An Action Research Study on Dynamic Sight Translation as A Pedagogical Tool for Skill Development and Transfer in Simultaneous Interpreting Teaching

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A thesis submitted for the degree of Doctor of Philosophy

2018

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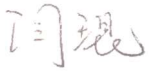
STATEMENT OF CANDIDATE

I, Kun Yan, declare that this work has not previously been submitted for a higher degree or diploma in any university or institution and all usage of source has been duly referenced.

I certify that the information contained in this dissertation is the result of the research work conducted under the supervision of Dr. Zhongwei Song, Department of Linguistics, Faculty of Human Sciences, Macquarie University.

I certify that all sources used and help received in producing this dissertation have been acknowledged to my best knowledge.

Kun Yan



Date: October 2, 2018

ACKNOWLEGEMENT

Firstly, I want to express my immense gratitude to my supervisor Dr. Zhongwei Song, who also supervised my Master's thesis in 2011. His immense knowledge and research experience guided me through my interpreting study and research. All the in-depth feedback, penetrating views and incisive advice from him are incredibly helpful for both my research and my personal growth, which enlightened my thoughts, broadened my views, and elevated my critical thinking. Dr. Song's meticulous scholarship is down to every detail of research and he provided me with enormous help in polishing the thesis.

In addition, I am also thankful for his continuous and kind encouragement during my research, with his patience, motivation and understanding in all the time of research and writing of this thesis. Dr. Song could always boost my confidence even when the research halted at some point. I simply cannot ask for a better mentor for my PhD study.

I also want to thank the staff members of the Department of Linguistics at Macquarie University, Ms. Collette Ryan and Mrs. Margret Wood for their generous assistance. The training and support provided by Macquarie University during my candidature is very instrumental to the completion of this thesis.

Special thanks to Dr. Bradley Smith who has done an excellent proof-reading for this thesis. I am also indebted to Dr. Yi Chen who gave me helpful advice on writing at the last stage of the thesis.

I am also deeply grateful to my fellow PhD candidates at Macquarie University, whose support and company added much pleasure and fun to my PhD candidature. My gratitude also goes to my friends and the special ones who are constantly supportive and generous, giving me strength to finish the long journey.

Above all, I want thank my parents for their physical and emotional support. Thanks for your faith in me.

ABSTRACT

Sight translation (ST) is a common didactic tool in simultaneous interpreting (SI) teaching but there is only limited research on systemic usage of ST and expansion of its current pedagogical roles in skill acquisition. This research therefore is conducted to fill such pedagogical gap. Based on Moser's (1978) information processing model, Gile's effort model (1995a/2009) and cognitive theories of skill acquisition, shared cognitive stages and skill components in SI and ST are discussed as the basis upon which a new ST variant, the so-called dynamic sight translating (DST) is designed and further the effects of the new variant integrated into different forms of DST-related exercises for SI skill acquisition are discussed.

With these exercises designed in a modular and progressive manner in order to facilitate the trainees' transition into SI, this study is conducted within the methodological framework of action research (AR) to test the effectiveness of a DST-based pedagogical design in SI training. In experimenting on the exercises in the authentic teaching, the researcher has embedded the exercises as a part of teaching component in one unit of the Conference Interpreting Program at Macquarie University (MCI) from 2014 to 2016. Teaching cycles are procedurally repeated to test the consistency of data, while necessary adjustments are made on the as-needed basis to enhance the efficacy of skill development and transfer.

The findings show that appropriate use of DST-related exercises can contribute to the skill development and transfer in SI training, which requires measured yet flexible manipulations of variables to accommodate students' skill levels and learning needs. Nevertheless, their intrinsic limitation calls for complementary use of other exercise components in SI to achieve a synergy of skill development. Meanwhile, the findings also have proved AR is an effective methodological approach to explore pedagogical issues in a way that is practical, holistic, locally relevant and mutually stimulating to both teacher-researchers and students involved.

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LIST OF ACRONYMS

AI accurate interpretation

CI consecutive interpreting

CIT Conference Interpreting Trainers

CLT cognitive load theory

CST conventional sight translation

DI dialogue interpreting

DST dynamic sight translation

IS interpreting studies

MCI master of conference interpreting at Macquarie University

MI misinterpretation

OI omission

ST sight translation

T&I translating and interpreting

TS translation studies

WM working memory

AVT audio-visual translation

1 INTRODUCTION

1.1 Background of this research

Adopting the cognitive theories for information processing and skill acquisition as theoretical basis and action research (hereafter, AR) approach as methodological framework, the present study explores the use of dynamic sight translation (hereafter, DST) as a new and upgraded variant of conventional sight translation (hereafter, CST) for simultaneous interpreting (hereafter, SI) teaching. CST in this research refers to the sight translation (hereafter, ST) variants with static text input, which are traditionally defaulted as equivalent to ST (Jiménez, 1999; Moser-Mercer, 1995); DST, by contrast, features dynamic input text display as a new feature introduced in the present study. Both CST and DST are ST by essence but bear different features of textual display as their names suggest. With DST as the focus in discussion, this pedagogical inquiry is conducted in a context where the didactic value of ST in SI needs to be further established and extended; and such exploration needs to be done in a way that meets the trends of interpreting research and pedagogy.

