferences. Even without linguistic and cultural interferences, cognitive framing alone can generate a variety of linguistic frames in the target language, partly due to the understanding of how to facilitate the readers' comprehension, and partly due to the personal style of using language. Gile uses the following equation to explain the nature of sentence generation (1995:57):

Sentence information = Message + (FI+LII+PI)

FI: framing information

LII: linguistically induced information

PI: personal information

The above equation clearly indicates that when reproducing an informative sentence, the target text contains more information than the actual message. The information that is added by students includes *the framing information* (FI), which serves the function as a guide and facilitator to help the Receiver (listener or reader) understand correctly and more easily the part of the utterance conveying the Message proper; *the linguistically induced information* (LII), which is "made by the rules of the language used" (1995:56), as well as *the personal information* (PI) which is "associated with personal habits or with the personal "style" or other idiosyncrasies of the Sender" (1995:57).

The merit of applying Scene-frame theory to the study of interpreting is that it may help trainers to understand the causes for the variations of interpreted texts by student interpreters, and thus work out solutions addressing student interpreters' weak areas in their language proficiency, personal style of using language and audience-oriented strategies. However, Scene-frame theory does not answer how to save interpreters' time and energy so as to reduce cognitive overload.

4.2.2 Relevance Theory (Sperber & Wilson 1986)

4.2.2.1 Human Communication as Ostensive-inferential

Using a cognitive approach, Sperber and Wilson (1986) depict human communication

process as ostensive-inferential. Given that human communication involves interactions between the communicator and the audience, an ostension is defined as a stimulus provided by the communicator who intends to trigger the expected inferences from the audience. Then the audience makes inferential efforts by setting up a set of assumptions of their own. During the communicative process, although the communicator wishes the audience to follow his/her guidance towards the communicative goals he/she expects, it should be noted that the audience are not passive receivers. That means that they judge the communicator's ostension on its relevance to their own expected communicative goals.

In relevance-theoretical terms, information offered by the ostensive stimuli has two layers of content: informative and cognitive. Informative content deals with explicatures which are "explicitly communicated assumptions" (Sperber & Wilson 1986:182). The function of informative content is to inform the audience what the communicator said. Cognitive content deals with implicatures which refer to "implicitly communicative intention" (ibid.). It is assumed that more effort is needed for the audience to understand why the communicator implied something. This is mainly because both communicator and the audience differ in their knowledge, assumptions and expectations. I summarize such information processing in human communication in Figure 4.1 below:

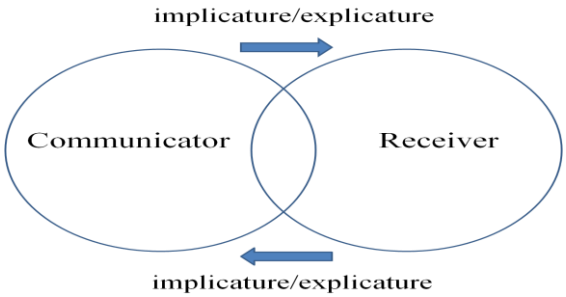


Figure 4.1 Information processing in human communication

Sperber and Wilson (1986) also propose that ostensive-inferential communication has to take into account of "the interests of both communicator and the audience" (158). The more similarities in background and shared communicative expectations both parties have, the more likely it is that the audience could make inferences "of the optimal relevance" and thus get closer to the communicator's intentions (ibid.). To illustrate the relationship between the familiarity of the participants and the accuracy of comprehension, I will make an analysis of a short conversation between my daughter and me.

One day, I was having dinner with my ten year-old daughter. She looked at a new kind of

fish, one that I had never bought before. Then a mother-daughter conversation went as follows:

Daughter: *Mum, is this fish edible?*

Mum: *YOU eat it*.

Daughter: *No, I won't.*

Without basic knowledge of my daughter's eating habits and my usual requirement for her to eat what I provided, the conversation above may sound illogical and not easy to understand, especially when hearing the daughter's refusal to eat the fish. In a relevance-theoretical framework, the mother-daughter conversation could be understood as follows: when the daughter asked "[I]s this fish edible?", she was sending off her ostension. The explicature or the superficial information in this ostension is: she wants to know whether this fish can be eaten or not?

Knowing so well about the daughter's criteria for fish that is 'edible' and her eating habit of not eating any fish which has many bones, the mother immediately understands the daughter's intention (or implicature of her question): *does this fish have some bones?* Based on her inferences, the mother makes her own ostension: YOU eat it.

Hearing this ostension from her mother, the daughter makes her own inferences based on her familiarity of her mother's tone and eating rules. Usually, the mother wants her to eat fish no matter whether it has some bones or not. If the fish does not have bones, the mother's answer to the question would be "[y]es, it's very yummy. Do have it". If the fish has bones, when hearing that kind of question from the daughter, the mother sometimes will be annoyed and answer with impatience. This time, without answering the question directly, the mother emphasizes the articulation of the word "YOU". All these contextual clues have helped the daughter to make the correct inference that this fish does indeed have some bones. Consequently, she quickly answers "[n]o, I won't".

This case has clearly shown two implications: in-depth inferences do not stop at the comprehension of the first layer of informative sentences (i.e. explicatures) so the second layer of informative sentences should not be neglected, and better inferences could be made by being more familiar with the assumptions and expectations of the counterpart in a communicative situation.

4.2.2.2 The Two Principles of Relevance

As mentioned earlier, the core of RT is to use minimum effort or cost e.g. time and energy for maximum communicative effect. In doing so, Sperber and Wilson (1986) propose two principles of relevance to guide ostensive-inferential interactions.

In relevance-theoretical terms, the notion of relevance thus refers to the closeness between assumptions constructed by both communicator and audience and the communicative goals. Every assumption is thought to be relevant, though to a different degree for different participants. Sperber and Wilson (1986) propose that "ostensive stimuli arouse definite expectations of relevance, of relevance available once the communicator's informative intention is recognised" (155-45). Furthermore, the relevance of information can be graded along a continuum from not relevant at all to most relevant.

Wilson and Sperber (2005) point out that the nature of human communication is to search for relevant information to narrow down the infinite number of inferences. As they explain,

> [a]ccording to Relevance Theory, utterances raise expectations of relevance not because speakers are expected to obey a co-operative principle and maxims or some other specifically communicative convention, but because the search for relevance is a basic feature of human cognition. (251)

To overcome the potential communicative difficulties that may result from the differences between communicator and audience in background knowledge, assumptions and communicative goals, Wilson and Sperber (2005:256) propose two principles of relevance as follows:

- *In the principle of optimal relevance, it is relevant enough to be worth the audience's processing effort.*

This first principle of relevance aims at improving information processing from the perspective of the communicator. The communicator is expected to adopt all means to facilitate the audience' inferential efforts so that maximum communicative effects of communication could be achieved. It is not appropriate to set up unnecessary input which might divert the audience to a wrong assumption or take their time and energy to process information which is not that relevant to the communicative goals.

The second principle of relevance is:

- *It is the most relevant one compatible with the communicator's abilities and*

preferences.

The second principle of relevance aims at improving information processing from the audience's perspective. To save their time and energy, audiences are expected to make "worthwhile conclusions" that are most relevant to the communicator's expectations (Wilson & Sperber 2005:252).

In summary, Scene-frame theory reveals the complexity in the comprehension process while RT emphasizes the trend of human communication to use minimum effort for maximum communicative effect. According to the principles of relevance, both communicator and audience are expected to produce information that is most worth being processed.

For my construction of a cognitive model to optimize interpreters' memory management, I chose RT as a theoretical basis for the following reasons. Firstly, right before the start of listening to the speaker, interpreters are at a disadvantageous stage. While the audience could be better prepared for comprehending the speaker's speech "on the basis of their knowledge, interests and assumptions" about the speaker, interpreters suffer from informational asymmetry, i.e. "they are usually deficient in their knowledge of the relevant subject matter" (Kalina 2000:7). Secondly, during actual interpreting, interpreters are always under time pressure to produce quality interpreted texts promptly. Moreover, the interpreting job may become more difficult since interpreters have no control of the input of information in terms of speed, quality and presentation manner (see Chapter Two). What interpreters need to solve most is how to optimize their limited processing capacity to fulfill demanding interpreting requirements. Therefore, RT is most appropriate for my research purpose, because it shows directions for efficient information processing by means of "the smallest possible expenditure of whatever resource (time, money, energy…) it takes" (Sperber & Wilson 1986:46).

In the following paragraphs, I will illustrate the conceptual mapping model within the relevance-theoretical framework. To start with, I will discuss the fundamental concepts that are involved in this cognitive model, i.e. interpreting processes (section 4.3.1), segmentation (section 4.3.2) as well as mind mapping and conceptual mapping (section 4.3.3).

4.3 Fundamental Concepts

4.3.1 Interpreting Processes: Interpreters' Preparatory Work and Their On-going Interpreting

Interpreting is a special form of human communication in which interpreters play a dual role first as listener to the speaker and then as the second speaker to the target audience (Setton 1999:8). In my cognitive study of consecutive interpreting, interpreting is treated as information processing which goes beyond linguistic forms. It should be noted that a broad sense of interpreting process is used in my study. That is, it includes not only the on-going interpreting, but also the preparatory work by interpreters for their interpreting assignments.

During the on-going interpreting, information processing involves the exchanges of implicit intention and explicit expression between speaker and interpreter, as well as between interpreter and audience. That is, the speaker conveys his/her intention A by means of message B. The interpreter understands the literal meaning of message B and makes inferences C based on his/her "subjective sense of" message B (Chernov 1996:223). Then the interpreter delivers "an explicit message of D in the target language from which [the audience] makes an inference of E" (ibid.). During the interpreting process, the challenge, however, comes from the fact that interpreters have little shared knowledge with the speaker and audience, and that they have no control over the presentation style of the speaker. Without efficient processing capacity management, interpreters cannot tackle such challenges successfully by making appropriate inferences of the source text and reproducing a coherent target text, as well as balancing the interpreting efforts that compete against each other for sufficient mental resources.

During the preparation for interpreting assignments, interpreters need to use all resources available e.g. dictionaries and the Internet, to collect as much information as possible related to the interpreting topics.

4.3.2 Segmentation

For translators and interpreters, segmenting the source text into meaningful chunks is the first and foremost cognitive task in their comprehension of the writer/speaker. Gile (1995)

claims that translation is “a recursive process followed Translation Unit-by-Translation Unit" and that this segmentation method is also applicable to interpreting (107). In SI research, Liu, Schallert and Carroll (2004) depict SI interpreting as “the moment-by-moment operations” in which interpreters are expected to express in the target language the meaning of segment A, just heard from the speech in the source language, attending to the incoming segment B and temporarily holding segment B and/or its meaning in memory while continuing to translate segment A, and at the same time monitoring the target language output for accuracy and smoothness of delivery (19-20).

Given the importance of segmentation of meaning in both translation and interpreting, the question arises of how to segment. What is the analytic unit for segmentation?

In the related literature, the notion of the segment has been named differently, e.g. Translation unit (Gile 1995), information unit (Li 1996), or idea unit (Liu et al. 2004). The treatment of this notion has been ambiguous.

Gile defines ‘Translation Unit’ as a single unit that translators and interpreters adopt to segment a text:

> [T]he Translation Unit can vary in length from a single word (“Yes”) to a whole sentence (“Results were excellent indeed”) or more than one sentence, depending on the source-language text and the translator. (1995:102)

Assuming that “the target-language version of a single source-language Translation Unit is acceptable does not ensure acceptability of the whole text” (1995:102), Gile (1995) emphasizes the importance of treating the Translation Unit within contexts so as to avoid the potential “inconsistencies in terminological usage, or a stylistic drift between the beginning and the end of a text” (105).

In his discussion of applying discourse analysis for improving translation quality, Li (1996) defines a single segmentation unit as an “information unit”, “a basic proposition or an image element” that forms “a concept or an idea” (111-113). He gives a narrower scope for the segmentation unit which focuses on a clause, a phrase or a single word. One concept or idea can be expressed in single sentence groups.

Similarly, Liu et al. (2004) also see textual segmentation from a cognitive approach. In their study of WM in SI, they use the notion of an “idea unit” to segment items of information that are entailed in each sentence. Each sentence is reported to have various

numbers of idea units, ranging from two to ten units (2004:26). One sentence contains more than one idea.

The analytic units that have been discussed above mainly result from the study of translation or from empirical research of SI. None of them is suitable for my study of optimizing student interpreters' memory operations. The reason is that translators have the opportunity to apply most of those analytic units to their actual translation. Since translation is a recursive process, which implies that translators can take sufficient time to base their segmentation on much smaller units, e.g. words, phrases, and then adjust their segmentation when necessary. Interpreters, however, do not have this opportunity due to the rapidity of interpreting, and the limited supply of memory and attention. What has been said is gone and cannot be heard again. Memorizing without digesting meaning could only arouse cognitive overload. Thus, interpreters are not permitted to abstract meanings either from words or sentences or from sentence groups. The notion of the idea unit used in Liu et al. (2004) is not suitable for my study either, because its main purpose is to facilitate researchers' data analysis process.

In such circumstances, I would like to argue for a kind of analytic unit which goes beyond lexical, syntactical and discursive levels. In other words, this type of analytic unit should bear such features as aggregating as much as possible relevant information and "activating the corresponding word (or string of words) rapidly and automatically" (De Groot 2000:57). Section 4.4.2.1 discusses the advantage of using 'concept unit' for efficient segmentation in interpreting.

4.3.3 Mind Mapping and Concept Mapping

Both mind mapping and concept mapping are effective graphical tools for knowledge representation and organization. As shown in Figure 4.2, mind mapping organizes thoughts with a combination of symbols and words (Buzan 1989; Buzan & Buzan 1996). In order to visualize the thematic expansion of a topic, mind mapping does not use "linear thought patterns when processing information" (Mento, Martinelli & Jones 1999:394). Figure 4.2 shows that mind mapping starts at the center of a sheet with the main idea, using branches to demonstrate how ideas flow into related directions.

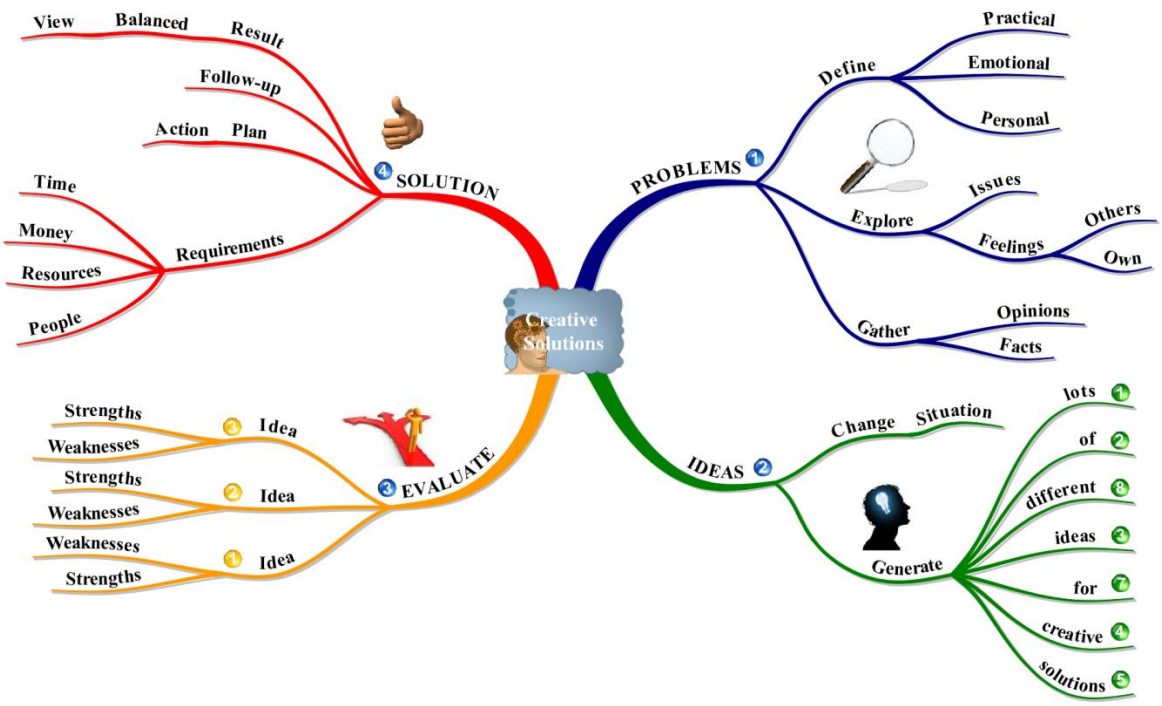


Figure 4.2 Mind mapping (Buzan 2011:n.pag.)

The notion of concept maps goes back to 1972 in Novak's cognitive-psychological research on developing a tool to represent the development of children's understanding of basic concepts of science (Novak & Cañas 2006:178). In their terms, a conceptual map is represented in a hierarchical structure which involves *concepts, propositions* and *cross-links*. *Concept* is "a perceived regularity in events or objects, or records of events or objects (Novak & Cañas 2008:1). A conceptual map may have several layers of concepts, with "the most inclusive, most general concepts at the top of the map and the more specific, less general concepts arranged hierarchically below" (Novak & Cañas 2006:179). One or more concepts are combined to form one meaningful statement or *proposition*, which is a "statement about some object or even in the universe, either naturally occurring or constructed" (Novak & Cañas 2008:1). *Cross-links* are "relationships or links between concepts in different segments or domains of the concept map" (Novak & Cañas 2008:2), indicating the status of each concept within the concept map. Novak strongly emphasizes using concept maps in education so as to achieve meaningful learning.

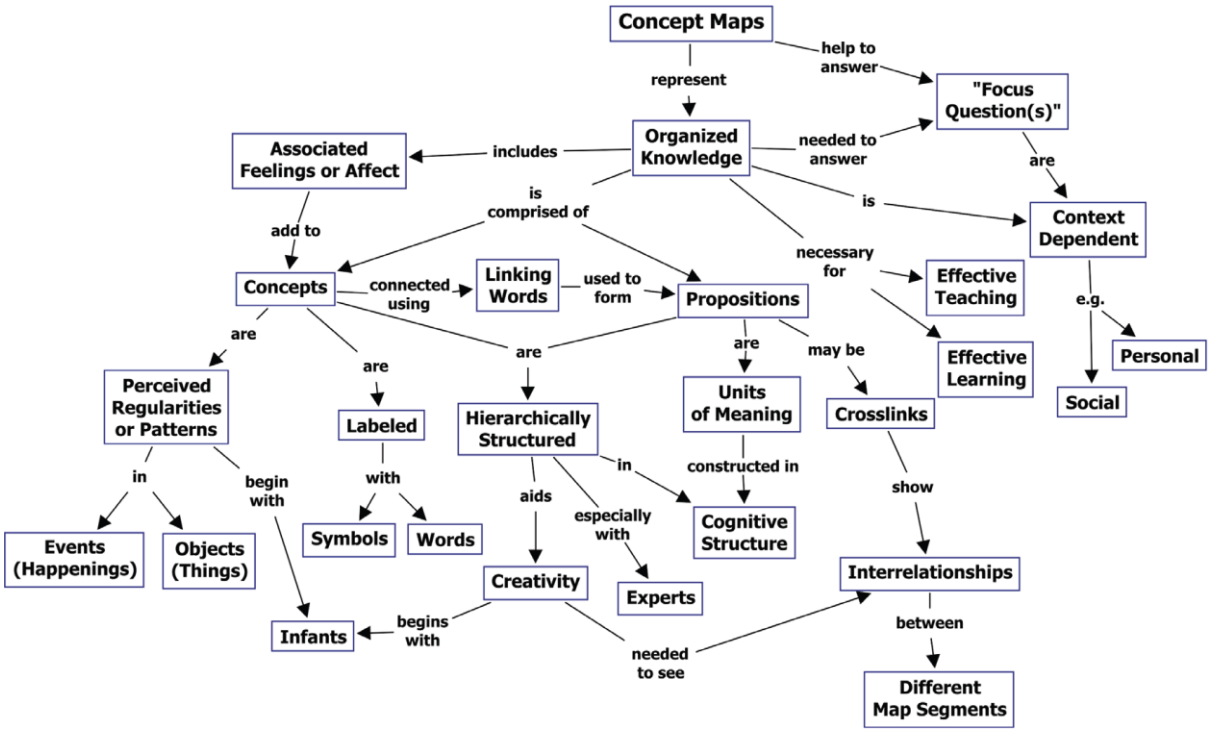


Figure 4.3 Concept mapping (Novak & Cañas 2008:2)

In spite of their different approaches to organizing knowledge, both two graphical tools, mind mapping and concept mapping, have the advantage of enabling people to concentrate on their thinking, allowing them to expand their imagination in finding new cross-references or links to generate new concepts for further in-depth thinking. Both of these tools have proved very successful in business and education.

In my study, which aims at optimizing student interpreters' memory operation, both mind mapping and concept mapping have given valuable inspirations in overcoming student interpreters' poor memory efficiency. It should also be noted that due to the defining characteristics of consecutive interpreting, modifications are needed in my development of the conceptual mapping model.

Interpreting processes include interpreters' preparation and their actual interpreting. Information processing is carried out in different patterns in these two phases. During the preparation phase, since interpreters share little knowledge with the speaker and the audience, a radiant thinking pattern, which is used in mind mapping, could enable the interpreters to branch out concepts related to the interpreting topic. During their actual interpreting, interpreters have no control over the presentation of the speech. This means that interpreters have to follow the speaker and that thus information processing is carried

out in a linear way. Here, concept mapping could be of help. Another advantage of concept mapping is that, compared with mind mapping, it gives more attention to the interactions between the components within the cognitive structure.

In my opinion, the advantage of mind mapping is in its use of a radiant thinking pattern, which uses one key word to summarize one concept. This advantage fits the needs of doing conceptual mapping by interpreters, especially at the interpreters' preparation stage, because mind mapping could help the interpreters to know how to organize their documentary search purposefully and thus save the interpreters' time and energy.

Where I disagree with the idea of concept mapping is in the treatment of the role of concepts. According to concept mapping, the notion of concept has many layers. The integration of concepts forms leads to a proposition, i.e. a statement about a specific event or object. In consecutive interpreting, such a multi-layered concept method is not suitable for speedy memory operations, simply because it may confuse interpreters with the relationships between concepts and pieces of information, thus lowering their cognitive abilities to categorize the flow of information. Therefore, in my development of the conceptual mapping model for consecutive interpreting, I have modified concept mapping by proposing that in interpreters' conceptual mapping, there be only single-layered concept units, which govern one layer of information units. Furthermore, information units may branch out covering supporting informative details of the same category. The working strategies for the application of the conceptual mapping model will be discussed in detail in section 4.4.3.

4.4 Operation of the Model

4.4.1 Consecutive Interpreting as Conceptual Mapping

In the conceptual mapping model, which aims at optimizing student interpreters' CPCM with a focus on memory operation, consecutive interpreting is viewed as conceptual mapping. Here, the interpreting process is understood in its broad sense, covering both interpreters' preparation for interpreting assignments and their on-going interpreting (section 4.3.1).