Controversies over the didactic value of CST in SI teaching still exist. On the one hand, its efficacy in SI training is contested on the ground that CST is deviant from SI in terms of skill requirement and cognitive processes (Agrifoglio, 2004; Brady 1989; Gile, 1995a, 1997a; Martin, 1993; Mikkelson, 1994; Viezzi, 1989a). On the other hand, CST is deemed useful as a supporting exercise in SI teaching (Bacigalupe, 1999; Baxter, 2014; Curvers, Klein, Riva, & Wuilmart, 1986; Donovan, 2002; Kalina, 1992; Setton & Dawrant, 2016; Viaggio, 1995; Weber, 1984). The latter view is based on the argument that CST and SI share common cognitive processes, and thus require some common skills, both linguistic and cognitive ones (Biela-Wolonciej, 2007; Lambert, 2004; Li, 2015a).

Nevertheless, the research on the didactic role of CST in SI is limited in both quantity and scope (Angelelli, 1999; Lim, 2006; Mikkelson, 1994; Pöchhacker, 2016). CST is mostly studied as a tool for SI aptitude testing (Alexieva, 1993; Lambert, 1991; Moser, 1994; Russo, 2011) or as a preparatory exercise for SI (Gile, 1995a; Sandrelli, 2005; Seleskovitch & Lederer, 1989; Setton, 1993). The research on how to systemically use CST, by manipulating it into variants for specific teaching purposes in SI in particular, is scarcely sufficient (Li, 2015a), with only Baxter (2014), Noel and Song (2006), Sandrelli and Jerez (2007) and Song (2010), as a few exceptions. To add on to the current limited exploration, the present pedagogical research investigates a new variant of CST, i.e. DST, by experimenting on and evaluating the effects of a cohort of DST-related exercises designed for skill development and transfer in SI teaching.

Besides this, a set of current trends in interpreting research and pedagogical philosophy in translating and interpreting (hereafter, T&I) education and training has formed a new context for pedagogical inquiries. The first prominent trend in interpreting research is towards wider inclusion of different paradigms and disciplines (Gile, 2009). In a review of the historic development of interpreting studies from their onset in the 1950s, Gile (1994) observes that interpreting research has evolved into a direction featuring inter-disciplinarily, decentralization with more participants, and more empirical and experimental exploration. The second trend is the surge of constructivism in pedagogical philosophy, which promotes the transition from the trainer-centred teaching to learner-centred teaching. First introduced into translation education (Holz-Mänttäri, 1984; Kiraly, 1995/2000; Sainz, 1995), constructivist thinking was also accepted by the interpreting teaching community (Class & Moser-Mercer, 2013; Ficchi, 1999; Sainz, 1995; Takeda, 2010; Van Dam, 1989).

Against this backdrop, the current mainstream research methods in use need supplementing to measure up to those trends. With the interdisciplinary and experimental inclinations of interpreting studies, the weaknesses of purely quantitative or qualitative methods are more exposed, in terms of their limited capacities for taking into account the environment and human factors, or explaining and theorizing the complexity of interpreting activities (Gile, 2009; Li, 2014). Furthermore, in face of the emerging constructivist approach in interpreting pedagogy, the ensuing principles of student-centred teaching and learner empowerment are promoted in all pedagogical activities. However, these are not well manifested in the current mainstream research methods - traditional qualitative or quantitative methods, both of which fashion an approach that views students as subjects investigated; and the research is generally dominated by researchers only, in terms of designing and conducting the research, and interpreting the results. Such an approach does not emphasize the emancipation and empowerment of the students, offering no obvious impetus in advancing the students toward taking more responsibility in the process of learning. The use of the AR approach in the present pedagogical study, conducted as a "reflective action" which reflects the student-centred pedagogical approach in interpreting education and training (Kiraly, 2000), is experimented with to supplement the prevailing mainstream research methods and approach.

1.2 Research objectives

With the intention to gain better understanding of the didactic role of CST in SI, in the new interpreting pedagogical context formed by the evolution of investigative approaches and teaching paradigm transition, the present study is designed to explore the efficacy of new

didactic tools in an approach that fits within this new context. Therefore, it has two research objectives:

1) To explore the use of DST, a new variant of CST, as a didactic tool in SI teaching, to identify the extended didactic role of CST, in the sense of 'why' and 'how'. That is to say, it first explores theoretically whether DST can be a valuable tool in SI teaching by referring to cognitive theories and worldwide pedagogical practices in teaching. Then through documenting the teaching–learning interaction and analysing the result of skill development and transfer subsequent to the teaching, it aims at exploring whether and how the designed exercises centring on DST can be manipulated to simulate SI features to accommodate students' needs.
2) To conduct an interpreting pedagogical research under the AR methodological frame. Through testing the theoretical benefits of AR in practice, it is expected to determine: whether an AR-framed research approach accommodates the complex nature of skill acquisition and thus contributes to enhancing knowledge of the use of CST in SI teaching; and whether this approach meets the current trends in interpreting pedagogy. This objective is to promote the integration of this research frame into future inquiries on SI skill development and transfer, in particular, and pedagogical inquiries in general.