Now let me introduce how conceptual mapping is carried out throughout the interpreting process. Problems related to information processing start from interpreters' preparation for

their interpreting assignment. It is not that difficult to get access to the information which is relevant to interpreting topics. The point is how to get instant access to the information which is most relevant to interpreting topics. The next challenge is how to store the most relevant information in ways for most efficient recall during actual interpreting.

Information processing remains a central issue during actual interpreting. In-depth information processing requires interpreters to go beyond the reception of information from the speaker. In other words, it requires interpreters to quickly identify the main thread of speaker's thoughts and convey them in an elaborate and coherent way to the audience.

As already discussed in section 3.4.2, efficient memory operation is faced with the conflicts between remembering and digesting information. That is, if interpreters are busy remembering information, their ability to abstract its essence would probably be lowered. According to my own interpreting experience and teaching experience as an interpreter trainer, I have also found that due to a weakness in information processing, inexperienced interpreters become anxious when they spend too much time collecting information, either in their documentary search or while listening to the source text without being able to digest it. Moreover, the inexperienced interpreters do not know how to re-arrange their collected data in a clear and logical structure. This may cause problems in later recall during interpreting. While listening to the source text, interpreters may feel that they understand every sentence, but still have difficulty in note-taking and in coherent and fluent delivery of their interpreted text.

To overcome the above-mentioned cognitive problems related to memory operation, the core of conceptual mapping enables interpreters to do in-depth information processing by focusing their attention on the conceptual structure of information.

Conceptual mapping starts before the interpreters' documentary search. On the assumption that a well-structured map of ideas will be conducive to quick access to the most relevant information and efficient activation of the stored information, interpreters are expected to set up what I call 'a preliminary conceptual map'. In doing so, interpreters predict the potential expansion of interpreting topics, which will guide them to do purposeful documentary search.

The completed preliminary conceptual map is thought to be able to free up much of the interpreters' time and energy during actual interpreting. The reason is that interpreters do

not start their listening activity from knowing nothing about the interpreting topic, or from only knowing loosely-organized background information and/or from being familiar with some glossaries related to the topic. With a well-structured preliminary conceptual map, most of the time interpreters just need to put the in-flow information from the speaker into the pre-set slots within their preliminary conceptual map. Even if the new information does not fit the pre-set slots, interpreters would not feel nervous, because they could immediately generate a new slot for it. When it is time for interpreters to deliver their interpreted texts, this adjusted conceptual map could provide good cues to activate what they have comprehended in listening, since it clearly shows the main thread of the speaker's thoughts with enriched supporting details.

Given that conceptual mapping as discussed above helps to the search for information that is most relevant to interpreting topics, in the following section, I will further discuss the issue of relevance in conceptual mapping (section 4.4.1.1). I will also demonstrate the procedural steps of doing conceptual mapping in government press conference (section 4.4.1.2).

4.4.1.1 Relevance in Conceptual Mapping

The crucial point in information processing is how to get instant access to the most relevant information. In conceptual mapping, the notion of relevance represents the relations between interpreters' efforts and successful interpretation.

In an interpreter-mediated communication between speaker and audience, the success of communication depends on how well the interpreter's pre-set conceptual map (made during the preparation stage) and their adjusted conceptual map (made during the actual interpreting) overlap with the concepts of the speaker and those of the audience. See the cognitive relationships among interpreter, speaker and audience in Figure 4.4 as below:

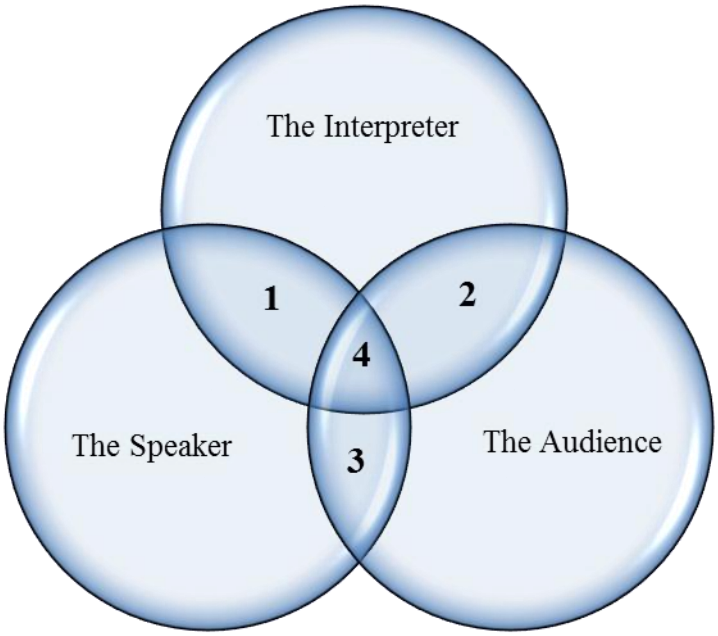


Figure 4.4: Relevance in conceptual mapping during consecutive interpreting

In Figure 4.4, each circle represents the conceptual map that each participant has regarding the interpreting topic. Shadow 1 represents the overlapping area between the interpreter and the speaker when the interpreter is trying to understand what the speaker is talking about. Shadow 2 represents the overlapping area between the interpreter and the target audience when interpreters are trying to deliver interpreted texts in an audience-friendly way. Shadow 3 represents the overlapping area between the speaker and the target audience, regarding how much both the speaker and the audience share their knowledge, assumptions and expectations in relation to the interpreting topic.

It is assumed that the greater Shadows 1, 2 and 3 are, i.e. the greater the mutual understanding among interpreters, speakers and audience is, the bigger Shadow 4 will become. This means interpreters are more likely to (a) make good predictions of the forthcoming speech, (b) make efficient adjustments at the comprehension stage of consecutive interpreting, and (c) deliver interpreted texts which are more audience-oriented.

4.4.1.2 Example

In the following section, I will demonstrate how to apply the conceptual mapping model to consecutive interpreting for a governmental press conference in China. Generally speaking, a governmental press conference on national policy is conducted in a question

and answer pattern. The consecutive mode of interpreting applies. In this analysis, the interpreting topic is 'the market economy in China'.

Step 1: Preliminary conceptual mapping

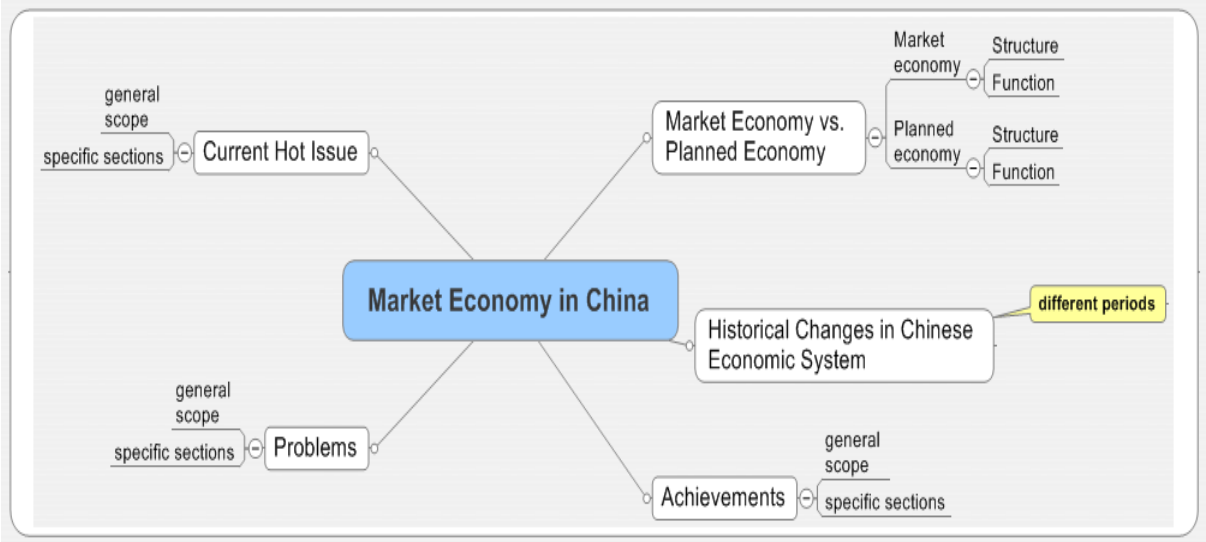


Figure 4.5 Mind mapping of a government press conference

As shown in Figure 4.5, the technique of mind mapping is adopted here. Conceptual mapping at this stage is carried out by putting the key concept "market economy in China" at the center of the sheet and then generating relevant ideas.

Here, 'the market economy in China' is the theme of the interpreting topic, which is expressed in the shadowed box at the center of this preliminary conceptual map. Five main ideas branch out from it are expressed in boxes. They represent five concept units for the interpreters' documentation search and for later alignment during actual interpreting.

The remaining information in this preliminary conceptual map is expressed as one item of information per line. They represent the information units that will be used to guide the interpreters' documentation search and for later alignment during actual interpreting. Each concept unit displayed in one box and each information unit displayed on one line could be used as a key word to search for the most relevant information.

It should be noted that since interpreters are different in terms of reasoning, knowledge and experience, preliminary conceptual maps by individual interpreters can vary in terms of the quality and the quantity of concept units and information units.

Step 2: Aligning the preliminary conceptual map

A good preliminary conceptual map could, to a certain degree, reduce interpreters' cognitive burdens. However, aligning efforts are needed to best represent the speaker's intentions. In reality, such alignment can be challenging, mainly due to information asymmetry between interpreters and the speaker. This could also be attributed to the imperfect presentation manner by the speaker, such as vague or even wrong linguistic expressions, illogical structuring, or expressing ideas too implicitly. To overcome such interpreting difficulties, interpreters should be flexible in identifying what the speaker really wants to say and be able to restructure the ideas into a coherent text. In the following, I will demonstrate the interpreting strategies for the alignment of an interpreters' preliminary conceptual map in the case of a press conference.

The following is an excerpt of the interpreting assignment on "The Market Economy in China". The journalist from Phoenix TV of Hong Kong asked a question in Chinese on China's Telecom. In his questioning, he did not express his ideas clearly and thus increased interpreting difficulty for the interpreters. For the convenience of analysis, each sentence in the source text was numbered:

Source text (in Chinese by a journalist)

①香港凤凰卫视记者。②总理，您好！③我的问题跟香港生活与投资有关。④让我打个比方吧，⑤如果说我在香港打电话给美国总统克林顿的话，每分钟只要九毛八；⑥但是如果打电话给您的话，每分钟就要九块八毛钱，是十倍的价钱。⑦这次我到北京发现就是说，从北京打电话回香港的话，每分钟的价钱从原本的八块一降到了五块钱。⑧我们知道竞争可以（增加这个，） 降低通话费用以及提高服务品质。⑨想请教总理的是，您有什么样的方法可以加快中国电讯市场的竞争步伐。

literal translation: ①I'm from Phoenix TV of Hong Kong. ②How do you do, Prime Minister! ③My question is concerned with the life and investment of Hong Kong. ④Let me give you an analogy: ⑤If I make a phone call from Hong Kong to the President of the United States, it costs me only point ninety-eight kuai per minute. ⑥But if I make a phone call to you, it costs me nine point eight kuai per minute, that's ten times more expensive. ⑦This time when I came to Beijing, I've found that for a call from Beijing to Hong Kong, the price has fallen from the original eight point one to five kuai per minute. ⑧As we

know, competition can (help increase)… reduce the charges and improve the quality of service. ⑨Now I would like to ask you, the premier, what measures you can take to accelerate the pace of competition in China's telecommunications market?

In this case, interpreting problems are mainly related to information units which were not expressed clearly.

(a) ambiguity in the monetary unit

In Chinese, usually '快' ('kuai') refers to the Chinese currency unit RMB. '美金' ('mei jin') refers to the currency unit in the United States, i.e. US dollars. '港币' ('gang bi') refers to the currency unit in Hong Kong. However, in daily conversations, the Chinese people are likely to casually use the word '快' ('kuai') to refer to all sorts of currency units, assuming that the listeners understand perfectly which currency unit is being discussed. Problems would arise if the listener is actually not clear about what currency unit the speaker is referring to, and could lead to misinterpretation because 5 US dollars or 5 RMB in China obviously have different monetary values.

In the given source discourse, which was in Chinese, when the journalist was talking about different prices for phone calls between three different geographic areas, i.e. Hong Kong, Beijing and the United States, he simply used 'kuai' without making any explanation of the exact currency unit he actually referred to. This would cause confusion to the target listeners, because those three geographic areas use different monetary systems, namely, HK dollars for Hong Kong, US dollars for the United States and RMB for China. A solution to such an interpreting difficulty is to make clear the different currency units in the target text.

(b) ambiguity in geographic locations

In the given source discourse, the journalist intended to compare the cost of long-distance calls between three different geographic areas. However, he failed to make it clear from where and to where a call was made. In his questioning, the journalist said: ⑤If I make a phone call from Hong Kong to the President of the United States, it costs me only 0.98 kuai per minute. ⑥But if I make a phone call to you, it costs me 9.8 kuai per minute, here we can see that "if I make a phone call to you" does not indicate clearly the locations for the phone call to occur.

(c) a lack of knowledge of concepts on economics

In the given source discourse, the journalist makes a confusing comment on the relationships between competition and pricing. In segment ⑧, he said, "As we know, competition can help increase… reduce the charges and improve the quality of service."

To deal with imperfect source texts that are vague, inaccurate or even confusing (as shown above), interpreters should keep calm and focus their attention on clarifying what that journalist really meant. In this case, due to the interpreting difficulties caused by that journalist's vague and illogical presentation, the first step in an interpreter's alignment efforts is to identify the conceptual structure of the whole remarks by that journalist. It has been found that the conceptual structure of that journalist's questioning fitted the norms of questioning in a press conference (see Figure 4.6 as below).

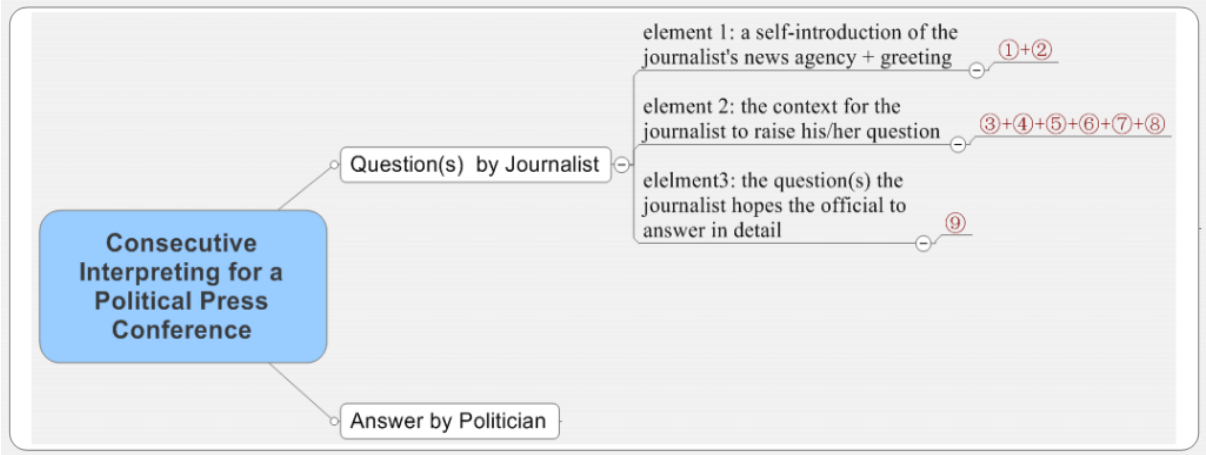


Figure 4.6 The conceptual structure of a journalist's questioning in this study

In Figure 4.6, conceptual mapping like this could serve as the backbone to the interpreted texts. That is, the interpreted text would start with that journalist's self-introduction and greeting to the official (as shown in segment ①and ②). What followed would be the context for the journalist to raise his/her question (as shown from segment ③ to segment ⑧). The last part of the interpreted text would be the very question for the official (as shown in segment ⑨). This question concerned the reform in China's telecommunications, addressing the current pricing competition and measures for further reform.

Based on a clear and well-structured conceptual structure as discussed above, the second

step in an interpreter's alignment efforts is to focus on the problematic issues which, if interpreted literally, would impede the audience from understanding easily or accurately. In this case, as discussed earlier, that journalist did not make explicit currency units and geographical location when he was using Beijing, Hong Kong and the United States to discuss price differences in long-distance calls. It is known that all these three places use different currencies. What interpreters could do is clarify the involved currency units through their target language speech. With regard to the illogical statement in segment 8, that journalist made a confusing statement on the relationship between price competition and service quality. Interpreters could judge the logic of that statement and consequently convey that journalist's real intention in a logical way.

4.4.2 Operational Constructs: Concept Units and Information Units

Within this model, as discussed above, consecutive interpreting goes through three stages: (1) the preliminary conceptual mapping during interpreting preparation; (2) adjusting this preliminary conceptual map on the basis of the speech; and (3) using this adjusted conceptual map to guide the production of interpreted texts. In order to facilitate conceptual mapping during interpreting processes, I have designed two operational constructs: concept units and information units. Both of them deal with meaning-based segmentation and organization. Within the relevance-theoretical framework, information contains two layers: informative content and cognitive content (section 4.2.2.1). Concept units are related to cognitive content. Information units are related to informative content. In the following, I will relate my discussion of concept units (section 4.4.3.1) and information units (section 4.4.3.2) to the three-stage conceptual mapping in consecutive interpreting.

4.4.2.1 Concept Units

In cognitive psychology, the notion of concept is an organizing unit that helps human beings to synthesize their perception and production of thought (Smith & Medin 1981:1). Concept is closely associated with memory operations. Without concepts, "we would be overwhelmed by the sheer diversity of what we experience and are unable to remember more than a minute fraction of what we encounter" (ibid.).

The interpreters' job is understood to grasp the sense of the message by "drawing inferences about the actual meaning of what is being said" (Chernov 1996:223). The

underlying assumption is that paying too much attention to linguistic form could negatively use up interpreters' limited cognitive resources and thus impede them from in-depth comprehension and production of information. To free interpreters from these surface constraints, Nida suggests that concepts "are the units that form the basis for finding equivalent expressions in the receptor language" (2001:104). AIIC suggests that interpreters do their job by "comprehending the concepts of speakers' messages and conveying them orally in another language" (AIIC Bulletin 22/3, 1994:19 cited in Vuorikoski 2002:21).

My interest in using concepts as segmentation units has stemmed from my disagreement with segmenting information on the basis of a linguistic boundary, such as words, phrases, or sentences (section 4.3.2). Unlike De Groot, who uses concept as an aid in "a search of memory for the appropriate name or an attempt to paraphrase" (2000:57), I adopt concept units to deal with information at a macro-level. In other words, this segmentation unit does not consider how many words or sentences the speaker has used to express his/her thought. What it concerns most is "cognitive (or denotative) meanings that people have with regard to the content of verbal communication" (Vuorikoski 2002:34). In the relevance-theoretical framework, concept units are supposed to reflect the cognitive content of information regarding individual aspects of the thematic expansion of interpreting topics. Each concept unit is like a node of a web of thoughts, having its own independent status. The interactions among concept units can form the main thread of the speaker's thought and thus form well-structured discourse.

The advantage of using concept units for efficient segmentation is that they bear the features of aggregating as much as possible related information and of activating the previously stored information rapidly and automatically. As a consequence, interpreters could save much of their energy usually expended on memory. In their documentation search before interpreting, interpreters use concept units to predict a potential conceptual structure of interpreting topics. The choice of concept units for that purpose depends on (a) interpreters' previous knowledge and experience on reasoning patterns and subject matter, and (b) interpreters' ability in predicting what and how the speaker might expand the theme of their speech; and (c) interpreters' ability in predicting the audience's expectations of the interpreting topic i.e. what might interest them most. Using this concept-based preliminary map, interpreters can quickly judge the relevance of the information available

and also work out efficient key words for an in-depth search. More importantly, the collected information could be arranged in a clear and logical structure for later recall. In their delivery of interpreted texts, following the concept units that have been identified in the source text could equip interpreters with a higher degree of flexibility in reproducing the meaning of the source text.

4.4.2.2 Information Units

In my study, information units are subordinate to concept units, dealing with the source text at a micro-level. The plural forms are used, because a concept unit consists of one or more information units.

Information units deal with the informative content of concept units. When concept units reveal the main thread of interpreters' prediction (during their preparation stage) and speaker's thought (during the actual interpreting), information units serve to enrich or expand each concept unit. Here it should be noted that information units in my study are different from "information units" in Li's (1996:111) discourse analysis and "idea units" in Liu et al.'s (2004:23) data analysis in SI (see section 4.3.2). The latter two analytic units focus on lexical or syntactical meanings, whereas information units in my study focus on complete ideas.

4.4.2.3 Example

In conceptual mapping, concept units which are at a global level of texts and information units which are at a local level of texts interact with and between each other in thematic expansions. See Figure 4.7 below, which shows how concept units and information units interact with each other within a conceptual map.

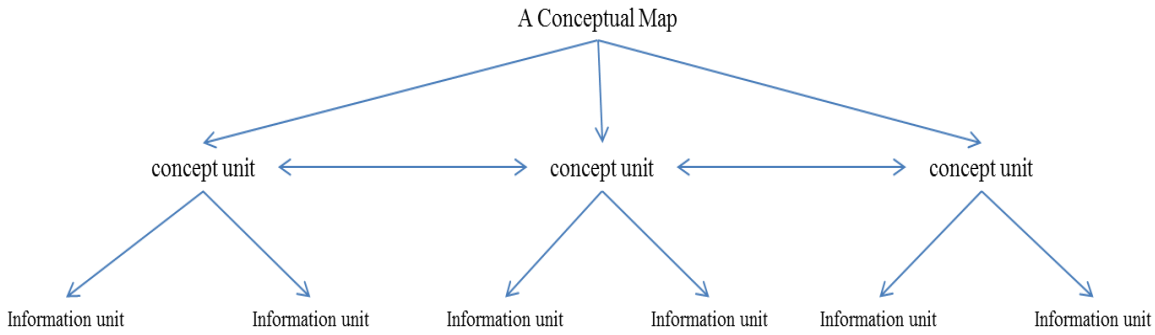


Figure 4.7 The relationship among conceptual map, concept units and information units

To give a clear picture of how to apply concept units and information units to map the

cognitive structure of given texts, in the following, I will demonstrate the process as follows:

The following is an excerpt of a speech that was given by former British Prime Minister Margaret Thatcher at a Welcoming Banquet for a Chinese delegation in Britain. For the sake of convenience for later analysis, I have labeled each paragraph.