To serve the first objective, the present research takes two steps to lay a theoretical foundation to establish and extend the didactic role of CST in SI: to contest adverse comments on the didactic role of CST; and then to identify the potential to extend its existing role in SI. For those adverse evaluations of the role of CST in SI teaching found in the literature, this research first collects theoretical evidence to contest their position and the associated practices. Evidence of significant similarities between the two modes is presented to refute the assertion that CST is not an appropriate didactic tool for SI teaching. After this, with regard to the limited usefulness of CST in current SI teaching practice claimed in the literature reviewed, theoretical analysis is made to identify potential methods to enhance its simulation of SI, by manipulating some features of CST to better serve the purpose of skill development and transfer. On this theoretical basis, some new features are added to CST for the geniture of DST as a new variant and the design of DST-related exercises that intend to simulate SI more effectively and at different levels.

Then, to test whether the new DST-related exercises can practically help with skill development and transfer in SI, experiments are conducted on these exercises using DST as a teaching component, in the Conference Interpreting course at Macquarie University (MCI). To evaluate the efficacy of the exercises experimented on, evidence is collected from both the students and

the researcher during the teaching and research period. For the students, their comments are solicited on their own progress/problems and their performance on the three designed tests with DST at three points in time across 13 weeks of a typical academic semester in Australia. From the teacher-researcher's perspective, a qualitative evaluation is made based on the teacher-researcher's field notes on class interaction; a review of the students' feedback, mainly collected through questionnaires and interview; and performance analyses of the students' interpretations. These findings can help contribute to identifying effective ways of manipulating or adjusting the variables constituting the dynamic feature of DST, to make the DST-related exercises accommodative to various and changing needs for skill development in SI.

To serve the methodological objective, this research is conducted as an AR inquiry based on the theoretical matchings between the features of AR and the complexity of skill acquisition and interpreting teaching and research. The purpose is to investigate the operability and pedagogical benefits of employing AR in SI pedagogical exploration. In order to maintain the inquiry as an evolving process, as characteristic of AR, the exercises are subject to adjustments according to the feedback of the students at each checking point in conjunction with the researcher's deliberation on the necessity for changes. Through repeated but upwardly cyclical AR procedures, of planning-implementation-testing, analysis-adjustment, and implementation-testing for evaluation, in relation to the effects of the manipulated exercise features, it can be determined whether there is a need for any adjustments, and furthermore, whether the adjustments improve, hinder, or make no difference to the students' skill development and transfer.

The present research constitutes three rounds of action, which are completed in the space of three years, from 2014 to 2016. The first round of action in 2014 functioned as a pilot study to a certain extent; and the rounds of action in 2015 and 2016 repeated the cyclical procedures, with necessary adjustments made in each in response to the problems found in the previous and the current rounds. During this inquiry process, it is intended to determine whether the AR research approach accommodates the complex nature of skill acquisition and thus contributes to enhanced knowledge of the use of CST in SI teaching. At the same time, an aim of the process is to observe whether this approach transforms the way of teaching and learning, especially whether such transformations can meet the requirements of the current trend of constructivism in interpreting education and training.

1.3 Research questions

Based on the literature reviews and research objectives in the present study, the following four research questions are thus formulated for the research. Questions 1-3 are aimed to achieve Objective 1, and Question 4 to achieve Objective 2.

Question 1: What are the primary deficiencies of skills and capacity that must be addressed to help students to transit from consecutive interpreting (CI) to SI mode in the early stage of SI learning, and when and how should these be addressed?

The answer to Q1 provides clues to the sub/skills to be targeted during the transition from consecutive interpreting (CI) to SI, during which the students may face many skill deficiencies that need scaffolding assistance. The scaffolding process should focus on practicing particular subskills first, and then on gradually integrating these together, helping the progression of transition to SI by transferring the developed skills. This research holds that the priority of skill practice should be given to addressing the primary deficiencies that prominently hinder this transition in the early stage of training. To make the design of the DST-related exercises zero in on concerned skills to advance the transition, the present research takes as its point of departure the primary difficulties facing novice SI students during their progression of learning, so that the choice of DST-related exercises and the way in which they are manipulated can be in response to the most prominent skill deficiencies.

Question 2: What subskills can be developed and enhanced as a result of different DST-related exercises?

Question 3: Whether and how can the developed skills be transferred to SI with the assistance of the DST-related exercises?

Q2 and Q3 are formulated to test the efficacy of new features added to the DST-related exercises, in terms of two aspects: skill development, and skill transfer. The DST-related exercises are technically designed to provide scaffolding assistance for developing and transferring key skills in the simulation tasks, which resemble SI, but in a relatively easier manner, to the novice students. Question 2 and 3 are meant to decide whether the exercises, including the adjustments made for manipulation of exercise features, lead to improvement in targeted skills; and whether the improved skills can strategically contribute to performance in SI practice. That is, unimproved deficiencies subsequent to the exercises targeting the relevant skills could indicate unsatisfactory effects of the exercises; while any improvements may indicate otherwise.

Together, the findings can verify whether and exemplify how a cohort of DST-related exercises can facilitate the scaffolding process of skill development in SI learning.

Question 4: How well does the implementation of AR contribute to SI skill development and transfer, and extend the benefits to improving ways of teaching and learning in a broader context?

In exploring AR as a methodological framework to implement and promote the constructivist approach to SI pedagogy in general and SI skill development and transfer in particular, the focal point of this question is on how the teacher-researcher and her students can benefit from the inquiry process of AR. To that end, this research argues that AR not only contributes to the potential gains of didactic knowledge, it also generates transformative influences on the teacher's teaching orientation and skills and on the students' transition to becoming autonomous learners. The latter benefits are discussed particularly in relation to conformability with the transition to a student-centred approach.

1.4 Definition of key terms

In this thesis, some key terms are defined first to avoid any possible confusion, as some terms are used interchangeably in the literature by researchers despite different connotations existing for each of these terms. The key terms to be clarified comprise three pairs: pedagogy vs. didactics, interpreting education vs. interpreting training, and capacity vs. skill. In each pair, the distinctions to be clarified, and working definitions adopted for the terms in this thesis, are presented as follows.

- Pedagogy vs. didactics

In educational research literature, pedagogy and didactics are sometimes used interchangeably to refer to how teaching is conducted. However, Andrews (2007) points out that these two terms are distinctively different. Drawing on the European educational literature, Andrews concludes that pedagogy is a broader concept and thus includes didactics. Andrew explains that pedagogy refers to knowledge of general theories of teaching and learning that transcends specific subjects, including knowledge about curriculum and underlying objectives of education. Didactics, however, is more subject-specific, including "strategies and warranted approach to subject teaching and learning" and "the day-to-day and the in-the moment decision making of teachers and the manner in which they are formed" (Andrews, 2007, p. 22). Melissinopoulos (2013) also distinguishes didactics from pedagogy in a similar way, holding that pedagogy is

more general than didactics. According to Melissinopoulos, pedagogy defines the theoretical and organizational architecture of education, while didactics concerns teaching content, teaching methods, and justification of curricular component choices. As a summary of the definitions from the two researchers, pedagogy is used to refer to the general system of teaching focusing on the overall goal and style, while didactics refers to more specific teaching practices, such as what and how to teach. In this thesis, the same definitions for the two terms are adopted.

- Interpreting education vs. training

In pedagogical discussions, one important topic is teaching objective or teaching purpose. Alexieva (1991) identifies three general purposes of SI teaching: 1) knowledge enhancement in major and specific subject fields; 2) skill development to cope with grammatical difficulties associated with information retrieval; and 3) memory and attention. Alexieva thus summarizes these teaching purposes as improvement in the grammar, topic knowledge and cognitive capacities.

To make the teaching objectives more specific, some researchers point out that the objectives should depend on the type of teaching conducted, i.e. training or education. In T&I studies, such a distinction starts from the relevant discussion in translation pedagogy. A good example is Pym (2009), who holds that the distinction of two types of teaching in translation leads to different focuses of teaching. According to Pym, training is a process during which technical skills are to be acquired to meet the requirement of performing a (translating) task through instruction and practice; while education aims at both skill acquisition and nurturing a wider range of competences, such as interpersonal skills, critical thinking and creativity in translation. In the similar spirit, Bernardini (2004) makes a more detailed distinction between training and education in translation by quoting Widdowson (1984), focusing on their different natures, various outcomes and suitable areas for use. Bernardini argues that translation training is a cumulative process, where as many pieces of knowledge about the trained area as possible are to be acquired, and that the process is suitable for the teaching of language for specific purposes. By contrast, education is a generative process, where the aim is to cultivate abilities to use available resources to solve new problems and to gain new knowledge, which is suitable for long-term language teaching for general purposes. Bernardini (2004, p. 20) stresses that the objectives of education include more than simply to "practice, store and use more or less specific strategies and procedures", but also include development of awareness and resourcefulness. For awareness, Bernardini defines this as the learners' right attitude towards translators' role, that translators should also be meaning conductors and cultural mediators rather than transcoders only. For resourcefulness, Bernardini (2004, p. 21) refers to the ability

to “exploit finite resources indefinitely to cope with new and unexpected challenges, and to acquire new resources autonomously, as the need arises”. In this sense, training and education pose “short-term” versus “long-term” implications.

However, translation teaching at the post-graduate level appears to involve elements from both training and education. Conducted at tertiary institutions providing higher education, the teaching is argued to be an “educationally-oriented type of instruction” (Bernardini, 2004, p.21) which aims at professional specialization. The argument is that study at the post-graduate level is built on foundations in language, culture, basic knowledge and skills that are already laid, so that the focus of teaching at post-graduate level should feature specialization in order to “deepen these capacities and competencies, effectively gaining professional specialization” (Bernardini, 2004, p. 27). The focus on specialization in teaching at the post-graduate level appears to indicate a strong accumulative feature of training, despite the integrated element of education. Such a duality of post-graduate teaching is typically reflected in Davies (2004), who uses the term “training” to broadly refer to all postgraduate degree courses provided at university level in her discussion. However, when Davies summarizes the aims of postgraduate training for translating and interpreting, the content transcends the narrow sense of training. Davises mentions three themes of objectives: 1) specialization and knowledge management, 2) refinement of transferable skills, and 3) ability to be adaptive to the market, with various client expectations and standards. In essence, the last training objective fits well into resourcefulness developed through education as discussed by Bernardini.

By this token, the term of training used in the present thesis refers to the teaching conducted in this study, but with a similar dual nature: involving both education and training elements. On the education side, the transfer of skills and knowledge and the development of abilities for adaptation and continuous study are intended to be developed in the students. On the training side, attention is given to specialization of skill development through intensified teaching, which aims at “short-term” outcomes.