In all these projects, we are investing together in the future. I am therefore particularly pleased that this afternoon Vice-Premier Li Peng signed with Sir Y. K. Pao and Geoffrey Howe a Memorandum of Understanding establishing a major new scheme to bring many more Chinese students to Britain. **(Paragraph 1)**

This scheme arose from the imagination and characteristic generosity of Sir Y. K. Pao. We thank him warmly. As a scientist myself, I am particularly pleased that many of the scholarships will be in science and technology. **(Paragraph 2)**

The scheme is also innovative: ingeniously pooling the efforts of two governments and the private sector. Imagination brings practical results. **(Paragraph 3)**

The most striking achievement of creative policy is our agreement on Hong Kong. The continued stability and prosperity of Hong Kong is a vital commitment for both our governments. We are delighted that implementation of the Joint Declaration is going smoothly. We are confident that it will continue to do so. **(Paragraph 4)**

It is important that we should remain in the closest contact up to and beyond 1997, in the joint Liaison Group and elsewhere. That is also what the people of Hong Kong want and expect. **(Paragraph 5)**

4.4.2.3.1 The analysis of information units

Based on my definition of information unit (see section 4.4.3.2), I will first categorize the source text into the following sets of information units. Each information unit is identified by the letter *I*, which refers to information unit, followed by Arabic numeral, which indicates its location in the given text. For the sake of convenience, each information unit is in bold. As shown below, this excerpt has five information units:

I1: feel happy with the signing of memorandum of understanding;
I2: the details of this memo: Sir Y.K. Pao (who made this proposal) and Scholarships for Chinese overseas students who study science and

technology;

I3: comment on this memo: integrated efforts from two governments and the private sector;

I4: achievements on Sino-Britain agreement on the issue of Hong Kong:

- the importance to keep stability and prosperity of HK
- the implementation of the Joint Declaration
- confidence in smooth implementation in the future;

I5: the importance of maintaining the closest contact before and after 1997

- in the Joint Liaison Group and all the other aspects
- the wish of the people of Hong Kong.

Referring to the original excerpt, the above analysis has indicated that mostly noun phrases are used to summarize each paragraph. This is mainly due to the requirements for speedy cognitive processing when interpreters are digesting information available. Regarding the relationship between information units and paragraphs of given texts, the above analysis has shown two conditions. First, one information unit has only one item of information (see I1, I3). Second, one information unit has more than one item of information (see I2, I4, I5).

Focusing on information units seems to have more advantages than focusing on linguistic units. If interpreters base their comprehension on syntactic segmentation, they have to remember the literal meanings of a total of eleven sentences of this excerpt. Such memory behavior might affect interpreters' reproduction quality, since the deficiency of human memory in memorizing too many details could weaken reasoning power (see section 3.3.1.2). By contrast, the information unit method allows interpreters to do in-depth comprehension, because interpreters do their active listening by summarizing the in-flow of information. This could help interpreters to activate their LTM efficiently at the reproduction stage, since before they start speaking, they are already clear about the interrelationship among pieces of information coming from the given text. Moreover, only a total of five information units are needed to be remembered, which could further reduce the interpreters' memory burden at the reproduction stage.

In actual interpreting, a note format which is based on information units could appear as follows:

Notes	Explanation of each symbol and short form in the left column
I1: ☺ Memo	**I1** ☺: feel happy
I2: Sir Y.K. Pao	**I2** $: scholarship
$ sts – sci/ tech	sts: students
I3: 2 gov. private	sci:science
I4: ! HK	tech: technology
= / $pros HK	**I3** gov:governments
J Dtn	**I4** !: striking feeling
+ future	= stability
I5: !! ≏ - 1997-	$pros； prosperity
J Liaison Grp / all	J Dtn: Joint Declaration
wish - HK 人	+future: confidence in its future
	I5 !!: very important
	≏: closest contact between the two countries
	-1997-: up to and after 1997
	J Liaison Grp: Joint Liaison Group
	人: the Chinese character which means people

Figure 4.8 Note format based on concept units

In Figure 4.8, the left column is the suggested note format which is based on information units. It should be noted that symbols and short forms are used to save interpreters' time and energy. More importantly, when information units are arranged in a parallel way, within an information unit, if it has any, information items are indented so as to indicate their subordinate status. The reason for doing so is that it could facilitate interpreters' LTM and thus facilitate their note-reading at the reproduction stage.

4.4.2.3.2 The analysis of concept units

Information units are subordinate to concept units. Therefore, the next move of in-depth comprehension is categorizing the processed information units into concept units.

The first concept unit (C1) governs I1, I2 and I3. These three information units discuss the Sino-British memorandum of understanding in three aspects: the British government's attitude towards the signing of the memo (I1), the content of the Memo (I2) and the political reason for signing this memo (I3). The second concept unit (C2) governs I4 and I5, because these two information units cover the political issue of Hong Kong's return. See the note format which is based on concept units in Figure 4.9 as below:

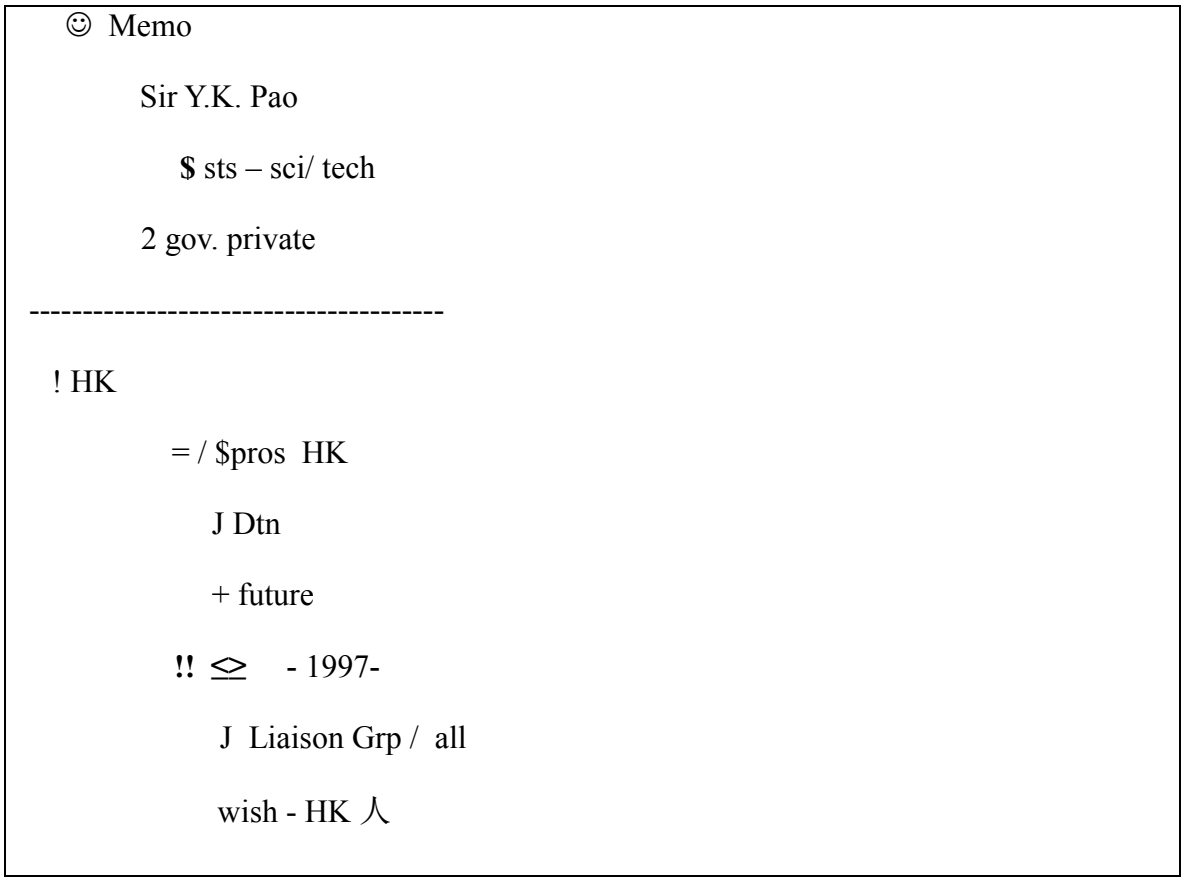


Figure 4.9 Note format based on information units

The fundamental difference between the note format based on concept units and that based on information units should not be understood as the use of segmentation lines (between I3and I4 as shown in the above Figure 4.9). The importance of concept-units-based note format is that it furthers in-depth comprehension by reflecting the main thread of the whole speech. In this example, the excerpt of speech which has eleven sentences entailed

in five paragraphs now has been condensed into only two concept units. This could help interpreters to concentrate on two important issues at their reproduction stage: comments on the Sino-British Memo and comments on HK's return. Clear understanding like that could help interpreters to build up confidence in not missing the most important or most relevant information in their interpretation and in delivering their interpreted speech in a well-structured way.

4.4.3 The Working Strategies

In order to facilitate interpreters' cognitive efforts in abstracting and expanding concept units and information units during their conceptual mapping, in the following section three working strategies will be introduced, namely, the attention strategy (section 4.4.4.1), the layering strategy (section 4.4.4.2) and the clarity strategy (section 4.4.4.3).

4.4.3.1 The Attention Strategy

Considering the operations of WM and LTM in interpreters' documentary search and actual interpreting, the attention strategy is to guide interpreters on what to focus and what to abandon.

It is always the conceptual structure that attracts most of the interpreters' attention for in-depth information processing. Documentary searches always start with the setup of concept units, which predict the potential thematic expansion of interpreting topics. Mind mapping is recommended at this stage. Interpreters write down the theme of the interpreting topic at the center of a sheet of paper; and then they use their knowledge and experience to imagine as many relevant concept units as possible. It is assumed that the more relevant concept units the interpreters can work out at their preparation stage, the more likely their preliminary conceptual map may match the conceptual structure of the speaker.

In actual interpreting, note-taking and note-reading are considered to be distracting for interpreters, taking their attention from in-depth information processing, i.e. attentive listening to the source text, and coherent speaking in the target language.

In this study, note-taking and note-reading are treated as only the means to an end, i.e. grasping the conceptual structure of the speech. Thus, in order to save more time for in-depth information processing, the attention strategy stresses the importance of categorizing

and summarizing of information units in the build-up of the conceptual structure of the speech by interpreters. Firstly, interpreters should know how to categorize information units into corresponding concept units. Secondly, they should continue to process the related information units by summarizing them with the use of shortened linguistic forms e.g. words, abbreviations and symbols. A general principle of establishing concept units is that the fewer concept units, the more efficiently interpreters could manage their WM in in-depth information processing and activate their LTM in later recall at the reproduction stage of interpreting.

In such contexts, the attention strategy does not simply advocate abandoning note-taking and note-reading when cognitive overload occurs. What it does most is arouse interpreters' awareness about the role of note-taking and note-reading and let them decide the specific interpreting strategies themselves. If the efforts of note-taking impedes interpreters from listening to what is being said, it should be sacrificed to maintain the continuity of WM operation. If note-reading is not giving useful cues for activating the LTM, interpreters should neglect the notes on the pad and continue their interpretation on the basis of their understanding of the conceptual structure of the source text (Jin 2008:344).

4.4.3.2 The Layering Strategy

To strengthen interpreters' WM and LTM management, the layering strategy stresses conceptual segmentation of information in their establishment of a preliminary conceptual map and the alignment of this map during the comprehension stage of interpreting.

During their preparation for interpreting assignments, usually the challenge does not come from where to find the relevant information but from how to store such a large amount of information effectively. Therefore, the layering strategy suggests that the interpreters have two major tasks to complete at this stage. Firstly, as mentioned in the previous section, to build up concept units to form a rough outline of the interpreting topic before the documentary search; secondly, to synthesize the collected information from the documentary search into the preliminary conceptual structure. In doing so, on the one hand, adjustment, which may involve omission and/or addition of some concept units due to new findings and understandings regarding interpreting topics, may be necessary. On the other hand, interpreters could categorize clusters of information and put them under the corresponding concept unit. But most importantly, interpreters should summarize the related information so as to reduce constraints on memory.

In note-taking, the layering strategy also emphasizes the importance of segmenting notes on interpreters' note pads. Thus the evaluation criterion for good notes is understood as whether the note format could provide a clear thread and details of the speaker's thoughts. One of the efficient techniques is to label the location of concept units and information units, using symbols and indention to show the linkages between them.

4.4.3.3 The Clarity Strategy

The clarity strategy is applied to the reproduction stage of consecutive interpreting. Being audience-oriented, it suggests making the original messages and their "underlying significance" explicit (Jones 1998:24-26).

In the reproduction of interpreted texts, one big area of concern is information density. Interpreters may jam too much information into one long sentence, increasing the degree of difficulty in comprehension for the audience. But the interpreters themselves may still feel that they have conveyed the comprehended information accurately and clearly.

In relevance-theoretical terms, to achieve the best communicative effects, the speaker should produce utterances which are most worth the audiences' inferential efforts. This may imply the establishment of clear signals that would enable the audience quick access to the original message.

Thus, besides the use of appropriate logical connectors showing the linkage of concept units and information units, the clarity strategy emphasizes that interpreters should set up clear signals to show the location of concept units and that of information units.

Unlike previous research which suggests breaking long sentences into short sentences to solve information density, the clarity strategy of this study recommends the use of focus questions like 'Who did what?' or 'What happened?'.

4.5 Summary

Interpreting is a complex cognitive activity. To simplify contextual complexity in a speech, especially a fast speech, a potential solution is to see beyond "superfluous and/or ambivalent" linguistic phenomena and thus focus on "whole ideas or units of meaning" and the inner relationships between sentences (Nolan 2005:25). For that purpose, the conceptual mapping model that has been developed in this study sees consecutive interpreting as conceptual mapping, a three-phase cognitive process including predicting

the thematic expansion of interpreting topics before doing a documentary search, aligning the preliminary conceptual map to the conceptual structure of a speaker's speech and presenting the aligned conceptual map for coherent and elaborate interpretation. Thus informational segmentation is carried out by means of meaning-based concept units and information units. Concept units deal with the main ideas or cognitive content of interpreting topics. Information units are subordinate to concept units, covering details or informative content of conceptual units. The interactions of these two organizational units build up a text.

In the context of interpreting pedagogy, theoretical models have been criticized as being too purely theoretical and thus being not practical enough to guide interpreter training. To be exact, they lack "explanatory power…[regarding]…understanding phenomena, "understanding translation (oral and written) difficulties"…[and]…understanding translation strategies" (Gile 1995:13). To further overcome the said deficiencies in the development of theoretical models, in this study three working strategies have been depicted to solve specific interpreting problems that may arise in the documentary search or the actual interpreting. The attention strategy highlights the importance of a concept-based documentary search. In addition to that, this strategy emphasizes that note-taking and note-reading should serve as aids in conceptual mapping and that if these two interpreting efforts become distracting factors, they should be delayed or abandoned so as to release more attention and energy for attentive listening to the speech and coherent speaking in the target language. The layering strategy concerns the potential problems in information storage. It emphasizes cognitive abilities to summarize and categorize clusters of related information during in-depth information processing. The clarity strategy copes with information density in production of interpreted texts. To justify the conceptual mapping model, in the following chapters, I will report my observation on the training effect of applying the conceptual mapping model to my cognitive training of student interpreters.

Chapter Five An Experimental Study of the Training Effects of the Conceptual Mapping Model

In this chapter, I will describe the way the conceptual mapping model can be applied to the training of interpreters studying consecutive interpreting. A study was designed to test the training effects of the cognitive model on a small sample of student interpreters. To that end, their learning performances before and after the cognitive training were evaluated. In this chapter, I will discuss the methodological issues in my research on the potential effects of using this cognitive model in my training of student interpreters. In doing so, I will start with a discussion of the research question related to the training efficiency of this cognitive model for CPCM (section 5.1). Due to the methodological difficulties and multi-layered research purposes, I will then discuss the merits of using mixed methodology as a justification for combining a qualitative method (case study) with a quantitative method (quasi-experiment) (section 5.2). The research design is presented in section 5.3. What follows next is a detailed account of other major variables involved in empirical research: the pedagogical context (section 5.4), the research participants (section 5.5), data collection tools (section 5.6) and data analysis tools (section 5.7). In my summary of this chapter (section 5.8), I emphasize the significance of an information-related EA tool that I designed with an aim to help interpreter trainers to distinguish the type, nature and proportion of errors detected in interpreted texts.

5.1 Research Question, Hypotheses and Aims

5.1.1 Research Question

The conceptual mapping model described in the previous chapter has revealed a type of cognitive management which aims at using limited cognitive resources to process information efficiently in consecutive interpreting. Thus my research question is associated with the efficiency of this model in the actual training of consecutive interpreters:

> *Can we reduce cognitive overload by using the proposed conceptual mapping model to optimize student interpreters' processing capacity management?*

I assume that the conceptual mapping model could be of help in optimizing the operations

of the interpreter's cognitive resources, which are constantly tested by the efforts to interpret. Unfortunately, interpreters' cognitive resources are always in limited supply. If the interpreter learns how to manipulate this model to filter out only the information closely related to the interpreting tasks at hand, then this may reduce the amount of the interpreter's time and energy used for non-essential information or effort. As a result, this optimized processing capacity management may avoid the potential cognitive overload and thus improve the quality of the interpreting performance.

If the research results show a positive answer to the research question, then the potential value of this conceptual approach might help to clarify the distinction between in-class interpreting training and the teaching of advanced language learning and translation.

From a research perspective, and based on the assumption that it might be too ambitious to offer a thorough insight into two aspects of processing capacity management in one thesis, this study has given priorities to the exploration of memory operation, which is believed to motivate future research on the optimization of attention allocation.

5.1.2 Hypotheses and Aims

My research question described above is motivated by the desire to optimize the interpreter's processing capacity management through an application of the conceptual model to interpreting pedagogy. Therefore, two related research objectives are pursued: first, to justify the training effect of the conceptual mapping model on the quality of student interpreters' interpreted texts (Chapter Six); second, to develop an interactive model for cognitive training in consecutive interpreting on the basis of the said findings (Chapter Seven). By 'interactive', the training model emphasizes engaging student interpreters into the development of their cognitive competence (see section 5.4).

Bearing the research question in mind, I formulated the following general hypothesis:

The application of the conceptual mapping model can help optimize student interpreters' processing capacity management

To make my observation of the training effect of the said model more feasible, I broke the general hypothesis down into three sub-hypotheses as follows:

5.1.2.1 Sub-hypothesis 1

The conceptual mapping model can help student interpreters activate their LTM with better recall of their theoretical knowledge of interpreting

Sub-hypothesis 1 deals with the LTM aspect in student interpreters' processing capacity management. LTM is understood as storing the information that has already been processed and recalling it for the delivery of an interpreted text (see Chapter Three). In the context of interpreter training, I have assumed that student interpreters' LTM abilities could be strengthened after learning about the conceptual mapping model, which enables prompt and accurate recall of previously stored information. Improved LTM was thus assumed to be manifested in the student interpreters' improved understanding of the interpreting process.

5.1.2.2 Sub-hypothesis 2

The conceptual mapping model can help student interpreters use their WM efficiently to produce better interpreted texts in terms of sense consistency and completeness of information

Sub-hypothesis 2 is concerned with the WM. WM processes on-going information (see Chapter Three). To test this, I made comparisons of the source text and student interpreters' target texts. I assumed that an application of the conceptual mapping model could optimize student interpreters' cognitive management of their WM and thus achieve better interpreted texts. In this study, two quality criteria were adopted to evaluate the quality of the interpreted texts: sense consistency and completeness of information. Here sense consistency expects interpreters to give smooth delivery of interpretation by focusing only on the essentials of the source text. Completeness of information expects interpreters to convey all the details that are entailed in the source text in their delivery of interpretation. While discrepancies exist among interpreters and users on their preferences for sense consistency or for completeness of information (see sections 2.3.2.3 and 2.3.2.4), Kurz (2001a) suggests that quality interpreting service should be able to provide something more than users expected. Therefore, in my observation of the training effect of my model on student interpreters' WM management, I expected better interpreted texts that could convey the information of the source text in a detailed and coherent way.

5.1.2.3 Sub-hypothesis 3

Student interpreters who have received cognitive training on the conceptual mapping model can provide more detailed and coherent interpreted texts than those who have not.

To further confirm the training effects of the conceptual mapping model, I set up two groups: an experimental group and a control group. The experimental group received my cognitive training while the control group did not. I observed any changes (either increase or decrease) in the number of concept units (as related to the main ideas of source text), information units (as related to details on individual concept units) and their linkage in interpreted texts within each group before and after my cognitive training. Then a gap percentage was used to see if there would be any difference in the enhancement of their WM for information processing (section 5.7.2.3). My expectation was that due to my cognitive training, the experiment group would be able to provide interpreted texts that would include more details and be more coherent than the control group. In order to carry out my empirical study, in the following section, I will justify the adoption of mixed methodology in this study, addressing a case study method (for sub-hypothesis 1) and a quasi-experimental method (for sub-hypothesis 2).

5.2 Research Approach and Methods

As mentioned in the previous section, a case study method and a quasi-experimental method were adopted in my empirical study. These two methods seem to be contradictory, since the former belongs to the qualitative approach and the latter to the quantitative approach. The rationale for using these two seemingly contradictory methods is due to the merits of mixed methods over monomethods. Savenye & Robinson (2004) argue that research methods are only a means to the end, not the end itself. Therefore, the choice of research methods should be determined by the research question. Forcing a choice between using qualitative or quantitative methods limits and inhibits the quality research. Researchers should be creative in their choice of research methods. In research which involves “different facets of a phenomenon”, mixed methodology has been thought to have a triangulation effect in seeking convergence of results and consequently “add breadth and scope to a project” (Tashakkori & Teddlie 1998:43). In general, current research has shown

"a gradual development of a number of research designs that incorporated both the quantitative and the qualitative orientations" (41).

In this study, the observation of student interpreters' LTM and WM management requires different methodological treatments of these two cognitive aspects. Interpreting involves interactions of LTM and WM of interpreters. It should, however, be noted that on the surface, WM is more observable and accessible, since interpreted texts could directly reflect how well interpreters' WM have processed the ongoing information. With regard to LTM which deals with the storage of previously processed information, it would be difficult to observe how it might be influenced by the application of the conceptual mapping model. Previous research on observing LTM management is asking the subjects to recall the heard information (Lambert 1992, 1998; Liu, Schallert & Carroll 2004). The underlying assumption is that good LTM management could lead to better recall rate. Therefore, in this study, a case study method was adopted in observing how well student interpreters could recall their learned knowledge on interpreting before and after my cognitive training. For that purpose, I designed a questionnaire with open-ended questions, addressing how student interpreters understood knowledge on interpreting. In addition to that, the questionnaire also included questions on their learning background. The collection of the second type of information was not used for the immediate purpose of this research, but for pedagogical purposes, because it allowed me to adjust my teaching to the needs of the student interpreters.

With regard to the empirical study of student interpreters' WM management, the biggest challenge concerns the small size of the research pool. This is not unusual in empirical research on interpreting (Gile 1995; Tirkkonen-Condit 2000). Dodds et al. highlight the significance of carrying out empirical research in such negative circumstances:

> [A]s professional teachers and for the sake of improved teaching in the classroom with consequent improved performance in the booth later on, not to lose sight of the small, the simple, the practical and the replicable, unexciting as these may be, so that we may consolidate what we have already discovered and to let others, in need of funding, reputations or chairs, go on to where no interpreter has gone before. (1997: 91)

It is understandable that there can be great concerns about the validity of small-sized research. As in this type of approach, there is no manipulation of the sample size as this sample is a naturally occurring one (Harris et al. 2006). Moore (2008) adds that quasi-

experimental evaluation is applicable when (a) random assignment is not feasible; (b) a program is still under development; and (c) the pool of potential participants is too small. She emphasizes that the ultimate purpose of quasi-experimental evaluation is not for generalizability, but for replicability.