- Capacity vs. skill

The terms capacity and skill often appear in SI literature to generally refer to qualities possessed by interpreters to perform SI, but the terms are different in nature. Capacity refers to the cognitive abilities of interpreters to perform the task - to perceive incoming information, comprehend it, reformulate it for delivery, render it in target language, and coordinate all these tasks (Setton, 2001). By contrast, skill refers to abilities to mobilize resources or techniques, based on the cognitive capacities, to solve difficulties (Chernov, 1979, 1992). Chernov explains

that skills are significant in that the cognitive resources are limited, so that special methods are required to achieve the optimal deployment of mental resources when the total amount of resources is limited. Kalina (2000, p. 22) defines skills as automatic processes where abilities can be used in a strategic way. Both definitions of skill emphasize that skills lie in the capacity to strategically and deliberately use capacity-based methods and techniques to optimize cognitive resource deployment.

This thesis adopts such a definition of skills, that is, the skills under discussion in this study include the methods mobilized at the discretion of interpreters to enhance the efficiency of relevant cognitive sub-processes, including the use of strategies.

1.5 Outline of the thesis

In search for the answers to the four research questions, analyses of the AR cycles conducted in the local context of a Master of Conference Interpreting (MCI) course at Macquarie University from 2014 to 2016 are conducted from cognitive, linguistic and pedagogical perspectives. Findings are drawn from the analyses based on the data sourced from the documentation of the teaching-learning interaction involved as well as jointly constructed by the teacher-researcher and the students during the three rounds of action. To present this research and its findings in detail in the course of the 3-year action, this thesis contains ten chapters, each having a different but related focus to achieve the research objectives specified above.

Chapter 1 sets outs the general background of the present research, specifying its research objectives research questions, and the organization of the thesis.

Chapter 2 begins with an overview of the SI pedagogical background of the present study, consisting of the historic development, future trends, and existing research gaps of SI pedagogy. The overview has two functions. Firstly, the overview of the development of SI pedagogy involves a comparison of pedagogical principles to foreground and, therefore, to justify those adopted and applied in the present research and in the exercise design as well. Secondly, the overview identifies the future trends and current research gaps in SI pedagogy, to highlight the significance of this research which may potentially fill these gaps and meet the new trends in SI pedagogy.

Chapter 3 reviews at length CST, a didactic tool to be studied in this research, by comparing it with SI for their cognitive and didactic relations. This is to confirm the existing role of CST and justify its potential to be manipulated to facilitate SI training. Cognitively, the common

cognitive sub-processes in and skills required for the two modes are identified, to justify the shared cognitive ground for CST as an element conducive to the SI curriculum. At the same time, the differences between the two reveal the potential for manipulating some relevant features of CST to enhance its simulation of SI in SI teaching and training. Didactically, existing practices in the use of CST in SI teaching are also reviewed, laying the practical foundation for a strong justification of the present exercise design to be implemented for experimentation in authentic classroom teaching.

Chapter 4 explains in detail the methodological framework adopted for the present research: action research (AR). Firstly, a review of the main features of AR and the history of the introduction of AR to educational contexts, especially in T&I research, strongly prove how and why AR features may satisfy the needs of SI pedagogical studies, both theoretically and practically. Meanwhile, the use of the AR approach is defended by refuting criticisms of its validity and addressing some concerns about its implementation.

Chapter 5 outlines the original research design constituting two layers: one for the exercises, and the other for the AR action. The exercise design specifies the features of the DST-related exercise cohort designed for this research, comprising its various types resulting from different combinations of dynamic variables, and their integration with other exercise types; the pedagogical intention of including different types of exercises; and the deployment of different types of exercises during the 13 weeks of teaching. The exercise design is mainly based on theoretical reviews conducted previously and the teacher-researcher's earlier observation as both a student and teacher. The AR plan mainly explains what one full round of an action cycle involves and how it is framed within the overall research timeline. Lastly, the plan for data collection and analysis is explained with a data synopsis for the present research provided.

Chapter 6 details the implementation and the general results of the first round of AR in 2014, which serves the function of a pilot to a large extent. With more of a descriptive function, this chapter narrates the full process of the action round in the first academic semester of 2014 following the original teaching plan. As part of the report, the data collected from both the teacher-researcher and the students is presented together with the data analysis. Moreover, reflection upon the successes and failures during and after the implementation of the DST-related exercises constitutes the other half of the findings, which inform the necessary adjustments to be implemented in the following rounds of action.

Chapter 7 highlights the subsequent adjustments made to the teaching plan on an as-needed basis, and their effects during the actions in 2015 and 2016. Instead of rerunning the relatively

repetitive process for a second and/or third time, the report focuses on the adjustments featuring the upwardly cyclical feature of AR, by presenting the reasons for the adjustments, the implementation of the adjustments, and their effects. The resulting successes or failures in relation to skill development and transfer, and the analysis of the causes, contribute to the knowledge for manipulating the exercise features and sequences to be accommodative to the students' needs.

Chapter 8 analyses the didactic merits and demerits of the DST-related exercises in terms of skill development and transfer in SI. Based on the summary of successes and failures in the course of the three rounds of action, the merits of the features that facilitated scaffolding and led to successful results are analysed, which can be instructive and informative for the future exercise design; while the demerits are analysed too for their underlying causes, based on the problems that led to failures, for which possible remedies are discussed in order to avoid similar failures in future.