In my study of the training effects on student interpreters' memory management, I could only observe a small number of students who enrolled in the interpreting course I was teaching at the Centre for Translation and Interpreting Studies, The University of Auckland. By adopting a quasi-experimental method, I carried out an empirical study that, while having a small sample size, was appropriate for achieving replicability in future research in this area.

5.3 Research Design

I introduced the conceptual mapping model in an interpreting practice course that lasted for twelve weeks during one semester and involved the language pair of English and Chinese. A three-phase syllabus for this cognitive training was designed to fit for specific teaching objectives at the beginning, mid and final stages (section 5.4). In order to evaluate the training effect of this cognitive model on student interpreters' memory management, I designed the research flow as follows in Figure 5.1:

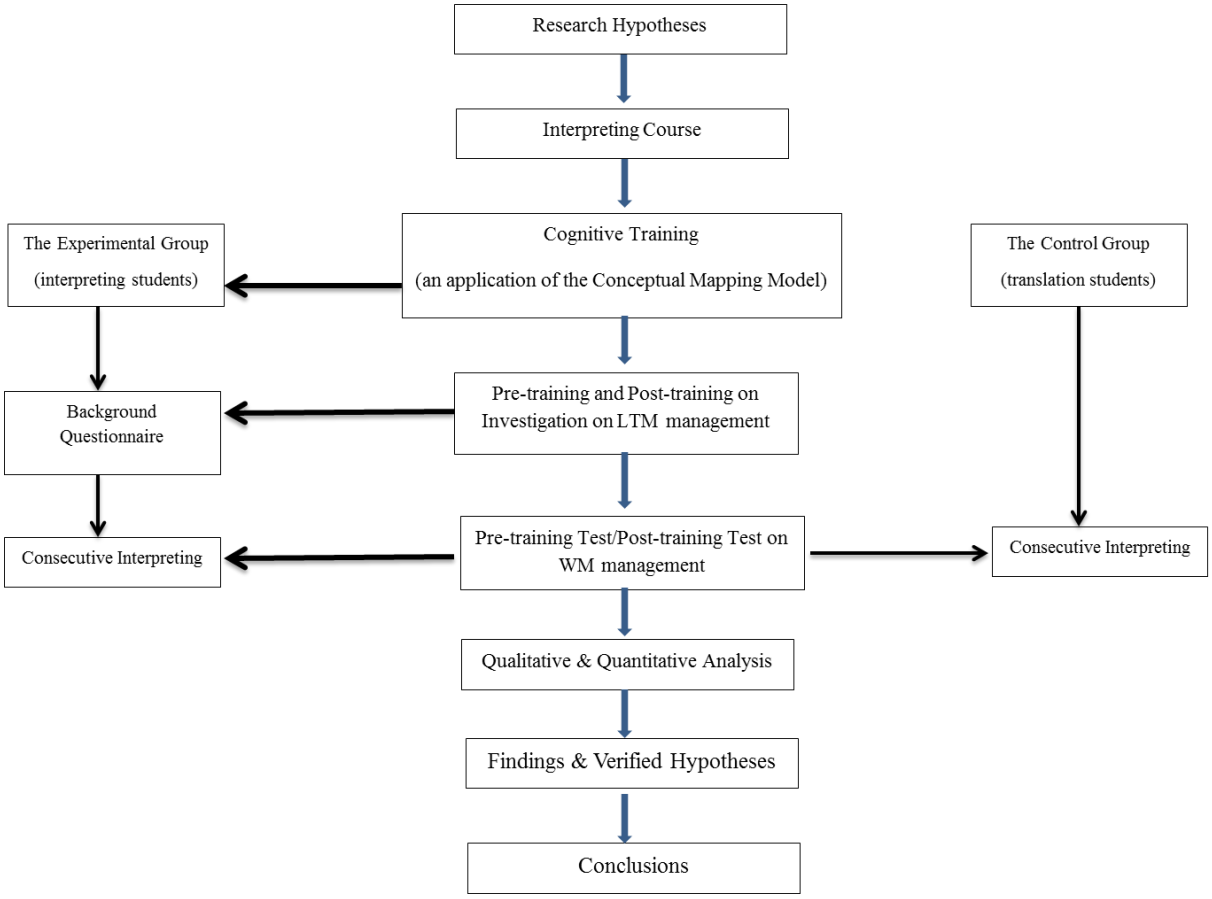


Figure 5.1 Research design

To test the three sub-hypotheses (section 5.1.2), I observed two groups of subjects: the experimental group (which received my cognitive training) and the control group (which did not).

The experimental group was required to fill out a questionnaire respectively before and after my cognitive training. The purpose of doing so was to observe whether my cognitive training could influence their LTM management in recalling what they had learned previously in a theory course on interpreting (section 5.6.1).

The experimental group was also required to do consecutive interpreting on a given source text before and after my cognitive training. The purpose of doing so was to observe whether my cognitive training could influence their WM management in processing ongoing information efficiently (section 5.6.2).

The control group serves to further evaluate the training effect of the conceptual mapping model in terms of WM management. The subjects were required to do consecutive interpreting on the same source text that was given to the experimental group (section

5.6.2). In data analysis of the involved questionnaires, those open-ended questions were coded to reflect the strength and weakness in student interpreters' LTM management (section 5.7.1). In data analysis of interpreted texts by both groups, information-related error analysis tool was adopted to identify the error types and the distribution of concept units and information units within those interpreted texts (section 5.7.2). The aim of doing so was to isolate the strength and weakness of the subjects' WM management in processing ongoing information. The discussion of the findings that were obtained in my empirical study was related to the proposed sub-hypotheses. Given the nature of quasi-experiment, my understanding of the relationship between cognitive training via the conceptual mapping model and optimization of student interpreters' CPCM was treated not as a generalized conclusion, but as motivation to future research in this regard.

5.4 The Study Context

I carried out my empirical study on student interpreters' CPCM in an interpreting practice course which is offered within the Postgraduate Certificate in Advanced Interpreting (PGCertAdvInterp) by the Centre for Translation and Interpreting Studies at The University of Auckland.

This twelve-week course aimed at equipping students (whose A language was Chinese) with practical skills in liaison interpreting, the working mode of which was consecutive interpreting.

In this pedagogical context, cognitive training was an integral part of training. The main purpose was to introduce the conceptual mapping model so as to optimize student interpreters' CPCM with a focus on memory operation. Learning objectives and teaching methods were cautiously considered and designed to fit for the pedagogical requirements of the initial, mid and final stages of training.

5.4.1 Learning Objectives

The main objective of this cognitive training was to strengthen student interpreters' abilities to efficiently manipulate their processing capacity. The whole learning program was roughly divided into three stages, each with a specific teaching target.

5.4.1.1 The Initial Learning Stage

The rationale for my teaching arrangement was based on Kolb's (1984) experiential learning theory (ELT). Kolb sees learning as a cycle in which learners build up new knowledge on the basis of their old knowledge. The learning process starts with learners' observation and reflection of their past learning experience, followed by their active build-up of new knowledge by abstracting concepts from the past experience and activating these concepts through experimental practice.

In my cognitive training, student interpreters started their learning with observing how well they could remember what they had previously learned from theory course on interpreting and how well they could interpret before this interpreting practice course. What followed is the introduction of the conceptual mapping model. This two-week initial learning stage thus had the following objectives:

Specific objectives for the initial stage of cognitive training (for two weeks):

- understand the importance of cognitive processing capacity management;
- distinguish cognitive mechanisms from interpreting efforts;
- clarify the role of note-taking and the impact of exaggerating its role in consecutive interpreting.

These learning objectives were meant to prepare student interpreters for the mid stage of cognitive training in three ways. Firstly, they would not give imbalanced attention to linguistic problems, e.g. new words, long sentences, while neglecting cognitive problems in identification and reorganization of information.

Secondly, they would understand that the completion of interpreting efforts (listening, note-taking and speaking) is subordinate to that of cognitive efforts (comprehension and reproduction). If they have problems in their interpreting efforts, they should go beyond them, seeking the possible causes of and the plausible solutions to their information processing capability. It was not fair to blame everything on a lack of note-taking skills. Thirdly, they would understand the basics of the conceptual mapping model, seeing consecutive interpreting as conceptual mapping via concept units and information units (Chapter Four).

5.4.1.2 The Mid Learning Stage

Using student interpreters' self-evaluation of their own interpreting performance as a starting point, the initial stage of training focused on an introduction to the conceptual mapping model. In this context, the six-week mid stage of my cognitive training was primarily concerned with guiding student interpreters to learn how to establish an accurate and coherent conceptual structure by means of concept units and information units. For that purpose, it should be noted that doing interpreting was only a small part of training exercises. Other forms of training exercises were designed to strengthen student interpreters' cognitive abilities in conceptual mapping (see detailed descriptions in section 5.4.2.2).

Due to the primary focus of this study, a majority of teaching time was given to memory operation. Due to their controversial role in consecutive interpreting, note-taking techniques were introduced very briefly.

Specific objectives for the mid stage (for six weeks):

- enhance student interpreters' WM in consecutive interpreting;
- enhance student interpreters' LTM in their documentary search for interpreting assignments;
- strengthen the student interpreters' cognitive ability in attention allocation.

5.4.1.3 The Final Learning Stage

When student interpreters became familiar with how to do conceptual mapping in their documentary search and in their comprehension and production of texts, the final stage of my cognitive training gave student interpreters four weeks to practice conceptual mapping for documentary search and actual interpreting. They were also required to be able to evaluate the strength and weakness in their interpreted texts in terms of information processing.

5.4.2 Teaching Methods: The Conceptual Mapping Model

5.4.2.1 The Initial Learning Stage

Keeping the specific objectives for the initial learning stage in mind (see section 5.3.1.1), I

asked the students to briefly write down their understanding of interpreting on the basis of what they had learned from their previous theory course on interpreting. Immediately after they finished, I organized a group discussion in which I guided them to observe and reflect upon the answers they had written down. Reading their own answers, student interpreters realized that they did not give much information and that the texts were not well organized. On the basis of students' own findings, I explained the vital role of cognitive competence in information collection and organization for successful completion of interpreting assignments. That is, a lack of strong cognitive competence could make interpreters' documentary search inefficient and thus affect the quality of information collection. Moreover, it could affect interpreters' abilities in delivery interpreted texts accurately and coherently. To resolve the conflicts between cognitive requirements and interpreters' limited CPCM, the conceptual mapping could be conducive. At this training stage, I demonstrated how the conceptual mapping model through works by analyzing the cognitive structure of sample texts and by describing how I prepared and completed interpreting assignments as interpreters.

5.4.2.2 The Mid Learning Stage

The primary focus on the mid stage of my cognitive training was on strengthening student interpreters' LTM and WM management.

I would like to highlight that doing interpreting is not the only training form and that it should come only after student interpreters have become familiar with the operation of the conceptual mapping model. Therefore, the sequential order of the teaching methods involved at this stage was as follows: *summarizing, web search, interpreting without notes* and *simple consecutive interpreting*.

Summarizing was originally used in language learning. I adopted this training method for my cognitive training, assuming that this could be a perfect way of encouraging the students to identify the main points of the given texts. In my teaching context, summarizing functioned as a supplementary training exercise for strengthening students' WM. With necessary adaptations, I asked the students to do summarizing exercises in two ways: (a) summarize the given texts in the form of a list, one sentence for one main point; and (b) write a summary of the given text. Such summarizing exercises were carried out from English to English and from Chinese to Chinese. The biggest advantage of summarizing in the form of a list was that it provided both me as trainer and my students a

quick way to evaluate the efficiency of these students' WM, because it clearly showed how well the students identified the main points in the given text. Comparatively speaking, writing a summary could be more difficult because it also involved cognitive abilities to expand the identified main points into a coherent text.

Web search was a quick way to get access to a large amount of information through the Internet. I asked my students to do web search for topics either of their own choice or the ones given by me. Interpreters today use web searches to prepare for their interpreting assignments. To improve the efficiency of their LTM, the students were required to develop a preliminary conceptual map which included the potential main concepts they could predict on the basis of their knowledge and experience, before they started their web search. With this preliminary conceptual map on the subject matter, the students began to use their own key words to select the information available on the Internet. To observe how well the students could recall the acquired information after the completion of their selective web search, they were required to give oral presentations on the topic. These presentations were two or three minutes, either in their A language or B language.

After the students were clear about the quality requirements for summarizing and web-search tasks, it was time to guide them to apply the conceptual mapping to consecutive interpreting. To start with, interpreting without notes was adopted. This teaching method had been commonly used in the training of consecutive interpreting skills in renowned SI training programs (see section 7.1). The aim was to remove the distraction of note-taking and thus force student interpreters to trace the main thread of the speaker's ideas.

Simple consecutive interpreting was associated with directionality and content of the given source texts. At the mid stage of my cognitive training, student interpreters were required to do consecutive interpreting from their A language into B language. The aim of doing so was to focus their energy on how to identify and reproduce the conceptual structure of given source texts instead of being distracted by jargons and new words. As the students progressed doing such interpreting exercises, I increased the degree of difficulty of the source text in terms of length and content. Texts also included technical topics e.g. on medical, legal and business issues.

Another central concern in my teaching at this stage was the evaluation of interpreted texts by means of a checklist that I designed. For the acquisition of the cognitive abilities in applying the conceptual mapping model, as mentioned above, a large amount of in-class

and out-of-class exercises had been given to student interpreters. Teaching never means simply giving exercises. The point is the completed exercises must be evaluated accurately and promptly. Without giving prompt feedback on the quality of their performances, this could affect their learning motivation. And this would also violate the responsibility of trainers. Giving a thorough and lengthy feedback which tried to cover every aspect of interpreting performances would not sound realistic due to the limited training hours. A general feedback only on the overall quality of interpreting performances would not be practical in showing the exact problem areas for students.

On the basis of Peng's (2006) review of evaluation criteria that were used by major international organizations and tertiary institutes, I designed the above checklist, which was exclusively for cognitive training in consecutive interpreting. On the basis of interpreter self-perception and user expectations (see section 2.3.2.5), my checklist covered three aspects: cognitive content, logical cohesion and clarity of expression (see Figure 5.2):

1. **Main ideas** □□□□□

   Specific problems: **few** **too many** □□□□□

   omission ……

   addition …… □□□□□

   misunderstanding …… □□□□□

   jotting down almost all of the main and minor ideas ……. □□□□□

2. **Logical connections of ideas** □□□□□

3. **Expression** □□□□□

   Specific problems: **few** **too many**

   construction of sentence …… □□□□□

   expression in one's own words …… □□□□□ ……..

   style …… □□□□□

   connectors …… □□□□□

Figure 5.2 Checklist for the evaluation of quality in consecutive interpreting

Figure 5.2 clearly shows two main advantages of my checklist. Firstly, it isolated students' cognitive strength and weakness by evaluating how well they could catch the main ideas of the content (as in item 1), set up logical linkage (as in item 2) and make the core meaning explicit (as in item 3). Secondly, my checklist was convenient for quick evaluation. Each category of evaluation was followed by a list of specific problem areas. Student interpreters were required to report their interpreting problems by ticking the rating box attached to each specific type of error. Thus this could clearly show the distribution of their problem areas.

5.4.2.3 The Final Learning Stage

All the interpreting performances were evaluated by using a checklist, which took care of the students' interpreting efforts and interpreted products. Bearing feasibility and applicability in mind, this checklist needed to be user friendly to the students, so it did not contain too many difficult-to-understand jargons and it did not pretend to cover all the aspects related to quality in interpreting. In designing such kind of checklist, a literature review was made on the quality evaluation checklists that have been adopted by international organizations and by universities.

Peng (2006) has given an account of the checklists by two international organizations (AIIC and SCIC) and four academic institutions (ESIT in Paris, The University of Leeds in Britain, ETI in Geneva, The University of Trieste in Italy). Most of these checklists only discussed conference interpreting in general (AIIC, ESIT, The University of Leeds and The University of Trieste), while the checklists by SCIC (see its EMCI program) and The University of Trieste (see its SSLMIT program) discussed quality standards in terms of consecutive interpreting and simultaneous interpreting. The checklist by ETI focused on the quality standards for simultaneous interpreting.

The comparison of these checklists has shown the commonality for quality interpreting as accurate and fluent interpreting performance (as set in macro-criteria). Their main difference lies in whether they emphasize macro-criteria, or micro-criteria, or rate both equally. With regard to who and how to use these quality standards, there are three commonalities. First, all the existing quality standards are used for testing at the end of the training programs, which means that such quality checklist are only for the trainers use,

not for the student interpreters. Second, all these quality standards tend to cover more sub-competences of interpreter competence. Third, cognitive competence is not stressed. The feasibility of using such a descriptive quality checklist is doubtful, because there is no hierarchical structure, and these check lists are too loose or too long with over-specific details. This can lower the value of feasibility in evaluation by both the trainers and the students.

Based on the advantages and disadvantages of the existing checklists for quality evaluation, I developed a checklist for quality evaluation of consecutive interpreting (section 5.4.2.2).

5.5 Research Participants

Six Chinese students were involved in this research study. These six subjects were divided into two groups: the experimental group and the control group. In the experimental group, the three students (or student interpreters) were postgraduates enrolled in a postgraduate interpreting training program at the Centre of Translation and Interpreting Studies at The University of Auckland They had passed a course on theory, ethics and techniques of interpreting and then enrolled in the course on interpreting practice, which I taught. During this twelve-week interpreting practice course, cognitive training as an important part of interpreter training was provided which encouraged them to apply the conceptual mapping model to their in-class learning activities and after-class interpreting preparation and exercises. In the control group, the three students were translation students who were enrolled in a postgraduate translation program in the same center. Thus, they were not exposed to interpreting training.

The purpose of setting up these two groups was to see the training effects of the conceptual mapping model, not only from looking for possible changes throughout the different stages of cognitive training on those student interpreters, but also from looking for evidence that these student interpreters could do a better job than those who were not exposed to the proposed cognitive training. Given that these two groups shared linguistic [9] and cultural

[9] Admission requirements included a completed Bachelors' degree, or an approved equivalent combination of tertiary study and professional qualifications and/or experience reflecting their bilingual proficiency and it is required that competence in English and an additional approved language or languages meets or exceeds the following levels: an IELTS score of 7.5 in the oral band for non-native speakers of English for languages other than English, oral and written competency equivalent to at least the level of advanced undergraduate courses at this University. Of course, this does not guarantee the group's homogeneity.

background, my focus was to compare these two groups of subjects in terms of their WM.

5.6 Data Collection Tools and Methods

5.6.1 Background Questionnaires

In my study, data collection started with asking the students who enrolled in the course on interpreting practice to complete two background questionnaires designed to elicit information on both their learning status and their knowledge of interpreting. The completed questionnaires provided useful information for my analysis of students' LTM working efficiency, which was the immediate purpose of my study. It also provided information on students' need analysis which would be helpful for customizing my training. In the following section, I will give a detailed description of the rationale of my questionnaire design (section 5.5.1.1), the components of the adopted questionnaires (section 5.5.1.2) and the procedure to give the said questionnaires (section 5.5.1.3).

5.6.1.1 Components of the Questionnaires

To investigate student interpreters' LTM, I used two questionnaires, one for the pre-training session (Q1) and the other for the post-training session (Q2). Each questionnaire was composed of open-ended questions. Q1 consisted of nine questions and Q2 of three.

In Q1, nine open-ended questions were designed to gather information on three aspects of the student interpreters' background. The first and foremost aim was to investigate their knowledge about interpreting which had supposedly been acquired in the course they had taken in the previous semester on interpreting theory. The findings in this area would be related to sub-hypothesis 1 (section 5.1.2.1) on student interpreters' LTM. The other two aspects that Q1 targeted were the student interpreters' learning expectations for this interpreting practice course, and their learning status including their educational background, their past experience with interpreting and their language proficiency (i.e. both Chinese and English). The findings in these two areas would be related to my suggestion on a cognitive training model for consecutive interpreting training (see details in Chapter Seven). The exact questions designed respectively for Q1 and Q2 can be found in section 5.7.1 in which I coded the raw data to facilitate my forthcoming analysis in section 6.1 of Chapter Six.

5.6.1.2 Procedure of Collecting the Questionnaire Data

The first questionnaire was given at the beginning of the first interpreting practice class. The students were given approximately ten minutes to write down brief answers (see section 5.7.1). A group discussion followed on their completed questionnaires. The purpose of asking the student interpreters to write down brief answers was to focus their attention on what they wanted to say. Equally important, their perception of the issues mentioned in the given questionnaires would probably not be interfered with by other subjects.

The second questionnaire was given at the end of the interpreting practice course. The students were asked to write down their answers on their understanding of the questions regarding selected interpreting issues (see section 5.7.1).

5.6.2 Testing Materials

5.6.2.1 Selection Criteria

For the validity and reliability of my study, I kept in mind that the choice of testing materials should be very cautious so as to assure that I was testing what I had expected to test. Therefore, in my selection of an appropriate source text for students to do for consecutive interpreting, I found it important that the errors that would be found in students' interpreted texts resulted not from linguistic difficulties, unfamiliarity of technical terms and technical topics, or psychological factors, because the primary concern of my observation was on the cognitive factors that affect the quality of the interpreted texts. To that end, the test material had the following characteristics:

- *short in length;*
- *general, non-technical topic;*
- *well-structured;*
- *clearly articulated at normal speed;*
- *interpreted from A language into B language*;
- *authoritative*.

Here I would like to emphasize again my research purpose. The source text was designed to be easily understood by the subjects, because my empirical research was targeted at how well or efficiently the subjects could continually identify and the main thread of the

speaker's thought and then organize those pieces of information into coherent interpreted texts. Using the selection criteria for source texts listed above, the source text should be easy to understand with few new words, on an easy-to-understand topic about the world or society. Its well-structured organization should allow the students to follow the main thread of the speaker's thoughts. Moreover, with the help of logical connectors, the students should easily weigh the degree of importance and the inner relationships of the information. The source text was articulated clearly at normal speed, to reduce the students' anxieties that caused by a strong accent and fast delivery of speech. As a consequence, it was unlikely that inappropriate information processing (e.g. omission, addition or distortion) was not caused by the students' comprehension difficulty. In other words, if the students did not do well in the pre-training/post-training consecutive interpreting, the errors were mainly due to their deficiencies in cognitive competence, i.e. unable to summarize the heard information during their comprehension and unable to reorganize this information during their reproduction.

It should also be noted that in removing or reducing the effect of non-cognitive factors on the quality of interpreted texts, using consecutive interpreting from students' A language into B language could, to certain degree, reduce their anxieties for their potential difficulties in listening comprehension. In other words, doing consecutive interpreting from A to B language could probably avoid the errors caused due to an immature psychological state, e.g. failure to focus due to being over-nervous.