Chapter 9 is devoted to a review of the methodological benefits and limitations of this AR, without which the research would be regarded as incomplete both methodologically and pedagogically. The benefits are analysed from both teaching and learning perspectives, providing evidence to support the integration of AR into SI pedagogical studies. The limitations of this AR are also identified, of which some are as expected as inevitable consequences of AR and others were discovered in the process of implementation. These limitations, associated with fluid factors constituting the research conditions, or with the researcher's inadequate knowledge and lack of experience in taking preventative or responsive measures of AR, all prove the complexity of AR in terms of its research design and implementation. Acknowledgement of these limitations in the research design and implementation is to admit the imperfection of the findings that may require further rectification. Moreover, this provides some methodological references and suggestions for future inquiries adopting the same approach.

Chapter 10 draws conclusions by summarizing the didactic and methodological findings of this research. The findings are used to respond to the four research questions formulated at the beginning of the research. Then, the implications of these findings and identification of opportunities for future research in this area are highlighted to conclude the chapter.

1.6 Significance

This research is of cognitive, pedagogical and methodical significance in understanding how to employ ST or CST to facilitate skill development and transfer for SI; of which, as Li (2014) pithily points out, discussions on, for example, assessment of cognitive features, the

pedagogical usage and methodology, are so inefficient, leaving much room for exploration. This research, therefore, is of significance in potentially shedding light on these uncovered areas to bridge some of the existing research gaps.

From the cognitive perspective, this research gains better understanding of the cognitive relations between CST and other modes of interpreting, especially that of SI. Comparative studies for the purpose of identifying cognitive processes have been undertaken between ST and interpreting (Agrifoglio, 2004; Lamber, 2004; Viezzi, 1989a), and between ST and translation (Dragsted & Hansen, 2009; Shreve, Lacruz & Angelone, 2011). Among these, the comparative studies between CST and SI conclude that these two modes are under different cognitive constraints, and thus how the information is processed and stored is different (Agrifoglio, 2004). However, such a conclusion is incomplete given that variants of CST, which can be made with new features added (Song, 2010), are not sufficiently studied. To fill this gap, a new variant of CST, DST, is designed, examined and evaluated in the present study. The newly added features that are characteristic of DST are intended to change CST in terms of certain cognitive processes, thus making the cognitive differences between CST and SI as minimal as possible.

From the pedagogical perspective, this research supplements existing teaching practice using CST in SI teaching, by further exploring the didactic value of new variants of CST. Previous pedagogical studies about CST mostly explore it as an independent mode of interpreting, and thus the focus is on teaching and assessing CST in its own right in the interpreting course, such as in Akbari (2017), Chmiel and Mazur (2013), Ersozlu (2005), Lee (2012), Li (2015a), Nilsen and Monsrud (2015), Sampaio (2015) and Zeng (2008), as the most recent examples. To explore CST as a didactic tool used in SI teaching, studies have been conducted by Baxter (2014), Sandrelli (2005), Song (2010), Viaggio (1995) and Weber (1990). Based on these studies, the present research adds and manipulates new features to CST to form into different types of DST-related exercises, and tests their efficacy in skill development and transfer for SI, adding more systemic knowledge of the use of CST as a didactic tool in SI curriculum to the current body of knowledge.

From the methodological perspective, this research experiments with a relatively new, yet more suitable, research methodological framework for interpreting pedagogical research: action research (AR). In earlier studies, experimental research is the norm for studying CST (Brady, 1989; Chang, 2002; Lambert, 2004; Liu, 2011; Macizo & Bajo, 2004, 2006; Viezzi, 1989b, 1990). However, experimental research has some features contradictory to those intrinsic to educational or pedagogically-related research. Experimental research features one-off testing

and pre-fixed and limited variables; while educational research features extended time stretches and complex teaching environments involving multiple and unpredictable variables (McDonough & McDonough, 2014; Pöchhacker, 2010a). Due to these contradictory features, flaws have been identified in the adoption of experimental research methods in and for educational research, especially pedagogical research, in terms of experimental design, unlevelled pre-experiment conditions, difficulties in control of experimental variables, and lack of authenticity in the experimental settings (Li, 2014). Therefore, AR is considered as a promising alternative for interpreting pedagogical research (Pöchhacker, 2010b). With only a limited number of studies adopting AR as the research methodological frame in interpreting pedagogical research, the present AR research is, in this sense alone, a contribution in exploring the potential benefits of AR in interpreting pedagogical studies.

2 REVIEW OF SIMULTANEOUS INTERPRETING TEACHING

This chapter reviews the historic and ongoing development of simultaneous interpreting (SI) teaching. Section 2.1 starts from the onset of SI pedagogy research and tracks its evolvement to date and future trends. Section 2.2 reviews the main cognitive theories supporting teaching SI as a complex skill and the consequent pedagogical practices. Section 2.3 reviews the didactic tools used in SI teaching for the purpose of skill acquisition.

2.1 Ongoing development of SI pedagogy

2.1.1 Historic review of SI and its pedagogy

Formal discussions on SI as a branch of interpreting studies were not brought into the limelight until its adoption in the Nuremberg Trial in 1940s (Gaiba, 1998). Before that, SI went largely unnoticed as a mode of interpretation. It was a long path towards the establishment of SI as an accepted interpreting form. According to Baigorri-Jalón (2014), who reflects on the developmental history of SI in intriguing detail, the initial testing of the idea of SI can be traced back to the International Labour Organization (ILO) in 1925. However, it was not until the Nuremberg Trials that SI gained a wider acceptance, described by Baigorri-Jalón (2014, p. 211) as the start of age for SI, which has been sustained since then.

The growing adoption and acceptance of SI also gave rise to and contributed to the development of SI training. Once SI became in demand, to train qualified interpreters to do the job properly became a prominent issue to be addressed, which led to the initial concern about SI training. In the account of Baigorri-Jalón (2014), Edward Filene, an American merchant who was the earliest inventor of SI equipment and one main pioneering supporter of SI, called for the establishment of an SI school to provide proper training to prospective interpreters. Upon approval and agreement of the ILO, an ad-hoc course was provided in 1928 to equip interpreters with the relevant capacity to perform SI. Baigorri-Jalón also provides an account of the training details of the first SI course, starting from the selection of candidates, setting of the training and facility installation, to the execution of the training. Upon the conclusion of the course, 11 interpreters were qualified "to perform telephonic interpretation at the ILO conference" (Baigorri-Jalón, 2014, p.143). This course is highly commended by Baigorri-Jalón (2014, p.145) for the following merits: reproduction of authentic conference setting and condition, progressive arrangement of speech difficulty, involvement of peer review and feedback, use of genuine speech materials, inclusion of topics in alliance with conference needs, conduct of the final exam, and measure of reward. Some features and elements of training that were considered

necessary and practical back then still provide guidance to later training programs, including the present research. Principles such as progressive arrangement of speech difficulty and involvement of peer review and feedback are in line with the cognitive norms and new trends of SI teaching which will be discussed in detail later in this chapter.

With an increasing demand for SI interpreters, ad-hoc training appeared to be insufficient and the necessity of systematic SI training became prominent. Baigorri-Jalón (2014) comments that, despite some merits of such ad-hoc training as identified, successful results were not guaranteed without systematic training, which could be testified to by the results of the ad-hoc training provided at the Nuremberg Trials. After their short training, some interpreters failed to perform SI tasks during the trial proceedings despite their excellent multilingual capacity and previous non-SI interpreting experience. This shows that the effectiveness of training at this stage had a lot to be desired pedagogically. However, the recognition of necessity of SI training was not shared initially by all. Early on, systematic training was considered redundant. Even decades after the prevailing use of SI, a belief persisted that success in performing the task of SI relied on the inherent talents of the interpreters (Harris & Sherwood, 1978). Renee van Hoof, then head of the European Communities' Conference and Interpreting Service, even declared that "interpreters are born" (Weischedel, 1977, p.101). Such an idea simply denied the potential benefits and significance of systematic interpreting training.

Fortunately, despite the lack of support for and attention to SI training, it was finally agreed and acknowledged that formal training is beneficial and necessary in developing interpreting expertise (Herbert, 1978, p.9; Mackintosh, 1999, p.67). Formal SI training could be roughly categorized into two types, namely, in-house training programs provided by organizations adopting SI, and institutional courses. For the first type, examples include the programs provided within the ILO as described above and by European Commission and Parliament (Niska, 2005). It is noticed by Baigorri-Jalón (2014) that, while accustoming interpreters to the new mode of SI, these intensive in-house trainings have focused more on accommodating the needs of specific organizations or events by familiarizing the interpreters with the specific topic areas. For the second type, the teaching is conducted as academic courses at institutions. Institutional teaching of SI was officially introduced when the Ecole d'interprétation in Geneva was established in 1941 and its formal curriculum of SI was established in 1953 (Bowen, Bowen, Kaufmann & Kurz, 1995; Moser-Mercer, 2005a; Pöchhacker, 2010b), followed by institutes in Heidelberg, Vienna, Mainz and Paris just to name a few (Kalina, 2014). In the 1950s and 1960s, fully-fledged degree study of conference interpreting started at the university level, in which

both translation and interpreting were included in such courses while SI was involved as one part of interpreting (Kalina, 2014).

For either type of training as reviewed above, a common teaching approach was shared. The norm followed by many trainers then was to make trainees practice and polish their skills in authentic conference settings, which was considered more important than classroom teaching (Paneth, 1957, p. 88). Such a method, which emphasizes learning from mistakes when doing, is also called trial and error, featuring the reliance on the association of stimuli and responses (Anderson, 1993). It was so widely practiced that Moser-Mercer (2005c, p. 62), describing its prevalence, observes that "…trial and error were the order of the day". Moser-Mercer records that, in the training provided for the Nuremberg Trails, the training was conducted in the form of mock trials, and feedback was provided for improvement. However, there was no established teaching pedagogy to follow when SI teaching was initially conducted. Even when SI teaching was provided at the Ecole d'interprétation in a formal course, no particular teaching method existed at the beginning (Moser-Mercer, 2005c). With the absence of pedagogy, this trial and error approach could be the most natural and accessible choice for the trainers back then. As Paneth (1957) reported, many early SI interpreters taught themselves the craft of SI through persistent practice and trial until it worked. Then, some started teaching when they became professional SI practitioners, and naturally assumed that the way in which they had acquired the craft of SI should be the right path for other trainees to acquire similar skills.