Furthermore, the advantage of using tests offered by authoritative organizations could enhance students' motivation in doing their consecutive interpreting. This, in turn, would to a certain degree increase the level of validity of the test. Additionally, such a source text could be assumed to be more reliable in its readability, word frequency and length of genre (see more details on NAATI website at http://www.naati.com.au/).

5.6.2.2 The Source Text for Testing

I selected a short passage from NAATI. It was presented in Mandarin, with a total of 285 words. The topic was "The Aging Problem", which described the aging problem in this society in terms of its current situation, causes and possible solutions. See the attached source text as follows:

老人问题

现在在这个社会里面, 六十五岁以上的老年人越来越多 . 由于最近一二十年的医学的发达,好多以前认为是难医或者无法医的病,现在都有办法预防和得到医治.所以,现在的人就越来越长命.好多人不单是可以活到六十五岁,就是八九十岁的超级老人都是很普遍的现象. 老年人的年纪越来越大,造成了一个老年人人口爆炸的社会问题.社会学家一致认为这个问题已经很严重了.

一般地说, 这些超级老人的身体和精神一定不会太好.他们特别需要其他人的照顾. 如果他们的家人没有办法照顾他们, 就只能够靠社会工作团体和有关政府部门的安置. 要好好照顾这些老年人,不单是需要大笔的经费, 更加需要很大的耐心和很大的爱心.

5.7 Data Analysis Tools and Methods

5.7.1 Coding Schemes for the Two Questionnaires

In processing raw data collected from my two questionnaires (Q1 before training and Q2 after training), I adopted *coding*, an analytic strategy that has often been used in qualitative research (Miles & Huberman 1994; Bogdan & Biklen 1992).

Coding is treated as a "unique part" that "enables [researchers] to make an original contribution to [their] discipline" (Foss & Waters 2003:n.pag.). In the data coding process, researchers attempt to make sense of the raw data (Pavlović 2007:53) by formulating concepts and classifying and relating them to each other. In doing so, the researchers could "develop an original and sophisticated answer" to either their research question (Foss & Waters 2003:n.pag.) or testing a hypothesis (Bourque 2004; Lockyer 2004).

For that purpose, data coding could be carried out in two ways: in the first method, researchers convert questionnaire data into meaningful categories or *codes* (Savenye & Robinson 2004) so as to gain a comprehensive picture of how the collected data are related within or between each other (Goetz & Le Compte 1984). In the second method, researchers can develop categories before data is collected (Bourque 2004; Lockyer 2004). Researchers may think about their coding scheme at the beginning of their study, or build their coding scheme into their questionnaire.

It was the second coding method that I adopted in my questionnaire design. Based on my sub-hypothesis 1 (section 5.1.2.1), I set up a coding scheme for Q1 in which student

interpreters' LTM management would be examined. In addition to that, based on the necessity of understanding students' needs before the start of teaching, I also worked out another two categories: students' learning status and their learning expectations. I then built these three categories into Q1, shown below:

(1) Questions related to the students' understanding of their previous learning on interpreting:

- What do you think is high quality interpreting?

(2) Questions related to the students' learning expectations:

- What do you expect to achieve through this interpreting training program?
- What do you want to learn most from this interpreting training course?
- Do you have any idea of what an interpreting practice course should or might entail? If yes, briefly explain.
- Do you have any topics that you are most interested in for the incoming interpreting exercises? If yes, name some of them (no more than 3).

(3) Questions related to the students' educational background:

- How many years and to what degree of proficiency have you learned your B language?
- Have you ever received interpreting training before? If yes, where and when?

(4) Questions related to the students' proficiency of their A and B language

- Do you have any problems when using Chinese for daily communication and academic purposes? If there is any, give some examples.
- Do you have any problems when using English for daily communication and academic purposes? If there is any, give some examples.

The same coding strategy was applied to my designing of Q2, given after training. Given that the purpose at the post-training stage was to see how well student interpreters could recall what they had learned in the course on interpreting practice, I omitted those two categories regarding students' learning status and learning expectations. I only retained the first category which was used in Q1 (Questions related to the students' understanding of their previous learning on interpreting) before I developed them into three open-ended questions in Q2, which were shown as below:

- What is a high quality interpreting performance?
- How can an interpreter prepare for his/her interpreting assignment?

- What are the main strategies that can be used during the interpreting process?

Here, the first question aimed at investigating student interpreters' understanding of quality criteria for interpreting. The second question was to reveal their preparation skills. The third question concerned their interpreting skills.

5.7.2 Evaluation of Interpreted Texts

In the following, I will give a detailed account of how error analysis was applied in my teaching observation during this study. In section 5.6.2.1, I will define the error types and how they were treated quantitatively in my EA analysis. Then in section 5.6.2.2, I will illustrate the rating principles which determined how I understood those errors that had been discovered and categorized.

5.7.2.1 Information-based Error Analysis

In evaluating the students' interpreting quality, the literature review has shown a comparison method which is to analyze the relationships between the source text and the target text. In doing so, the previous researchers saw the evaluation of interpreted texts as error detection. Falbo (2002) points out that error analysis is "a tool for the classification of whatever is unsuccessful in the IT (interpreted text] and may affect the overall quality of the IT itself" (111). Using error analysis tool, Kopczynski (1981) counted the lexical or grammatical mistakes in the interpreted text to observe the factors that would affect the fluency of an interpreter's delivery (cited in Vik-Tuovinen 1995:57).

On her assumption that interpreters should express 100% of the information contained in the original discourse, Falbo (2002) classified errors found in interpreted texts as addition or omission of information. Based on that classification, she analyzed the quality of interpreted texts in terms of coherence. In her terms, addition of information referred to unnecessary information that was added in the interpreted discourse. For example, in my teaching observation and interpreting experience, irrelevant, unnecessary or repetitive information was added by interpreters in their delivery when they had interpreting problems (e.g. failure in comprehension or in finding equivalence) and thus wanted to avoid being quiet for too long during their interpreting. Omission of information, as Falbo defined (2002), referred to the efforts that information from the original discourse was omitted in the interpreted discourse.

Following the line of error detection, my evaluation of interpreted texts' quality adopted this comparison method. My error analysis focused on the quality of information processing at discourse level.

To quantify my EA analysis, I would like to further specify Falbo's (2002) classification of errors, using Nord's (2000) insightful questioning on the efficiency of information processing. According to Nord (2000), text production is information-processing oriented. To satisfy the needs of the audience, the text should pay attention to two aspects in relation to information: (a) "how much and which information is presented in the text"; and (b) "how is this information structured" (197).

Nord's remarks (2000) have clearly shown the directions to explore information processing beyond the information-related errors like negative addition and unacceptable omission (Falbo 2002). Nord maintains it is necessary for analyzers to detect the type of information-related errors, referring to which information is presented in the text. But this is far from sufficient. Therefore, analyzers should also quantify the detected errors, which Nord refers to as how much information is presented in the text. Furthermore, the overall cognitive structure of interpreted texts related to how this information is structured needs equal attention, because discourse is not an accumulation of pieces of information, but an integration of information serving to reflect the speaker's message and intentions. Therefore, analyzers should also observe the linkages amongst the processed information in interpreted texts.

5.7.2.2 Categories of Information-related Errors

In judging the quality of the interpreted texts generated after cognitive training, I used EA at the discourse level. Generally, I first classified error types into two groups: (1) errors related to concept units; and (2) errors related to information units. This classification was based on the operational constructs of the conceptual mapping model (see section 4.3.); and (3) misconnection, an error type I added to my quality criteria. It referred to mistakes using logical connectors.

Within interpreted texts, errors related to concept units refer to the failure in identifying the main ideas of the source text. Errors related to information units refer to the failure in collecting the supporting ideas from the source text. The third error type, misconnection, refers to a lack of coherence within the interpreted texts in their own right. Regarding the

coherence of interpreted texts, the number of linkages does not refer merely to the number of linkage that could be detected in the interpreted texts, but the number of 'reasonable' linkages that appropriately connect the concept units and information units of the interpreted texts;

It is not uncommon that a text full of cohesive devices could turn out to be illogical. In my analysis of the interpreted texts by both the experimental group and the control group, I found that some subjects tended to use a lot of connectors in their interpretation (see the findings in section 6.2.1.2). Thus trainers need to base their judgment on how many appropriate connectors exist in interpreted texts. The misuse of connectors only hinders the audience's comprehension.

5.7.2.3 Quantifying the Pre-set Error Types

After I had pre-set the error types related to my conceptual mapping theory (see Chapter Four), I began to process the interpreted texts generated from both the experimental group and the control group, quantifying the errors that I detected. I did this in order to give precise feedback to the students. The underlying assumption is that trainers' feedback should be specific and systematic. Usually, trainers give feedback by telling the students about their general feel of their performance and showing some of the obvious or big interpreting problems detected. My argument is that students would not be able to benefit a lot from general feedback because, although they know they have problems, they do not know what kind and how many errors they have made. Therefore, I would like to emphasize that quality feedback is needed which clearly shows the type, nature and proportion of individual errors that have been found in the interpreted texts. In this way it could it be possible to help students to gain an in-depth understanding of their weaknesses in interpreting.

In quantifying the error types, I separated the pre-set error types into two groups. The first group included errors related to concept units and the ones related to information units. My assumption was that information on concept-unit errors or information-unit errors alone could not reflect student interpreters' real ability in conveying the speaker's message. In my study, text production is thought to be an expansion of the conceptual map which includes the main ideas and their supporting details. Main ideas deal with information which I called concept units, while supporting details deal with information which I called

information units. The interactions of concept units and information units grow into a coherent conceptual structure (see section 4.3.2). The second group of pre-set error types included misconnection. It is concerned with the logical linking of information.

To understand how well student interpreters could strengthen their WM for better information processing, I started with counting the number of concept units and information units entailed in the source text. Then I counted the number of concept units and information units from the interpreted texts. Next I compared these two sets of units between the source text and the interpreted text to see the nature and proportion of students' errors in terms of concept units and information units. I applied the same counting strategy to observe misconnections in students' interpreted texts. To make my data analysis easy to follow, I designed a working sheet that I used in processing the data from the students' interpreted texts (see Table 5.1):

Table 5.1 Quantifying concept units and information units in evaluation of interpreted texts[10]

	addition	omission	causes	remedies
concept units				
information units				
the linkage				

In Table 5.1, the first two columns ('addition' and 'omission') were designed for the immediate purpose of my study, i.e. efficiency in information processing. I added two more columns on the right: 'causes' and 'remedies'. The purpose of doing this was that in actual teaching contexts, these two columns kept on reminding the trainer to think about the potential causes of the detected interpreting problems and apply corresponding remedies.

This counting strategy was applied to the analysis of any changes in information processing within the experimental group before and after they received cognitive training. It was also applied to my analysis of the two set of interpreted texts by the control group, which did not receive any interpreting training. For data processing within each group (the

[10] My working sheet was in line with Falbo's (2002) terms, i.e. addition of information is shown as 'addition' in my evaluation table, and omission of information as 'omission' in my evaluation table.

experimental group and the control group), percentages were used to detect the proportion of each error type (see section 6.2.3 for the experimental group and section 6.3.1 for the control group). For a comparison between the experimental group and the control group, gap percentages were used (see section 6.3.2).

5.7.2.4 The Rating Principle

The counting method adopted in my data analysis might be criticized when facing the following situation: when the total error numbers are the same between students' interpreted texts, how could a trainer make appropriate judgments on their quality? Such a dilemma could be solved by how we look at the counting strategy and how we read the numbers thus generated. As mentioned in section 5.7.2.1, counting itself is not the end, but a means to the end. In other words, the results should be understood in a wide context, in which the interrelationships of those numbers are examined carefully.

In my analysis of the interpreted texts collected from both the experimental group and the control group, I developed a rating principle which guided my evaluation, especially when the number of errors was the same between different students' interpreted texts. The rating principle for comparing the overall quality of the interpreted texts was modified by the following two conditions:

Condition 1

- When the total number of errors regarding the content of the source text is equal, the interpreted texts which contain more concept units are treated as better than those which contain more information units.

The following table indicates that Student A captured more concept units but fewer information units than Student B:

	Identified concept units	Identified information units
Interpreted text by student A	6	4
Interpreted text by student B	4	6

Therefore, bearing my rating principle in mind, I would comment that student A had done a better interpretation than student B, because student B might have understood more details regarding certain aspects of the speaker's message, but not more aspects of the speaker's thought.

Condition 2

- When the number of misconnections is equal, the interpreted texts which contain more concept units are treated as better than those which contain more appropriate logical links.

	Identified concept units	Identified logical links
Interpreted text by student A	6	4
Interpreted text by student B	4	6

If I found that compared with student B, student A had captured more concept units though showing a bit of weakness in setting up strong logical links in his/her interpreted text, then my judgment would be that student A did a better job, since he/she was more faithful in interpretation, giving the target audience at least a chance to know what had been said by the speaker.

5.8 Summary

In this chapter, based on my sub-hypotheses and research purposes, I have described the main elements of empirical research, i.e. research question, hypothesis, research approach and method, research design, research participants, setting of the study, data collection and analysis. I have provided a detailed picture of when, where, what and how I observed the training efficiency of the conceptual mapping model. In my discussion of how to evaluate the quality of interpreted texts, I explained how I coded the raw data collected from the subjects (section 5.7.1). I also revised Falbo's error analysis tool to facilitate determining the relationships between my findings and my sub-hypotheses (section 5.7.2). The information-related EA tool I used provided a clear guideline for systematic and specific feedback on the quality of interpreted texts. As a consequence, student interpreters were

expected to get insight into their WM-related problems in terms of type, nature and proportion of their errors. They were able to understand that speaking a lot in interpretation delivery does not necessarily mean that they are interpreting well, because it is not uncommon that a lengthy interpretation may (a) fail to reflect the main idea of the source text; (b) convey the main idea without sufficient supporting details; and (c) convey the information of the source text in a loose structure. In the next chapter, I will establish a cognitive model, which aims at optimizing student interpreters' CPCM with a focus on their memory operation.

Chapter Six Research Findings and Discussion

In this chapter, using the coding scheme (section 5.7.1 of Chapter Five), I compare the pre- and post-training questionnaires (section 6.1.1 and section 6.1.2). The findings are discussed in relation to sub-hypothesis 1 on student interpreters' LTM management (section 6.1.3). Then using an information-related error analysis tool, I will compare the pre- and post-training interpreted texts by student interpreters (section 6.2.1 and section 6.2.2). The findings will be discussed in relation to sub-hypothesis 2 on their WM management (section 6.2.3). What follows is a comparison between student interpreters and translation students.

6.1 Data Analysis of the Collected Questionnaires

The coding schemes for the two questionnaires that I used for my teaching observations show that in the case of Q1, three groups of categories were identified. See coding scheme for Q1 in Figure 6.1 below:

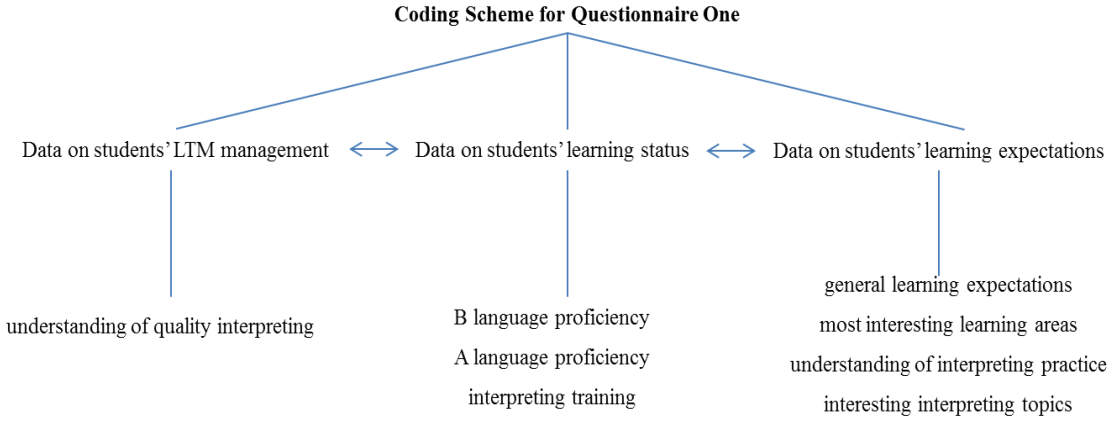


Figure 6.1 Coding scheme for questionnaire one

In this coding scheme for Q1 (as shown in Figure 6.1), I categorized the raw data into the *category for students' LTM management*, which fits one of the immediate purposes of my current study. Other data went into either the *category for students' learning status*, based on their A and B language proficiency and training experience of interpreting, or the *category for students' learning expectations*, based on general and specific needs as shown in Figure 6.1. The latter two categories, though not directly related to the research purpose

on students' memory operations, were necessary because of pedagogical considerations for student need analysis. The underlying assumption was that to tailor a training project to fit students' learning abilities and learning objectives, trainers need a thorough understanding of the students in terms of their bilingual proficiencies and their motivation for interpreting training.

Based on the coding scheme for Q1 as shown in Figure 6.1, in the following section I will firstly analyze Q1 data under the category for students' LTM management (section 6.1.1.1), and then Q1 data for the other two categories: students' learning status (section 6.1.1.2) and students' learning expectations (section 6.1.1.3).

6.1.1 Pre-training Questionnaire (Q1)

6.1.1.1 Category for Students' LTM Management

My analysis of the data collected from the completed Q1 seemed to indicate that the student interpreters were unable to recall what they had learned about interpreting. See their answers to quality criteria for interpreting in Table 6.1 below:

Table 6.1 Students' LTM management before cognitive training

• What do you think is high quality interpreting performance?
Subject J: *Accurate; fast*
Subject Q: *To transfer the meaning from one (language) to the other which should include everything they want to say*
Subject L: *Not too sure*

The students' answers shown in Table 6.1 indicate that except for subject L, who seemed not to be able to remember anything about her theoretical learning, the other subjects mentioned one or two quality criteria on accuracy, delivery fluency (subject J) and completeness of information (subject Q). Based on the data on students' LTM management (as shown in Table 6.1) I got the impression that these student interpreters did not demonstrate strong LTM capability in activating their memory of what they had learned for a whole semester. A potential cause for the student interpreters who seemed to have lost their memory suddenly could be that it was not because they did not possess knowledge on

interpreting, but they were not motivated at all to remember those theories, and/or they simply did not know how to synthesize the acquired information to facilitate their recall.

6.1.1.2 Category for Students' Learning Expectations

The data regarding students' learning expectations seemed to reveal that, although student interpreters did not give specific and comprehensive answers to basic quality criteria for interpreting, they implicitly expressed their understanding of quality interpreting as 'being professional' (as shown in subject Q). With respect to learners' expectations, the student interpreters seemed to show a strong desire for learning interpreting skills which were, as they said, 'good', and 'practical'. In their mind, the most-wanted learning objective was real interpreting skills, the ones which could help them to face the challenges encountered by professional interpreters. See more details in Table 6.2 below:

Table 6.2 Students' learning expectations

• What do you expect to achieve through this interpreting training program?
Subject J: *Good interpreting skills, accurate; fast*
Subject Q: *To be a professional interpreter*
Subject L: *Some practical skills*
• What do you want to learn mostly in the training of interpreting?
Subject J: *Interpreting skills; how to stay calm and confident when interpreting*
Subject Q: *The skills & technique for interpreting*
Subject L: *Basically everything*
• Do you have any idea of what an interpreting practice course should or might entail? If yes, briefly explain it.
Subject J: *Such a course perhaps involves listening to tapes and practice our interpreting skills*
Subject Q: *Lots of practice o be a professional interpreter*
Subject L: *No*

Table 6.2 (Continued) Students' learning expectations

• Do you have any topics that you are most interested in for the incoming interpreting exercises? If yes, name some of them (no more than 3).
Subject J: *Sports; medical; commerce*
Subject Q: *No*
Subject L: *No*

Table 6.2 seemingly reflected another interesting phenomenon: student interpreters had no idea about how interpreting practice should be carried out. It seemed that it was no more than 'listening to tapes and practice interpreting skills'. These student interpreters appeared to be rather passive when asked to visualize their learning. Except for subject J, who mentioned three topics that subject J might be interested in future interpreting practice, the other two subjects (Q and L) simply wrote 'no' to the question on suggesting some interpreting topics that they might be interested in. This might imply that student interpreters felt that trainers had the sole responsibility for all the learning-related arrangements.

6.1.1.3 Category for Students' Learning Status

Data on students' learning status showed that these student interpreters had received formal English language training at tertiary level (see Table 6.3). All of them showed great confidence in their use of English, in addition to Chinese, their native language. They only expressed their worries for new words or unfamiliar topics. This might imply that they assumed that if they could solve the problem of language and knowledge of subject matter, their interpreting performance would be good.

Table 6.3 Students' learning status

• How many years and to what degree of proficiency have you learned your B language?
Subject J: *BA in English language and literature*
Subject Q: *Studied English at university in China and got a BA degree*
Subject L: *Studied English in China at university*

Table 6.3 (Continued) Students' learning status

• Do you have any problems when using Chinese for daily communication and academic purposes? If there is any, give some examples ?
Subject J: *No*
Subject Q: *No*
Subject L: *No*
• Do you have any problems when using English for daily communication and academic purposes? If there is any, give some examples.
Subject J: *Do have problems using English for academic purposes, e.g. expressing ideas in an academic way*
Subject Q: *Sometimes when I don't know the words or topic*
Subject L: *No*
• Have you ever received interpreting training before? If yes, where and when?
Subject J: *No*
Subject Q: *No*
Subject L: *No*

Interestingly, Table 6.3 indicates that none of the student interpreters treated their previous theoretical learning of interpreting as 'real' interpreting training. All of them denied any interpreting training experience. After they completed their questionnaire, I asked them, "if you did not receive any interpreting training, how would you like to explain that course admission for my course on interpreting practice was that you must pass theory course on interpreting?" After hearing my question, they suddenly woke up and admitted that they had made a mistake. In their explanation, they thought 'interpreting training' referred to practical interpreting skills rather than theoretical knowledge of interpreting. In addition, they said that without passing the theory course on interpreting, they could not proceed to the course on interpreting practice, which was what they were interested in most.

6.1.2 Post-training Questionnaire (Q2)

The second questionnaire (Q2) was given to the student interpreters after they had received the whole cognitive training, a core part of the course on interpreting practice (as

mentioned in section 5.6.1.2). Data were collected to evaluate any change in the student interpreters' LTM management. See Table 6.4 below:

Table 6.4 Students' LTM management after cognitive training

• What is a high quality interpreting?
Subject J: *Convey the message rather than simply rendering word-for-word; be listener-friendly; the interpreting speed is very important.*
Subject Q: *Interpret the message accurately and coherently; the delivering speed should be fluent and natural; the interpreted version should be well structured and easily comprehended; the interpreter should convey not only all elements of meaning, but also the intentions and feelings of the native speaker.*
Subject L: *The interpreter should convey the meaning of the speaker faithfully without omissions, additions or misunderstanding and also give a good delivery with pleasnat voice without hesitaiton, repetition or self-correction.*
• How can an interpreter prepare for his/her interpreting assignment?
Subject J: *When doing a background research on the topic of an interpreting assignment, the more relevant information an interpreter gathers, the better prepared he or she will be… Building up a bilingual mini-glossary will also be helpful.*
Subject Q: *An interpreter should prepare the glossary and background knowledge for the assignment. He or she should organize all the information in a logical structure in mind and in writing if necessary.*
Subject L: *For a thorough preparation, the more the interpreter knows about the context, subject matter and terminology of the assignment, the better the performance will be. For all the preparations, it is advised that sufficient time is allocated to do the job properly. For ongoing interpreting, eye contact, clear articulation, negotiation with the speaker, note-taking, chunking and reorganizing information, paraphrasing are productive strategies.*

Table 6.4 (Continued) Students' LTM management after cognitive training

• What are the main strategies that can be used during the interpreting process?
Subject J: *In ongoing interpreting, an interpreter's short-term memory is limited, so it's always helpful to jot down notes using symbols and abbreviations and other useful techniques. Paraphrasing is important. Breaking down long and complicated sentences into short an d simple sentences is a useful strategy.*
Subject Q: *In interpreting, efficient note taking strategies. Main ideas and supporting ideas should be noted down with a well organized structure. Focusing on the message instead of words. Using short sentences to deliver the message. Be flexible with the restructure of the information.*
Subject L: *For ongoing interpreting, eye contact, clear articulation, negotiation with the speaker, note-taking, chunking and reorganizing information, paraphrasing are productive strategies.*

In Table 6.4, it seems that in filling out Q2, the student interpreters were able to give more information on interpreting. Compared with Q1, in which the student interpreters focused on semantic difficulties and fluency in delivery, Q2 showed a wider range of discussion, including their considerations of coherence, being audience-oriented (subject J), structure and restructure information in a logical order during interpreting preparation and actual interpreting (subject Q), time management in interpreting preparation (subject L). The comparatively deeper understanding of interpreting might imply a higher level of LTM activation.

6.1.3 Discussion Related to Sub-hypothesis 1

In cognitive science, LTM serves to store the information that has already been processed by WM. However, the activation of LTM, or the recall of the stored information, could be problematic for two reasons: firstly, the processed information is not stored properly, and secondly, cues are inefficient in activating or recalling the information which exists in the LTM. Using open-ended questions on interpreting quality as cues, I found that in Q1, which was given before my cognitive training, the student interpreters either could not remember information about interpreting at all or remembered only a small portion of it. By contrast, in Q2, which was given after my cognitive training, student interpreters seemed to become more active and show deeper understanding when discussing the issues on quality interpreting and interpreting strategies. The low recall rate represented in Q1

might be attributed to low motivation in theoretical learning. That is, they could not remember just because they were not interested in it. However, my argument is that irrespective of their learning motivation, they could have remembered well if they had had strong LTM management. Efficient LTM management is important because, in reality, there is no excuse for interpreters not to remember the information because they are not interested in it. It is not unusual that interpreters have to interpret topics which are very difficult, boring, or simply too much. Interpreters have the right not to like the information related to their interpreting jobs, but they must be able to remember it and to present it promptly when required to in their working scenarios. That is the basic requirement for good preparation for any interpreting assignment.

The better recall rate represented in Q2 seemed to reveal student interpreters could remember more and understand more. Due to the nature of the quasi-experiment style which I adopted for my research, it is not appropriate to confirm that my cognitive training was the direct cause for such improvement in students' LTM management. I would like to point out that my findings in this regard might motivate other researchers and trainers to further explore the effects of cognitive training on student interpreters' LTM management.

6.2 Data Analysis of the Interpreted Texts

6.2.1 Types of Errors

The advantage of adopting the information-related EA tool is that it helps to avoid giving general comments on the quality of interpreted texts. It enables analysts to show the type and proportion of interpreting problems so as to isolate student interpreters' cognitive strengths and weaknesses. In the following section, I will start with a typology of errors that were found in interpreted texts during my empirical observation. They are related to three aspects: information units (section 6.2.1.1), the linkage related to concept units and information units (section 6.2.1.2) and clarity of expression (section 6.2.1.3). Then I discuss the training effect on the experiment group in which student interpreters received my cognitive training (section 6.2.2). Finally, I compared the experiment group with the control group which had not received my cognitive training, to see whether there would be any difference in the quality of the interpreted texts (section 6.2.3).

6.2.1.1 Errors Related to Information Units

(1) addition of inaccurate informative content

Example:

Source text: generally speaking, the elderly are not in good physical and mental state.

Interpreted text:
someone realize[s] because old people have the problem of physical and mental health".

Comment:

Adding "someone realize[s]" would cost more of the audience' cognitive energy for comprehension. The reason is that it would stimulate the audience to think (1) who is this someone?; (2) is this person special or famous?; and (3) whether the statement "the elderly are not in good physical and mental condition" is a fact or just someone's own judgement? Thus, the interpreted version not only added a higher comprehension burden to the audience, but also may distract the audience' attention from the speaker's real intention on care for the elderly.

(2) omission of informative content

Example:

Source text: …many hard-to-cure diseases and incurable diseases can be cured and prevented nowadays

Interpreted text 1: *...more and more diseases ...*
Interpreted text 2:*…some diseases that have been thought incurable have now been cured*
Interpreted text 3:*... many diseases not be able to cured, now can be cured…*

Comment:

In the interpreted discourse, there has been omission in all the subjects of the experimental group. It seems that the subjects have focused on the theme 'disease' without giving full supporting details that have been provided by the source text.

6.2.1.2 Errors Related to the Linkage

(1) **Misuse of the cohesive devices between concept units**

Example:

Source text:

Nowadays in the society there have been an increasing number of old people who are over 65 years old. ***Due to*** *the medical development in the last twenty years, many diseases, which were hard to cure or impossible to cure in the past, now can be treated and prevented.*

Interpreted text:

Nowadays old people aged 65 years old is more and more. ***But*** *with the medical development, many disease before is are not cannot be cured can be cured nowadays.*

Comment

The first concept unit (people are living longer) is the result of the second concept unit (medical science has developed rapidly). However, this subject has mistakenly used 'but' to describe this cause-effect relation.

(2) Misuse of cohesive devices between information units

Example:

Source text:

If the social workers are expected to take good care of the aged people, it needs not only a lot of money, but also great patience and love.

Interpreted text:

If the social workers to take care of them, ***they need more money****,* ***they need more patient*** *and* ***more warm heart*** *to take care of the old people.*

Comment

In the source text, to explain the solution to the aging problem (as in concept 4), the speaker emphasizes that to take care of those elderly, money alone is not enough; the aged also need more patience and love. The subject X has caught the three information units (money, patience, love) but arranged them in a parallel structure without showing the

degree of importance among them. This subject has conveyed the information units accurately, but failed to convey the speaker's intention.

(3) Redundancy in using cohesive devices

In subject X's interpreted texts in the two interpreting tests, almost every sentence starts with the word 'so'. Obviously this subject has overused this cohesive device, partly due to her personal style, but also partly due to the fact she was saving time to think about how to interpret the next sentence

(4) Misconnection

Example:

Source text: to take good care of the elderly, a large amount of funding alone is not enough. Patience and love are particularly needed.

Interpreted text 1: *A lot of money needs to spend in this field. People need to be aware of that. Patience and care to old people.*

Interpreted text 2: *... the society needs to..give a lot of funds and patience*

Interpreted text 3: *old people also need patience and love to be take care of.*

Comment:

In the source text, in order to take care of the elderly, patience and love are considered more important than financial support. However, the three interpreted texts have failed to reveal such relations among these three information units.

6.2.1.3 Clarity of Expression

(1) Incomplete sentences

Example:

Interpreted text 1: *as people's age is getting ...uh, as people tend to live longer nowadays, it leads to a big problem...*

Interpreted text 2: *because the elderly people are getting more, the elderly population is explosion*".

Comment:

In this example, the subjects interpreted in broken sentences as shown above. It seemed that the subjects paid more attention to the language form than to the conveyance of meanings. They were busy paraphrasing the fact that "people got aged". But they neglected the relationships between 'the aging problem' and 'a social problem'. The subjects did not show strong cognitive ability to abstract the core meaning of the utterances they heard.

(2) Unnecessary repetition

Example:

Source text: nowadays more and more people are over 65 years old

Interpreted text: *Nowadays in our society, more and more people are over 65…there are more and more people over 65*

Comment:

In this example, the subject made syntactic redundancy, which would add more comprehension burden to the audience. In addition, this could also cost more of the interpreting student's own cognitive energies during the reproduction efforts. The subject failed to summarize the informative content. More effort for this simple sentence in the source discourse would distract the subject's attention from focusing on the next new piece of information. In this way, we treat syntactic redundancy as a result of cognitive failure.

(3) Use of fuzzy expression

Example:

Source text: During the last 20 years.....

Interpreted text: *During the last 10 or 20 years……*

Comment:

We infer that this type of mistake may result from the interference of the subject's cultural habit in his/her A language (Chinese). Since the Chinese language prefers to use vague or generic terms rather than a very specific term to describe things. For example, a Chinese

expression “三年五载” (the literal meaning is “three or five years”) is used to mean “several years”, rather than exactly “three or four years”. Another Chinese expression “半斤八两” has the literal meaning “0.5 or 0.08 jin” (here ‘jin’ is a metric unit of weight), but does not refer to the exact weight as shown in the literal meaning. As a matter of fact, it just means “a little”. Similarly, in this example, the expression “in the past 10 to 20 years” (“在过去的一二十年里”) is a frequently used expression when Chinese persons refer to a long period in the past. However, the use of a fuzzy expression was not appropriate when the period in the given source discourse only referred to ‘in the last twenty years”. We attributed the subjects’ careless attitudes towards temporal expression to the influence of their cultural traditions in their native language and failure to understand the importance of accuracy in interpreting.

(4) Information density

Example:

Source text: consequently, people can live longer.

Interpreted text: *and this caused the instant result that is people can live longer.*

Comment:

In this example, the subject appeared to fully understand the given source discourse. However, he did not show his comprehension effectively at the reproduction stage. We attributed this typical error to the difference between Chinese and English.

With reference to Li and Thompson (1976), Chinese is a topic-prominent language, while English is a subject-prominent language (459). That is, in Chinese, “the structure of the clause takes the form of a topic, about which something is to be said, and a comment, which is what is said about the topic…[while English] has a subject-predicate structure” (LaPolla 2009:9). In topic-comment construction, “the topicalised string is often marked off” by “a rich system of focusing devices” (Setton 1999:117-118).

In the above example, the source text (in Chinese) conveys a message: “[C]onsequently, people can live longer”. A subject has interpreted this message into English as “[A]nd this

caused the instant result that is people can live longer". If we analyse this English sentence by the rule of topic-comment construction used in Chinese, we can see that the topic is "people can live longer'. The comment is: the fact that people can live longer is an "instant result".

This interpreted sentence is not accurate, because of the unnecessary use of "this caused the instant result". Moreover, this interpreted sentence may cause information density by jamming two pieces of information into one sentence. However, if this interpreted sentence is back translated into Chinese and reviewed in isolation of the source text, Chinese listeners may feel that the back-translated Chinese sentence has expressed the meaning very clearly and that the use of the comment clause has facilitated their comprehension. Therefore, I would like to point out that if student interpreters cannot realize the differences between Chinese and English in terms of information construction, this would affect the quality of their interpreted texts in English.

6.2.2 The Experimental Group

To evaluate student interpreters' WM management, their pre- and post-training interpreted texts were analysed and compared in terms of conceptual structure. The overall findings of the pre-training interpreted texts were that:

- all of the student interpreters could grasp the four concept units of the source text
- they could capture 50%-58% of the information units of the source text, and
- they appeared to have made misconnections.

This may imply that before my cognitive training, the student interpreters appeared to be successful in revealing the main ideas of the speaker's thought related to concept units, but they captured only 50%-58% of the supporting details related to the information units. Moreover, they had difficulties in setting up the conceptual linkages.

The post-training interpreted texts did not show any change in student interpreters' abilities in producing the concept units that were entailed in the source text. A possible explanation could be that the given source text was simple in content and short in length (see section 5.6.2). Progress was detected in the post-training interpreted texts. Student interpreters appeared to be more capable in grasping more information units, ranging from an increase between 17% and 35%. With regard to the linkages among concept units and information

units, except for one student interpreter who remained the same, the other two students reduced the number of linkage errors after my cognitive training. This positive teaching outcome might motivate future researchers and trainers for further exploration of the relationship between cognitive training and efficient WM management.

6.2.3 The Control Group

As mentioned in Chapter Five, the control group was asked to do the consecutive interpreting assignment twice parallel to the experimental group. The source text was the same one that was given to the experimental group. In my analysis of the interpreted texts by the control group, I used C, W and X to represent the subjects.

The information-related EA tool was adopted to evaluate the conceptual structure of the collected interpreted texts. The overall findings in my comparison of the interpreted texts that were given by the control group at different times were that:

- The second-time interpreted texts did not show any change in the number of concept units, i.e. the translation students grasped all the concept units of the source text.
- The second-time interpreted texts seemed to show a tendency of reduction in the number of information units, except for subject X, who showed a 10% increase in information units, while the other two showed a 10%-30% decrease in the number of information units in their second-time interpreted texts.
- The second-time interpreted texts seemed to reveal a slight increase in the number of linkage errors.

The similarity between the experiment group and the control group is that both groups showed no difference in capturing the main ideas or concept units of the source text. The differences between these two groups are their ability to express the information units that are entailed in the source text. Using a gap percentage method to examine the degree of progress within each group, I found an 8% decrease in the control group's ability in capturing information units and a 19% increase in the experiment group. This might imply that, with time, the control group could become weaker in recognizing information units and consequently produce interpreted texts that are not as elaborate as before. With the help of cognitive training, the experimental group seemed to strengthen their cognitive

abilities to grasp more details to support the related concept units. Due to the purpose of the quasi-experiment, which is not for generalizability, but for replicability (section 5.2), I cannot come to the conclusion that my cognitive training was the direct cause for the enhanced WM management. At least, this teaching outcome could provide food for thought on interpreting pedagogy.

6.3 Summary

The coding scheme for evaluating questionnaires (section 5.7.1) and the information-related EA tool (section 5.7.2) appeared to make my data analysis efficient. My findings in Q1 (pre-training questionnaire) and Q2 (post-training questionnaire) by the student interpreters appeared to show an improved recall of their knowledge about interpreting, in terms of both quality and quantity (sections 6.1.1 and 6.1.2). Similarly, the experimental group, which received my cognitive training, appeared to be more capable of grasping more supporting details or information units of the source text and of establishing more appropriate logical links, compared with their performance in the pre-training consecutive interpreting (section 6.2.1.2.1). These trends also resulted from the comparison of the interpreting performance of the control group, which did not receive my cognitive training (section 6.3). Given the fact that my observations were based on small groups, the purpose of my observation is not to generalize my findings, but to provide replicable research patterns for further research in this area (see my discussion of the nature and application scope of quasi-experiment in section 5.2). Therefore, the conclusions gained from my data analysis could be twofold. On one hand, for the student interpreters an improved recall of past learning experience and an increase in capturing more supporting details of the source text could imply a certain degree of positive relations between the application of the conceptual mapping model and their LTM and WM management. On the other hand, the fact that both the experimental and control groups grasped all the main ideas of the source text might imply a denial of the pedagogical value of the conceptual mapping model in terms of strengthening student interpreters' WM management in identifying the main aspects of the speaker's discourse. But such possible implications still need further investigation, given the possibility that the content, the degree of comprehension difficulty and the length of the source text might affect my observation of the training effect of the conceptual mapping model.

Chapter Seven Teaching Implications of the Application of the Conceptual Mapping Model

On the basis of the conceptual mapping model (Chapter Four) and its justification in cognitive training in consecutive interpreting (Chapter Five), in this chapter I will reflect upon the role and the fundamental concepts of cognitive training for student interpreters. To begin with, I will firstly present an overview of cognitive training in the teaching of interpreting (section 7.1). In doing so, I will discuss the necessity of doing professional training (section 7.1.1) and its basic criteria for quality teaching (section 7.1.2). Also, I will discuss the pedagogical challenges to cognitive training in the context of interpreting (section 7.1.3). Secondly, I will relate my understanding of cognitive training to the findings of the pedagogical application of the conceptual mapping model (section 7.2). Finally, I will propose a training model which aims at optimizing student interpreters' CPCM with a focus on memory operations (section 7.3).

7.1 Cognitive Training in the Teaching of Interpreting

7.1.1 The Necessity of Professional Training

The early history of consecutive interpreting can be traced back to the 1920s. But the training of conference interpreters started much later. The first generation of consecutive interpreters did not get any formal training. They attempted to improve their interpreting skills through their on-the-job learning. Interestingly, the outcome of their interpreting jobs was reported to be highly regarded by the delegates. Thus a long debated question arose: are interpreters born or made? Some maintain that quality interpreting could be achieved by means of interpreters' talent and field practice. Others argue that formal training helps to professionalize the interpreting industry.

In my study, I cannot emphasize the importance of interpreter training enough. Jean Herbert is a renowned interpreter who was one of the first generation of conference interpreters. He recalled his early consecutive interpreting as follows:

> I am grateful that my interpretations were not recorded, because if I heard them now I should certainly blush. However, that was the best that could be done at the time, strange as it may sound, it was appreciated. (Herbert 1978:6)

His remarks may imply that the argument against formal training is not sound, as it is only

based on such anecdotes or reports. These in turn might cause distorted perceptions of interpreters' performances. Kalina (2007) stresses that professional training is more than "talent and field practice" (111). Arrojo (1996) supports that having experience *per se* does not mean that such experience can be fully and systematically adapted to solving problems in the future. Therefore, she concludes that professional training can be of help not only to beginners, but also to those learners who already have experience, because it offers great opportunities "to systematize knowledge and apply a certain theory to a certain practice" (97).

7.1.2 The Quality Criteria for Professional Training

Professional training should enable student interpreters to have as much freedom and confidence as possible in being well prepared "for the conditions they will find in the working world" (Ulrych 1996:253):

> [T]he task of a training programme is not… to shape a finished product but to provide graduate translators with …transferable skills that will place them in a position to deal confidently with any text, on any subject within any situation at any time and to be able to discuss their choices if necessary. (Ulrych 1996:254-255)

The related literature has shown that interpreter training is in itself a profession that "should be suited to the realities of the job market" (Kurz 2002a:66). The ultimate purpose of professional training of interpreters is to give "the future interpreter a maximum of assurance that he will be fully prepared to successfully face the acid test of his first professional assignments" (Keiser 1978:11). For that purpose, interpreter trainers should carefully consider the *why, what* and *how* questions related to the teaching of interpreting:

First of all, a students' need analysis should be undertaken as a prerequisite for efficient training, because it is "a clear perception of what exactly needs to be trained" (Kalina 2007:18). With regard to the teaching content, authenticity is stressed in terms of the selection of "unedited" texts (Dollerup 1994:124) and the situational analysis (Vienne 1994:55). Kalina (2007) emphasizes the necessity of teaching communicative skills that she calls "soft skills". Assuming that "it is not sufficient for an interpreter to be able to translate orally whatever is being said unless that interpreter has also learned what rules are to be heeded when out of booth" (111), Kalina argues that compared with encyclopedic knowledge, soft skills are more important in assuring interpreters' successful cooperation

with clients and colleagues:

> [These soft skills] extend from negotiating technical conditions with potential clients and processing of contract details to handling of documents received and include in- and out- conference behavior, confidentiality, and contacts with clients and colleagues. The importance of these skills has, in my view, not been sufficiently acknowledged in the past. It may not even have been necessary to teach them back then, but it certainly is necessary today. (Kalina 2007:111)

Another quality criterion for professional training is the provision of a standardized training method. This can help interpreter trainers to organize their teaching and evaluation, give students "a sense of belonging to a better-organized profession", and equally important, provide "good observation opportunities for research into interpretation and translation" (Gile 1995:3-4).

In my opinion, I would like to add that authenticity in training materials alone is far from sufficient. I advocate creating an authentic interpreting environment, which will allow student interpreters to develop a real feel for the imperfection of interpreting scenarios and for the pressure of both the preparatory work and actual interpreting.

More importantly, I would like to foreground cognitive training, which is conceived as an important part of interpreting training, but which has long been neglected in theoretical discussion. My argument is that professional training should also give sufficient weight to enhancing student interpreters' cognitive abilities in their processing capacity management, in particular memory operations.

7.1.3 The Pedagogical Challenges to Cognitive Training in the Context of Interpreting

It is generally accepted that professional training needs to develop the student interpreters' competence in all aspects in order to produce quality interpreting performances. Due to limited training hours, student interpreters' language proficiency and learning abilities, efficient training should be problem-oriented. As Riccardi (1996) proposes,

> [p]roblem-oriented training should be given greater importance, as it helps interpreters to recognize, separate and focus on single difficulties thus facilitating and fostering a conscious development of diversified simultaneous interpreting strategies. (221)

Different trainers vary the priorities of specific interpreting problems or interpreting skills. Krouglov (1996:82) stresses "the active use of lexical and phraseological units and the ability or produce grammatically correct sentences". Schweda-Nicholson (1985) points out

the necessity to enrich student interpreters' knowledge about real court proceedings and give them opportunities to observe their own interpreting behaviors in role play and note-taking (151). Chernov (1996) emphasizes the importance of background knowledge and preparation skills for interpreting in SI training. He believes that "extralinguistic background knowledge [is essential] for ensuring the mutually shared background information of a typical…speaker and the interpreter" (226). I do not mean to downgrade all the aforementioned training priorities in developing the languages, an encyclopedic knowledge, or knowledge on subject matter and preparation skills. What I want to emphasize is that cognitive training should not be neglected and should be given top priority in order to arrange a diversity of training foci systematically. The underlying assumption is that all interpreting behaviors involve cognitive efforts.

The literature review has shown that cognitive training has not been placed at the top of the training list, although there has been agreement on its importance in interpreting. The core of cognitive training is equipping student interpreters with strong cognitive abilities to process information efficiently, and to identify and re-produce the meanings of the original message:

> Had interpreters not refused to utter words that only reproduced other words and instead looked for sense and conveyed ideas, the interpreter training (my emphasis) would not be as successful as it is today. (Seleskovitch 1999:56)

I would like to add that cognitive training, in its narrow sense, is to strengthen student interpreters' abilities to abstract and generate meanings between source texts and interpreted texts. Cognitive training, in its broad sense, is to "provide students with the metacognitive skills" that will enable student interpreters to evaluate their expanding competence and to monitor their performance (Ulrych 1996:255).

The pedagogical challenges in cognitive training on memory operations have come from two aspects. Firstly, most of time, it is trained implicitly. It could be found only in some simultaneous interpreting programs. For example, in an EU training program for conference interpreting, which is called the *stage*, at the initial stage, student interpreters are asked to do consecutive interpreting without taking notes. The aim is to strengthen the trainees' memory operation in terms of "following a logical argument", seeing the speech in blocks and reconstituting it by retaining the essentials of the argument in consecutive renditions" (Heynold 1994:16). Secondly, even when memory-related cognitive training is

given explicitly, no systematic teaching method is followed.

To my knowledge, the only teaching model for cognitive training was proposed by Haddad (2008). In her proposed curriculum for a potential two-year diploma/MA interpreter training program for Syrian universities, Haddad highlights the importance of memory training for interpreting beginners and advanced learners on the assumption that it could improve the novice's memory and prepare her/him for the coming phase. She further suggests that memory training should start at the very beginning of the whole training (39).

She divides memory training into three phases: the warm-up phase (sight translation), the intermediate phase (liaison and consecutive interpretation), and the advanced phase (simultaneous interpretation) (34). For practice, short English and Arabic texts of about 65 words each are presented to student interpreters. Student interpreters are required to progressively recall the information within and between English and Arabic texts (39).

In step I, students are provided with texts in Arabic (their mother language) and asked to listen attentively and recall as much as they can in Arabic. In step II, students are asked to listen attentively to the texts in their B language (English) and recall as much as they can in English. This improves their retentive ability as well as their command of language B. In step III, students are asked to listen carefully to English texts and to recall as much as they can in Arabic, while they are asked in step IV to listen carefully to Arabic texts and recall as much as they can in English. Both III and IV improve students' retentive memory and translation skills (39-40).

The advantage of Haddad's model for cognitive training is that students have the opportunity to enhance their processing capacity management by improving the quality of recall which involves the operation of their LTM. However, Haddad does not explain how to improve student interpreters' recall rate. My argument is that students need practical solutions to improve their memory operations, rather than the rigid instructions like "recall what you heard" or "do the interpreting now".

Another challenge in memory training is related to training patterns that remain the same even if the student interpreters' learning context has changed:

> The difficulty in the type of text they use is gradually increased, but their teaching methods are basically the same: a speech is delivered to the students, after which they are asked to summarize it. This is what they call consecutive without notes. (Ballester &Jimenez 1993:238)

If memory training is given by simply asking student interpreters to just memorize without telling them what and how to memorize, then what is the value of classroom teaching or formal training?

7.2 Implications of the Application of the Conceptual Mapping Model

The findings in the application of the conceptual mapping model have shown that student interpreters seemed to have captured all the concept units of the source text but that they have made errors in their reproduction of information units, and in establishing the linkages between and within concept units and information units. With regard to errors related to information units, typical error types are the omission of the original information and the addition of inaccurate information. With regard to errors related to the linkages, typical error types are incomplete sentences, unnecessary repetition and fuzzy expression (see Chapter Six). All these findings have provided valuable pedagogical implications on cognitive training in interpreter training. In the following section, I will relate these teaching implications to my discussion of a training model for cognitive training in interpreting. It should be noted that the main aim of this training model is not to provide a teaching procedure, describing specific topics and exercise forms for classroom teaching, although I will mention a few of them in my explanation of the training model. This training model is targeted at raising interpreter trainers' awareness of the fundamental issues in cognitive training.

7.2.1 Different Thinking Patterns in Source Text and Target Text

The student interpreters were found to make such errors as fuzzy expression and information density (as mentioned in Chapter Six). This could be attributed to their insufficient English proficiency or cognitive abilities. However, cognitive differences in expressing the same idea between English and Chinese could also be a factor. Therefore, my suggestion is that it is quite necessary for trainers to make student interpreters understand the cognitive differences between English and Chinese. Based on this understanding, trainers should encourage English and Chinese interpreting students to analyze fuzzy expression and information density, which is comparatively acceptable in Chinese, but would probably cause comprehension difficulty in English.

A striking error type discovered in my observation of interpreted texts is a massive use of

cohesive devices. It seems that the subjects understood the role of cohesive devices as a useful tool to set up the logical connection of ideas within a text. But the problem is that they used this comprehension facilitator inappropriately, because they treated it as an end of their reproduction. Their misconception is that the more connectors they could use, the more logical and clear their interpreted texts may sound. My suggestion is that it is vital to correct student interpreters' misconception on the relationship between cohesion and coherence. They should understand that it is not the quantity, but the quality of cohesive device that is important. In other words, the potential audience could understand interpreted texts not by how many words like 'but' or 'because' have been used by interpreters, but by how interpreters give a clear cognitive structure in their delivery. Furthermore, I would like to suggest that trainers should focus student interpreters' attention on the inner links among concept units and information units, illustrating the negative effect of inappropriate use of cohesive devices.

7.2.2 The Important Role of Cognitive Sub-competence

The findings in my observation have shown that the application of the conceptual mapping model seemed not to have any impact on student interpreters' ability to identify and reproduce the concept units entailed in the source text. However, it should be noted that given that the source text for the test enabled student interpreters to easily grasp all the concept units due to its simple, short and well-structured content, the student interpreters' failure in setting up appropriate linkages among concept units and information units may well imply their potential inability to categorize information into concept units if they were to meet up with a source text which is longer, more complicated and poorly structured. Therefore, I stress that the training on cognitive sub-competence should always be given top priority throughout the whole training process, because student interpreters' linguistic errors (e.g. grammar and cohesion) could result from their weakness in their processing capacity management to deal with a large amount of information during interpreting processes.

7.2.3 Learner Autonomy

The findings about these student interpreters' course expectations have shown a typical image of passive learners. They had no or only vague expectations for the would-be

training. This might well be attributed to three possible reasons. They may not have thought it was their responsibility to consider course objectives and organization, or it could have been beyond their knowledge, experience and abilities in imagining what an interpreting practice course should look like. Alternatively, their learning patterns may have been fossilized so that in their minds practice just meant listening to the source text and doing the interpreting. A high risk of such a passive learning style is that it may lead to negative teaching outcomes. Given that any human behavior involves cognitive thinking, being unable to discuss learning expectations may thus imply the students' weakness in predicting and clearly expressing their thoughts. Here, I want to emphasize that in the context of interpreter training, interpreted texts are not the only source for trainers to observe student interpreters' cognitive sub-competence. In my study, student interpreters' negative answers to their learning expectations may well imply a necessity in strengthening their learning autonomy.

Due to "a limited number of hours in the classroom" with student interpreters, "it is important that they know how to continue training themselves outside the lab" (Kornakov 2002:175). The student interpreters have to "take on extensive practice by themselves outside of class" (Miyamoto 2008:146). To overcome this problem that is common to training programs, especially those intensive interpreting training courses, it is necessary to enhance student interpreters' abilities to "self-regulate and self-monitor their learning outside of the training hours in class" (Miyamoto 2008:146-147). Unfortunately, with more universities engaged in interpreter training, criticisms have arisen on their neglecting student interpreters' self-learning competence. That is, interpreter training has been instructor-oriented in which "the trainer plays the major role in judging and evaluating trainee interpreters' performance" (Miyamoto 2008:146). Not much has been done to enhance the student interpreters' learner autonomy.

In his study of efficient learning for adults, Knowles (1975) points out that "people who take the initiative in learning (proactive learners) learn more things, and learn better, than do people who sit at the feet of teachers passively waiting to be taught (reactive learners)" (14). Therefore, I strongly emphasize the necessity of inviting student interpreters to take more responsibility in diagnosing their learning needs, formulating learning goals, identifying material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. The underlying assumption is that

through learning to be independent learners, student interpreters' cognitive abilities could be strengthened.

7.3 A Training Model for Cognitive Training in Consecutive Interpreting

Although student interpreters in my observation imagined the forthcoming practice course would follow a listen-interpret pattern that was not what they really wanted. Practice without real understanding could cause lower motivation resulting from tedious work which requires the students to do no more any undirected self-learning. Therefore, my argument for training is that it is not a matter of quantity, but a matter of quality, i.e. whether the practice is closely related to the weak areas of student ability. Good training thus refers to the one that can enable the students to get the best learning results through minimum use of their time and energy. In the following paragraphs, I will discuss the fundamental issues that trainers must consider in their syllabus design.

7.3.1 Learning Environment: Authenticity

There has been consensus that being authentic is a leading indicator for the selection of the source text. Authenticity in source texts can be manifested in the following aspects: the text itself, and its delivery format. When choosing source texts, trainers should evaluate the source text in two aspects: "[T]he amount of information crammed into [the text]" and "the rate and clarity of its delivery" (Alexieva 1999:46). In other words, the topic, terminology usage, argument development, contextualized versus non-contextualized information, the speaker's accent, voice quality and speaking manner need to be considered. Moreover, "the level of difficulty is gradually increased" in a selection of texts for interpreting (Alexieva 1992:225). Gile (2005) suggests that the level of difficulty, on the one hand, should not be "far above the current level of performance of a class (or a specific student)", while, on the other hand, it should "be difficult enough to require efforts from the students and to reveal their weaknesses" (139). Typically, some source texts can be chosen from influential accreditation tests or from official press conferences which were delivered with the help of professional interpreters. The rationale is that it strengthens student interpreters' motivation by letting them feel that they are working with authentic texts. From an educational perspective, I propose that authenticity should also mean duplicating real interpreting processes and real interpreting scenarios. In this way the

interpreting process may be understood in its broad sense, including not only the actual interpreting, but also the preparation before interpreting. Therefore, it is important for trainers to guide student interpreters do their documentary search efficiently. When evaluating students' interpreted texts, trainers should raise students' awareness of being audience-friendly, i.e. by giving serious consideration to the "acceptability" of interpreted texts (Klaudy 1996:198), since quality interpreting gives priority to user expectations (section 2.3.2.5).

Interpreting in a lab is different from interpreting in a real working scenario, which involves the presence of speaker and audience. Even expert interpreters may also feel nervous in that situation. Therefore, it is necessary for trainers to provide mock conferences. De Laet (2010) suggests that "in the final semester of the curriculum, [it] might help the interpreter trainee to acquire enough self-confidence and personal autonomy, sufficient skillfulness and expertise" (254).

7.3.2 Free Translation and Literal Translation

It is understandable that one source text could result in a variety of interpreted texts (Setton 1999:173). Interpreting strategies may account for that in part (Gile 1995:61-62), involving free translation and literal translation, a pair of concepts that have aroused heated debated in the study of written translation.

In translation studies, the pros and cons differ in their understanding of "the degree of 'freedom' vis-à-vis the original" (Padilla & Martin 1993:201). For those who emphasize fidelity to the source text, literal translation, which is based on word-for-word translation so as to achieve equivalence at lexical and syntactical levels, is adopted (Ai 2004:195). The advantage of literal translation lies in its transfer of "all the meanings of the original without any omissions or additions" (Chen 2004:95). The high risk, however, is that "it emphasizes content at the expense of style" (ibid.). For those who emphasize translation as "presenting its profound thought", free translation, which "does not follow the exact order of words and sentences of the original text but reorganizes and elaborates … [but] does not deviate from the original ideas", is used (ibid.). The merit of free translation lies in the fluency of the target text, which maintains continuity of meaning and thus produces audience-oriented target texts. The risk may be that arbitrary modifications to the original text could sacrifice the original meaning of the author (Ai 2004:196-197).

While translators' freedom has been heatedly debated in translation research, it seems that there has been "no such debate" in interpreting research (Padilla & Martin 1993:201). There seems to be a consensus that "interpreters formulate largely independently of input sentence structure" (Setton 1999:173). Free translation is considered "permissible and in fact desirable [and] an essential prerequisite" in interpreting (Padilla & Martin 1993:201).

The preference for free translation could be due to the intense time pressure caused by interpreting, which often makes it difficult or impossible for interpreters to render all the details. In her theory of deverbalisation, Seleskovitch (1978) advocates conveying the underlying message of the source text. Moreover, in expert-novice comparisons, professionals seem to be more flexible and able to "forget single words…[because they] concentrate on meaning", while student interpreters "are afraid of missing part of the original message and stick to the superficial structure of discourse" (Fabbro & Gran 1997:24). All these studies have caused a far-reaching effect on interpreter training, which emphasizes the importance of the pragmatic effects of interpreting. In the context of interpreter training, Gile (1995) points out that "[i]n interpretation, more extensive stylistic and informational changes may be acceptable….[provided that] the interpreter focuses more on the Message"(65). Free translation allows interpreters to discard the form of the words and the structure of the source text. Therefore, interpreters are "free to concentrate on analyzing its meaning and to express it in the target language" (Orlando 2011:n.pag.). In doing so, students are required to take in the meaning of a text, to isolate the sense units, to organize them, to avoid including anything but the essentials in the rendering of the message, and also at the same time to abide by the logical coherence and the linguistic cohesion of the original (Ballester & Jimenez 1993:238). Here, the use of omission is not considered "a reduction in quality [since] …quality, in the broadest sense, must thus be a measure of the extent to which a communication act achieves its aims" (Pym 2008:90).

As far as I am concerned, the use of these two interpreting strategies should not force interpreters to make a choice: adherence to free translation or literal translation. As discussed earlier, free translation is essential for interpreting. But excessive or exclusive free translation would adversely affect the accuracy of interpreting quality. Contrary to the opinion that free translation is the only interpreting strategy for interpreters, I would like to point out that literal translation also serves as an emergency tactic when interpreters do not know how to translate some terms. Through literal translation, interpreters let the audience

decide its meaning on the basis of their shared background knowledge with the speaker. However literal translation is a must for interpreting proper nouns and numbers. The findings in the evaluation of interpreted texts in this study have shown that when students used free translation to interpret numbers, e.g. 'in the past twenty years' was interpreted as 'during the last 10 or 20 years', fuzzy expressions like this reduced the degree of accuracy (section 6.2.1.3).

I propose that trainers should raise student interpreters' awareness of the relationship between free translation and literal translation. Doing conceptual mapping is intended to help student interpreters to form the best route in information processing. That is, using minimum time and energy, they could identify and reorganize information accurately and promptly. It should, however, be noted that in their interpretation, the interpreted texts should "resemble the original pragmatically, logically and semantically, but not syntactically, morphologically or phonologically" (Setton 2003:150). Additionally interpreted texts are required to be "both idiomatic and terminologically accurate" (ibid.). The choice of either interpreting strategy is determined by whether it would help the realization of the expected pragmatic effects.

In teaching the free-translation strategy to Chinese student interpreters, effort is needed to ensure student interpreters make meaning explicit. The data analysis of the interpreted texts of this study has shown three major language problems: fuzzy expression, information density and overuse of cohesive devices (section 6.2.1.3). These problems may reflect the student interpreters' cognitive problems in information processing since the information was there, but hidden in unclear linguistic expressions. Differences in cognitive thinking between English and Chinese may probably explain this phenomenon. That is, "the Chinese language lacks precision, always failing to convey the sophisticated content expressed in a foreign language" (Ai 2004:195). Therefore, I propose that student interpreters should also be given more opportunities to practice how to express themselves concisely and precisely in English, a form of cognitive exercise that so far has not been found in previous research on interpreter training.

7.3.3 Note-taking and Conceptual Mapping

In AIIC's glossary, note-taking is treated as "an essential element of consecutive interpreting", which aims at helping interpreters remember the contents of the speech"

(AIIC 2011:n.pag.). The proponents for note-taking maintain that note-taking is considered to be an integral component of interpreting that reduces an interpreter's burden on his/her working memory (Dam 2007:184), as note-taking using abbreviations, "reduce[s] the words into the smallest unit possible" (Mahmoodzadeh 1992:234). Many researchers have focused on the practical aspects of note-taking by listing various note-taking techniques (cf Herbert 1952; Rozan 1956; Jones 1998; Nolan 2005). Opponents of note-taking do not deny its usefulness, but argue that a greater effort going into note-taking could "diminish [interpreters'] total processing capacity and impair the work their memory can do" (Alexieva 1994:198). As a result, the interpreter would not have sufficient energy for in-depth comprehension and effective reproduction (see Chapter Three). In this regard, Gile (1995), for example, states that "it generally turns out that students who did not take notes heard the names better than the ones who did" (189).

Despite the controversy over the role of note-taking, it should be understood that it is impossible not to take notes when a speech is long and complicated. Theoretical research on note-taking in consecutive interpreting has focused mainly on two questions: what and how to note down? Mahmoodzadeh (1992) suggests that interpreters should note down "the most important elements of each statements such as subject, verb, object" (234). Alexieva (1994) stresses that optimized note-taking should reflect "the hierarchical network of continuity of meanings, which allows for an optimum decision-making for determining what can be remembered and what has to be written down for memory reinforcement" (206). Albl-Mikasa (2008) argues that "a thorough understanding and the construction of a mental model are beneficial…[but not sufficient]… when it comes to recalling detailed textual information in the short term and minimizing the risk of losing source text input" (225). She proposes that extracting the micro-propositions of the source text "is conducive to the particular function of note-taking as a memory aid" (ibid.). With regard to the question on how to take notes, Santulli (2002) proposes that good notes should be arranged not horizontally, but vertically, which shows meaningful segments and transition markers "used to indicate the conceptual links between the different sections of the notes" (265).

The conceptual mapping model of this study fits the need of teaching note-taking systematically. Here note-taking is treated as "no more than an aid" to enhance interpreters' comprehension and reproduction, because "the best notes in the world will not

[necessarily] make you a good interpreter" (Jones 1998:43). With the guidance of the conceptual mapping model, notes are produced as a text, which, on the one hand, covers the global structure of the original message by means of concept units, while, on the other hand, builds up information at a local level by means of information units. Treating note-taking as a cognitive exercise may realize the goal to "relieve [interpreters'] memory…[without]…distract[ing] them from the key task of listening attentively to what comes next" (Jones 1998:43-44). The reason for this is that note-taking is seen not as mere recording what has been said, but as parallel information processing involving the aim of in-depth comprehension.

The advantage of using conceptual mapping in the process of note-taking is that it may reduce interpreters' memory burdens, because "although it is very difficult to remember a large number of *words*, it is not so difficult to remember a series of *ideas*" (Garretson 1981:244). Another advantage is that well-structured notes could help interpreters to recall and activate their LTM on what has been said by the speaker, and facilitate their WM process by enabling them to "read ahead in one's notes…[to]…foresee possible difficulties and decide in advance what to do about them" (Mead 2002:76).

7.3.4 A Combination of Product- and Process-oriented Feedback

Feedback is a pedagogical tool in guiding the learners systematically and efficiently towards their study goals. As Ferris (2006) points out, "the role of feedback is to engage students in guided learning and problem-solving and help them build skills as independent" (83). Without feedback, adult learners "will experience anxiety, frustration, and often failure, and so will their teachers" (Knowles 1975:15). For trainers, giving feedback is not only their duty, but also a useful tool to collect information about their students' profiles:

- Learning what his/her students are thinking and what they need
- Evaluating the teaching quality, i.e. whether the students have really understood the related instructions
- Offering practical analysis and suggestions on specific problems encountered at different stages of learning

- Keeping the students motivated by giving feedback.

The quality of feedback involves two main questions: (1) what to comment on, and (2) how to comment. With regard to the content of feedback, the literature review has shown two main types of feedback: product-oriented and process-oriented. In product-oriented feedback, feedback is considered to be error correction. The trainer focuses on "the erroneous renditions" of the target text in terms of "style and content" (Dollerup 1994:129). In process-oriented feedback, trainers focus on translation/interpreting strategies rather than the target text:

> They devote most of their effective teaching time to Translation strategies, and lose little time over their by-products. In process-oriented classroom training, prior to translation exercises, methodological guidance is given in the form of basic concepts and models. (Gile 1995:125)

In my study, I suggest a combination of these two types of feedback. The reason is that feedback on the target text alone could not strengthen the students' abilities "to perform successfully in novel situations" (Anderson 1982:391). Moreover, feedback on methodology alone could make students feel that the training is too theoretical and not practical. Here, passive feedback is defined as spending most of the teaching time on "students' selection of particular target-language words or linguistic structures" (Gile 1995:10). By contrast, positive feedback is to guide the students in moving from lower-level linguistic problems to higher-level cognitive problems (Alexieva 1998:187), which involves "accessing the dynamic processes" of interpretation (Séguinot 2000:147).

I suggest that mutual efforts from trainers and student interpreters are needed to set up a learner-oriented pedagogical setting for giving feedback. Feedback could potentially become trainer-oriented due to the following reasons. Firstly, it may take place at the learning stage, in which the trainer has to dominate the classroom teaching when students lack sufficient knowledge and cognitive abilities in doing critical thinking. Secondly, it may take place when trainers do not realize the importance of engaging students in active learning. Thirdly, it may take place when the cultural factor requires students to show their respect for trainers by not arguing against them. Trainer-oriented feedback could lead to inefficient teaching outcomes, as students may simply read the marks and remarks without further exploring the justification of the feedback and seeking solutions to their interpreting problems.

I assume that if the students do not reflect on the teacher's comments on their work, the

activity of doing that assignment would have lost its value. Thus I strongly suggest keeping a balance between trainer feedback and student feedback, which could make students' learning more meaningful. Student feedback involves "self-evaluation and reflection" (Johns 2006:162). It can take place between trainers and students, and between students. Alexieva (1992) stresses that "the report and discussion session, in which the students report on their findings is important", because it can help student interpreters to "develop their understanding of how we recognize and experience the world, and the way it is expressed in language" (227-229). Since the meaning of training by itself is "handing over the control of the task to the learner" (Weissberg 2006:249), at the early learning stage, students need more controlled feedback from their trainers to show them the problems, causes and strategies. With their progressive acquisition of knowledge and skills, students should be given more opportunities to "determine a way to revise in response to the feedback" (Goldstein 2006:203).

7.3.5 Trainers' Role in Learner Autonomy

It is self-evident that quality teaching is dependent on quality trainers. In brief, qualified interpreter trainers should know how to integrate their interpreting experience and interpreting knowledge into efficient classroom teaching. Here I would like to remind interpreter trainers' awareness of enhancing students' autonomous learning abilities, because "the role of autonomous learning in interpreter training can never be overestimated" (Fan 2010:278). Autonomous learning is especially important for Chinese students, who have been found to be "often more comfortable with advice from the teacher on what they need to work on autonomously and explicit instructions on how to go about it" (Fan 2010:278). The findings of Q1 has again proved that at the start of interpreting practice course, student interpreters appeared to be passive learners who had little or no specific expectations of the forthcoming training. In order to strengthen students' autonomous learning abilities, I have developed three teaching principles as follows:

The first principle is to know your students by doing a student need analysis at the very beginning of the teaching process. In this study, the findings from Q1 that was carried out at the beginning of the first training class revealed student interpreters' weakness in LTM and passiveness as learners (see 6.1.1.2). Such information enabled the trainer to justify her teaching purpose as strengthening student interpreters' memory operations. Having

realized that the student interpreters appeared to be passive learners, she educated them about the negative effects of being passive learners and also encouraged them to think critically. To do so, she expected the student interpreters to ask themselves questions as follows: (1) what do I want to learn from today's class? (2) what is the purpose of doing this interpreting exercise given by the trainer? (3) Did the trainer comment my interpreting performance reasonably? (4) How could I avoid this type of interpreting problems in future training and interpreting? Thus classroom observation in this study has shown that student need analysis could give valuable information to the trainer to adjust his/her follow-up training to fit his/her students' needs.

The second principle is to share responsibility with the students throughout the training process. Student interpreters should not see themselves as outside the training process in that they have nothing to do with how to improve their interpreting quality, because that is, according to them, the trainers' sole responsibility, and that all they need to do is wait for trainers to give them various interpreting exercises and comment on their performance. In order to encourage student interpreters to be active learners, a most efficient way is let them share responsibility with trainers. To do so, trainers should let student interpreters understand their learning deficiencies, and the importance of learning autonomy. Most importantly, trainers should guide them to finally become independent in monitoring the strong and weak areas in their learning and then working out the strategies to fit their personal learning style. Chesterman (1996) stresses the importance of explicit teaching of translation theory (65).

The third principle is to enable student interpreters to see their progress. In this study, student interpreters appeared to be highly motivated for the interpreting practice course, because they felt that they would learn practical interpreting skills (see section 5.4.2). High motivation is a good start for effective learning. But it is necessary to keep student interpreters motivated throughout their learning process. Kurz points out that

> it is an axiom of human nature that in the absence of progress we tend to lose interest. Thus, highly motivated students may find it difficult to maintain peak levels of motivation in the absence of clear short-term assignments. (2002a:68)

In interpreting training it is very likely that without appropriate guidance, students may feel tired and complain that interpreting exercises are not practical because they do not feel they are making any progress. Therefore, "[i]t is all the more necessary for the interpreter

trainers to play a part in helping students to make a correct diagnosis of their problems" (Fan 2010:278). To tackle this type of learning problem, in the cognitive training of this study a checklist was designed. It was clear and concise in targeting the main cognitive difficulties, as well as being easy to use by quantifying cognitive errors (see section 5.7.2.3). Using this checklist, student interpreters could know exactly what type of errors they had made in their interpreting performance. In this way, they could isolate their weakness in cognitive abilities, which provided a good platform for them to work out interpreting strategies of their own.

7.4 Summary

Professional interpreter training is aimed at preparing interpreters for a variety of challenges that may arise in real interpreting scenarios. For that purpose, one of its features is being problem-oriented in the sense that trainers should help student interpreters to solve their specific interpreting problems. Cognitive training is thought to play a vital role in enriching student interpreters' knowledge and enhancing their interpreting skills, in addition to the importance of other sub-competences in interpreter training. Cognitive training focuses on enhancement of memory operation. In order to make cognitive training efficient, I related this issue to the findings of my empirical observation in this study. These findings revealed the differences in cognitive thought patterns between English and Chinese, a lack of cognitive abilities for efficient information processing, as well as a lack of learner autonomy, all of which called for improved memory operation. In this context, I developed a training model for cognitive training. The aim of this training model is not to provide specific training methods, since I believe teaching creativity and innovation are vital to flexibly deal with different kinds of students. My major concern is to raise trainers' awareness of the fundamental training issues. These are authenticity in the learning environment, the choice between free translation and literal translation, the relationship between note-taking and memory operation, systematic feedback, as well as the trainers' role in cultivating learner autonomy.

Chapter Eight Conclusion

This chapter summarizes the theoretical and empirical parts of this study and outlines the working directions to continue my future research along the cognitive paradigm. I will start with briefly explaining the conceptual mapping model, which was developed to reduce cognitive overload by optimizing interpreters' cognitive processing capacity management, followed by the justification of this cognitive model in my cognitive training (section 8.1). Secondly, I will point out the limitations in the research methodology and teaching methods (section 8.2). Thirdly, I will give practical suggestions on deepening my research on the optimization of student interpreters' cognitive processing capacity management and on relating it to interpreter trainer education (section 8.3).

8.1 Synopsis

The urgent need for qualified interpreters and for quality interpreter training (in particular in consecutive interpreting) has been the main drive for this study. Based on my experience as an interpreter trainer at tertiary level and as an interpreter in both China and New Zealand, I have paid special attention to potential solutions to interpreting problems that are caused by a lack of cognitive competence. Much of the literature has shown that expert interpreters appear to be more cognitively mature, as they focus more on information processing rather than on finding out linguistic equivalence. The literature also shows that student interpreters seem to lack sufficient cognitive ability in identifying and reorganizing the ideas of the source text into quality interpreted texts. The lack of cognitive ability may lead finally to cognitive overload, in that there is too much information to be processed. It is agreed that cognitive overload is the result of conflicts between cognitive requirements and interpreters' limited cognitive processing capacity. In the context of consecutive interpreting, interpreters are expected to listen to the source text attentively, note down important information for later recall, and then with the help of note-reading, produce their interpreted text. All these interpreting efforts consume a large amount of time and energy. However, according to cognitive science, the cognitive processing capacity of human beings is always in limited supply. When interpreters do not know how to operate their memory system efficiently and balance their attentional resource for those competing

interpreting efforts, inefficient cognitive processing capacity management would lead to a reduction in the quality of interpreting. Considering the necessity to reduce cognitive overload in interpreter training, this study explores a feasible solution, with a focus on memory operation, which could enhance student interpreters' cognitive processing capacity management.

For the purpose of adopting a cognitive approach, I have developed a conceptual mapping model that treats consecutive interpreting as conceptual mapping. Since interpreters may share little background knowledge with the speaker, it is necessary for interpreters to predict how the interpreting topic might be developed. Before their actual interpreting, interpreters are expected to set up their preliminary conceptual map by using concept units that are related to the thematic aspect of the interpreting topic, and information units that are subordinate to concept units and include detailed information on single concept units. With this preliminary conceptual map, interpreters start to do a focused documentary search which could be selective and efficient. Thus the actual interpreting becomes a process of matching the interpreters' preliminary conceptual map with the conceptual structure of the speaker's speech. In this way, interpreters could save their energy, because they do not start their interpreting from knowing nothing, but from aligning their preliminary conceptual map to best represent the speaker's intentions.

To justify this cognitive model for consecutive interpreting, I have made observations on the training effect of this model in a postgraduate interpreting program at the Centre for Translation and Interpreting Studies, at The University of Auckland. The research pool included three student interpreters for the experiment group, who received my cognitive training via the application of the conceptual mapping model, and three translation students for the control group, who did not receive the said cognitive training.

The findings were that before my cognitive training, student interpreters showed a low recall rate of their previous theoretical learning on interpreting. Moreover, their interpreted texts appeared to be weak in terms of completeness of information and coherence. After my cognitive training, they did not show any change in the number of concept units that they captured from the source text. It is worth noting that they were able to grasp more information units and make fewer errors in the set-up of logical links in their interpreted texts. Furthermore, the experiment group appeared to make more progress than the control group in interpreting performance.

Due to the small size of this empirical observation, the above-mentioned findings are not meant to confirm a cause-effect relationship between the teaching of the conceptual mapping model and the improved training outcome (see section 5.2). Rather, these findings have provided enough hints for further research along the cognitive dimension.

In light of the conceptual mapping model and the findings of my cognitive training, I have discussed five issues that are fundamental in the implementation of the conceptual mapping model in classroom settings. That is, I have expanded the understanding of the notion of authenticity in interpreting pedagogy, stressing that it should not be understood in a narrow sense, thus the source text and practicing exercises should be as near as possible to real interpreting scenarios. I suggest that authenticity in interpreter training, in its broad sense, means a real learning environment, ranging from the selection of source texts to the inclusion of the documentary search through to the interpreting process being audience-oriented. While numerous researchers continue to discuss quality criteria for interpreting, I have discussed the relationship between free translation and literal translation, which I assume is related to the choice of interpreting strategies. The rapidity of interpreting requires interpreters to do free translation most of the time, while literal translation is essential for non-contextualized information such as names and numbers.

I have also pointed out that the findings of my empirical observation have revealed problems in the clarity of expression by Chinese students. I do not see unclear or vague expressions as linguistic problems, but cognitive problems due to differences in cognitive thinking patterns between English and Chinese. I emphasize the need to alert both trainers and Chinese student interpreters to make appropriate adjustments so as to achieve quality free translation. I have discussed arranging the content and layout of note-taking on the basis of the conceptual mapping model. I have analyzed the importance and techniques of giving quality feedback, which aims at merge theoretical learning with interpreting practice. Finally, I have highlighted the importance of the trainers' role in cultivating student interpreters' learning autonomy.

8.2 Limitations

The most significant limitations of this study are the research size, the interpreting directionality, the degree of difficulty in the source text used and the treatment of note-taking in my cognitive training.

The research size of this study is very small. This might increase the risk of making invalid generalizations about the findings. However, small projects have been the main form of empirical research in Interpreting Studies (Kurz 2001b:101), due to "difficult access to data" (Gile 2000a:79). Gile (2001b) argues that "as long as no unreasonable generalisations are made, there is nothing wrong with studies on very small samples" (12). He also proposes that "priority should be given to projects which are methodologically simple, small …and practical" (cited in Kurz 2001b:103). Kurz (2001b) agrees that with "the availability of an adequate infrastructure, small, well-designed studies, too, can yield valuable results and new insights" (101). However, it should be kept in mind that small research projects need to be well designed so as to meet scientific standards, and that "the implications, and in particular the limitations associated with this experimental procedure must be kept in mind" (Čeňková 2001:79).

The second limitation concerns the role of interpreting directionality in the interpreters' comprehension and production efforts during interpreting. In this study, consecutive interpreting was conducted from interpreters' A language into their B language. This is mainly due to the intention to remove non-cognitive factors in the study of interpreters' cognitive processing capacity management. The underlying assumption is that understanding the source text does not necessarily guarantee satisfactorily interpreted texts (as shown in Chapter Six).

The third limitation concerns the degree of difficulty of the source text that was used for consecutive interpreting. As discussed in Chapter Five, the comparison of interpreted texts before and after cognitive training did not show any change in the number of concept units within the experiment group and within the control group. It seemed to imply that cognitive training did not have any impact on the subjects' cognitive ability to capture the thematic aspects of interpreting topics. However it should be noted that another potential reason could be that the source text for the test was too simple in both content and language, so that it could not reveal the subjects' real ability in identifying the main aspects of the interpreting topic.

The fourth limitation concerns the teaching of note-taking in cognitive training. The twelve-week intensive interpreting training puts time pressure on both trainer and students. They needed to (1) identify the cognitive deficiencies in interpreting performance; (2) discuss the role of the conceptual mapping model for consecutive interpreting; (3) apply

this model to the students' interpreting exercises; and (4) evaluate their interpreted products and interpreting behaviors before and during the interpreting. Not much time was left for in-depth practice of note-taking skills.

On the basis of my theoretical exploration and empirical study of consecutive interpreting along the cognitive dimension, in the following paragraphs I will discuss the lessons that I have learnt and give suggestions on research methodology and interpreting pedagogy. I believe that future research on the cognitive aspects of interpreting will surely benefit from a thorough reflection on the limitations of the current study.

8.3 Working Directions for Future Research

My research into cognitive processing capacity management in consecutive interpreting has highlighted more questions than answers.

In light of this study's findings, I will further explore the optimization of training strategies not only within the interpreting practice course, but also between the componential courses of an interpreting training program. For the first pedagogical purpose, I will continue to explore the relationship between cognitive training and optimization of student interpreters' cognitive processing capacity management (CPCM). For that purpose, firstly I will explore how cognitive thinking patterns influence Chinese interpreters in their production of interpreted texts. On the ground that

> [f]or many Chinese interpreting students, the problem is … even when they do recognize the ideas of the original speech, they fail to split them into meaning units and recast them into short and simple Chinese structures. (Fan 2010:267)

In incorporating the findings of this study future research, I will examine (1) the similarities and differences between English and Chinese in cognitive thought patterns; (2) how such differences adversely affect the production of interpreted texts; and (3) whether cognitive similarities help successful cognitive transfer in interpreting. Furthermore, I will explore whether cognitive problems increase when interpreters have to do consecutive interpreting from their B language into their A language.

Furthermore, I will investigate the training effect of the conceptual mapping model on the optimization of note-taking and note-reading. Note-taking and note-reading could be a kind of memory aid if used properly, or an attention distractor if used inappropriately. The result of this study may provide a solid foundation in pursuit of balanced attention

allocation during consecutive interpreting. Following this paradigm, I will study how to further improve WM operation in the optimization of note-taking and how to activate LTM in note-reading.

As mentioned earlier, my second pedagogical purpose is to search for optimized training strategies by strengthening the inner links between the componential courses of an interpreting program. Usually, an interpreting program includes a theoretical learning module and an interpreting practice module. The findings of this study have revealed that the gap between these two training modules leads to the situation that mere learning theory is undervalued by student interpreters. I assume that cognitive training should not be restricted to an interpreting practice course, because strong cognitive abilities are also needed in the documentary search and digestion of information from the theoretical module. Therefore, in future research, I will investigate how to apply the conceptual mapping model to student interpreters' theory learning, which involves the aggregation of various theories, models and codes of ethics into a coherent knowledge system on interpreting.

Last but not least, I will investigate the attitudes of interpreter trainers towards cognitive interpreting. There have long been complaints about the conversion of interpreter training into the teaching of translation and/or advanced language learning (see section 1.1.2.2.). In this context, I will investigate how cognitive training is understood and practised in classroom settings, by addressing (a) trainers' understanding of interpreter competence, (b) their attitudes towards the role of cognitive training, and (c) the exercises they designed for cognitive training.

Appendix

Appendix A: The Analysis of the Test Material

During my case study, student interpreters were asked to interpret the test material from Chinese into English. For the convenience of analysis, the source discourse was numbered.

The title of the passage is The Problem of the Aged.

①当今社会，六十五岁以上的老年人越来越多。②由于最近二十年里医学的发达，好多以前认为是很难医治或者没法医治的病，现在都有办法预防和治疗了。③所以人的寿命也就越来越长。④好多人不单是可以活到六十五岁，老年人活到八、九十岁也都是很普遍的。⑤随着老年人的年纪越来越大，造成了一个老年人人口爆炸的社会问题。⑥社会学家一致认为这个问题已经相当严重。

⑦一般来说，老年人的身体和精神一定不是很好。⑧他们特别需要其他人的照顾。⑨如果他们的家人没有办法照顾他们，就只能够靠社会工作团体和有关的政府部门的安置。⑩要好好的照顾老年人，不单单需要大笔经费，更加需要很大的耐心和爱心。

The whole source text contains ten sentences, the tape script of which is presented in two paragraphs as in the NAATI test book. Using the theoretical constructs of the conceptual mapping model, the source text is analyzed on the basis of concept units and information units, together with the linkage among them.

From the informational processing perspective, a total of four concept units are involved in this source text:

Concept 1: **situation (**i.e. people are living longer)

Concept 2: **causes** (i.e. the development in healthcare)

Concept 3: **result** (i.e. the explosion of the elderly population)

Concept 4: **solution** (i.e. care from family, society and government)

Each concept unit is extendable into a cluster of relevant information units.

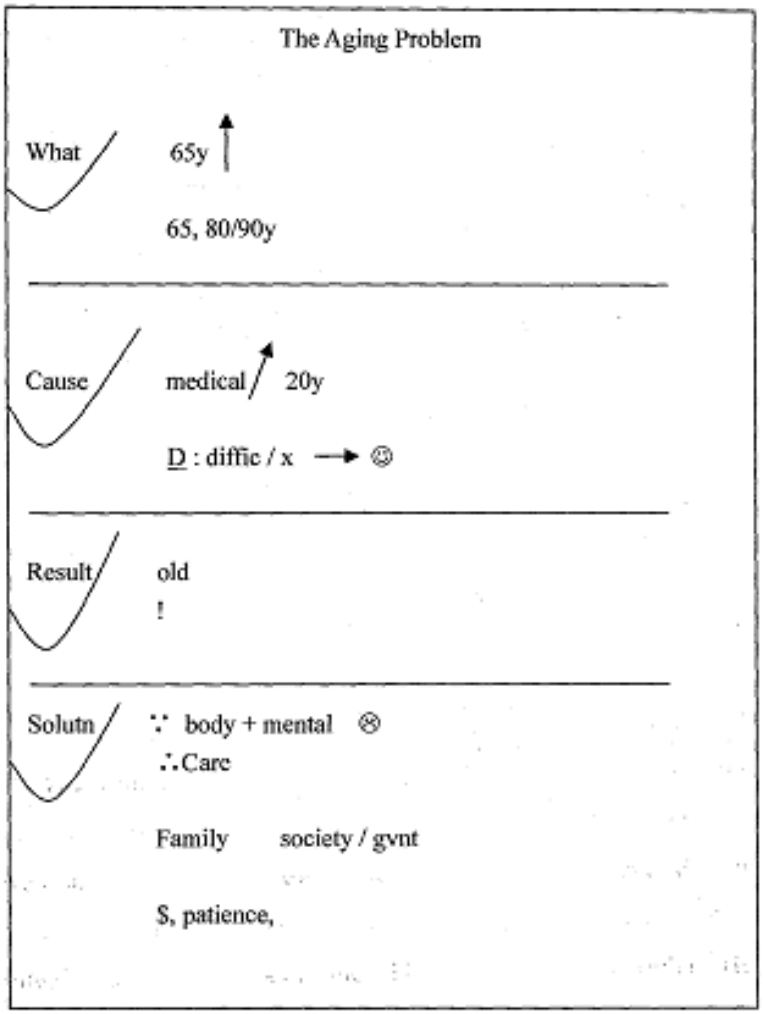
Concept 1 (**situation**): 65yr, 80-90yr

Concept 2 (**causes**): difficult disease now treatable; through prevention and treatment

Concept 3 (**result**): sociologists, serious social problem

Concept 4 (**solution**): a large amount of funds, patience and love

I suggest that the information of a given source text can be segmented by using concept units and information units. This segmentation method can clearly show the structure of the given source text and the relationships of the information involved. The following note format displays how to segment the information of the source text in terms of concept units and information units:



Appendix B: Interview Questionnaire One (before the Cognitive Training)

Part One: About the course

Q1: What do you expect to achieve through this interpreting training program?

Q2: What do you want to learn most from interpreting training course?

Q3: What do you think is high quality interpreting?

Q4: Do you have any idea of what an interpreting practice course should or might entail? If yes, briefly explain.

Q5: Do you have any topics that you are most interested in for the incoming interpreting exercises? If yes, name some of them (no more than 3).

Part Two: About your education background

Q6: How many years and to what degree of proficiency have you learned your B language?

Q7: Have you ever received interpreting training before? If yes, where and when?

Part Three: About your language proficiency

Q8: Do you have any problems when using Chinese for daily communication and academic purposes? If there are any problems, give some examples.

Q9: Do you have any problems when using English for daily communication and academic purposes? If there are any problems, give some examples.

Appendix C: Interview Questionnaire Two (after the Cognitive Training)

Q1: What is a high quality interpreting performance?

Q2: How can an interpreter prepare for his/her interpreting assignment?

Q3: What are the main strategies that can be used during the interpreting process?

Glossary

AIIC: Association Internationale des Interprètes de Conférence, an organization founded in 1953 to protect the interests of conference interpreters.

Chuchotage: A form of interpreting in which the interpreter sits next to the client or delegate for whom he or she is interpreting and whispers the interpreted version of what is being said.

Cognitive Overload: A negative phenomenon resulting from the conflicts between cognitive requirements and limited processing capacity. Cognitive overload occurs when there is too much information to be processed.

Cognitive Processing Capacity Management: A cognitive activity dealing with information processing by means of memory and attention.

Concept Unit: A concept-based organizational unit in the build-up of a text. Within the conceptual mapping model, it refers to the cognitive content of information, reflecting the thematic aspects of topics.

Conference Interpreting: A type of interpreting which includes two working modes: consecutive and simultaneous interpreting. Nowadays, conference interpreting is often treated as synonymous to simultaneous interpreting in the scenario of international conferences.

Consecutive Interpreting: One of the two basic modes of conference interpreting (the other is simultaneous interpreting). During the interpreting session, the interpreter listens to a section of a speech delivered in source language, and takes notes; then the speaker pauses to allow the interpreter to render what has been said into the target language.

DG-SCIC: A unit within the European Commission, responsible for interpreting services and conference organization.

Directionality: A term referring to the language direction of the translation or interpreting process (i.e. from which language into which language).

Effort Models: A theory developed by Gile (1995) to describe the interpreting process for simultaneous interpreting and consecutive interpreting. According to Gile, the act of interpreting consists of a number of cognitive efforts that are competing for interpreters'

limited cognitive capacity in terms of memory and attention.

ELT: A learning theory developed by Kolb (1984). It sees learning as a learning cycle, in which the learners experience, reflect, think and act in their acquisition of new knowledge or experiences.

EMCI: The European Masters in Conference Interpreting, a postgraduate conference interpreting training program designed for students with European and non-European languages. The EMCI program is provided by a consortium of European universities in collaboration with the European Commission and the European Parliament.

Faithfulness: A term used to describe the extent to which a target text can be considered a fair representation of the source text.

Free Translation: A type of translation in which more attention is paid to producing a naturally reading target text than to preserving the source text wording intact. It is generally more target language oriented than literal translation.

Information Unit: A meaning-based organizational unit in the build-up of a text. In the conceptual mapping model, it is seen as subordinate to concept unit, covering informative content of conceptual units.

Liaison Interpreting: A type of interpreting which is bi-directional and takes place in any small-scale context, such as business meetings, official visits or informal conversations.

Literal Translation: A translation strategy which uses word-for-word translation as its starting point, although because of the necessity of conforming to target language grammar, the final target text may also display group-group or clause-clause equivalence.

Long Term Memory: A type of memory which retains information that has been processed by short term memory or working memory for later recall.

Note-taking: An interpreting technique used in consecutive interpreting. It is assumed as an aid in facilitating interpreters' comprehension and reproduction. In some renowned international simultaneous interpreting training programs, student interpreters are not allowed to take notes at the initial learning stage of consecutive interpreting so as to focus their attention on tracking the main ideas of the speaker.

Ostension: A term used in relevance theory by Sperber and Wilson (1986). In human communication, ostension refers to the speaker's communicative behaviours, which

include two layers of information: "[T]he information, which has been pointed out" and "the information that the first layer of information has been intentionally pointed out" (50). It is assumed that the speaker guarantees that his/her listener can derive worthwhile contextual effects through inference at a reasonable cost in effort (158).

PACTE Model: This model was developed by the PACTE research group at the Universitat Autònoma de Barcelona, to investigate the acquisition of translation competence in written translation into and out of the foreign language. It treats translation competence acquisition as a process of restructuring and developing sub-competencies of translation competence (PACTE 2003:49).

Public Service Interpreting: Equivalence to community interpreting. Its purpose is to help immigrants to get equal access to social services in their host country.

Recency Effect: A phenomenon related to memory decay. It was found that due to their limited memory capacity, in immediate recall human beings tend to remember the last few items in a list more easily than the items from the middle of the list (Cowan 1999:81).

Relevance Theory: A theory proposed by Sperber and Wilson (1986), seeing human communication as information processing which tends to achieve maximum communicative effects through minimum cognitive efforts in terms of time and energy (46).

Scene-frame Theory: A cognitive theory developed by Fillmore (1977) in his study of reading comprehension process. He suggests that reading comprehension is a cognitive process involving interactions of scenes (cognitive understanding) and frames (textual meaning).

Simultaneous Interpreting: A non-stoppable delivery of interpretation. It is commonly used in conference interpreting.

Short Term Memory: A type of memory which stores the on-going information temporarily and passively. One of its characteristics is that material is lost within 30 seconds unless it is somehow repeated.

Working Memory: A type of memory which processes the on-going information temporarily but actively.

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