Admittedly, the role of practitioners in the development of SI training is undeniable. Pöchhacker (1995) affirms the practitioners' role in bringing insight on the activities of SI to the body of knowledge, based on their first-hand experience, and in being the pioneers of the early development of SI teaching. Their own experience became the primary inspiration when their teaching was conducted, since reflection on and description of their work constituted the know-how passed down to the new professionals. Although the understanding of SI was still intuitive and unsystematic at this stage, this can be considered as a start in the exploration of SI teaching.

To respond to the requests arising from the expanding institutional teaching of SI, attempts were made to search for a more efficient pedagogy of interpreting teaching in the institutional context, which search has yielded inspiring fruits. As the earliest probing, some established interpreters (mainly in Europe) drew on their personal experiences as practising interpreters to form the primary teaching theory frameworks (Kalina, 2014). As a result, the first handbooks of interpreting teaching were produced, including Hebert (1952), Paneth (1957) and Ilg (1959). These early works covered various aspects from observations of both professional interpreters'

and students' behaviours to hypotheses on interpreting processes and problems and recommended solutions. The value of these works is thought highly of by many later researchers. For instance, Kalina (2014, p. 22) comments that Ilg "laid the groundwork for scholarly discussion of training methods". Kalina also stresses that, although mostly intuitive and observational, some arguments in these works remain valid and instructive for interpreter trainers today.

One interpreter/trainer contributing to the early exploration that must be mentioned in particular is Danica Seleskovitch. Seleskovitch (1968) devised a teaching theory that brought both inspiration and controversies to the interpreting community: the teaching theory underpinned by "théorie du sens", or deverbalization. In this theory, Seleskovitch emphasized the comprehension of meaning as the prime task in interpreting, and regarded interpretation as a non-language-specific phenomenon, which means that linguistic equivalence is not a matter of concern in interpretation (Seleskovitch, 1975; Gile, 1994). What is at the core of this teaching is forming mental representation of the source information, which solely depends on the ability to strip the sense from its linguistic form. Consequently, the exercises proposed by Seleskovitch exclusively focused on text analysis and comprehension of the source message, such as finding key words, summarizing and so on (Sandrelli, 2005, p. 2). For quite a while, the dogma of deverbalization dictated interpreting teaching, which indeed resulted in some positive results, but its defects are also discussed. While agreeing with the emphasis placed on meaning comprehension and its consequent mental representation, Kalina (1994, p. 253) points out that teaching of reformulation is absent in this theory and the sole emphasis on meaning comprehension without considering linguistic form "definitely does not suffice for simultaneous interpreting". Besides this, it is increasingly accepted that language differences and linguistic factors are crucial in interpreting, and that difficulties related to specific language pairs must be discussed and addressed in the teaching (Gile, 1994; Sandrelli, 2005). In addition, other criticism is directed at the lack of empirical and scientific evidence in this approach (Dam, 1998; Pöchhacker, 2010b). Putting aside the controversies about deverbalization, Kalina (2014) argues that an extremely valuable contribution by Seleskovitch is that she insisted that interpreting studies should go beyond the frame of translation studies and into collaborating with other disciplines. Under Seleskovitch's initiative, the Paris cycle de doctorat was established, which is considered as "the cradle of conference interpreting studies" (Kalina, 2014, p. 23). This marked the beginning of the formal academic study of interpreting as in any other established subjects. In this process, Kalina (2014) also observes a transition in the search orientation: from purely personal experience-based to more empirically grounded studies.

To further enrich the pedagogy of interpreting, or SI pedagogy specifically, later researchers continued to make their contributions to this knowledge base, with Weber (1984), Gran and Dodds (1989), Moser-Mercer (1978, 1994), Gile (1995a, 1995b), Dollerup and Ldddegaard (1992,1994) and Kalina (2000) as outstanding examples. The pivotal issue they all addressed is to find the best tools, i.e. didactics to achieve efficient outcomes of SI teaching.

In either of the two types of teaching discussed above, skill development as the overlapping objective has attracted much research attention as to what didactics are optimal to achieve this objective. From the review of research here, it is found that existing didactics can be divided into macro vs. micro perspectives, namely, orientation/style of teaching vs. choices of teaching tools or methods, respectively.

Regarding the macro level, Pöchhacker (2016) claims that this is, firstly, about the choice of general teaching frame: subskill-oriented drill exercises, or holistic method. This can be considered as a principle and overarching choice as a starting point that will provide direction and foundation to the choice of a specific didactic toolbox. Another comparatively macro-level discussion on SI teaching is the sequence of interpreting modes to be taught before SI is introduced. Some researchers/trainers advocate that the teaching of different modes should start synchronously. For instance, Aarup (1993) considers that the teaching of SI and consecutive interpreting should start at the same time, due to the shared skills, and the possible difficulties in transition if CI is taught first. On the contrary, some trainers insist that the mastery of CI should precede SI learning, since students can learn to listen to meanings rather than simply words via consecutive interpreting, underpinned by "théorie du sens" as the theoretical foundation (Niska, 2005). Gile (2005) also agrees on such an order, advocating that CI (first without notes, then with notes) should be mastered before SI is introduced. As Gile (2002) introduces, the normal practice at École supérieure d'interprètes et de traducteurs (ESIT) and The Institute of Intercultural Management and Communication (ISIT) is that SI is introduced only after one year of CI practice. This is because CI is easier thanks to its lower cognitive load compared with SI, and mastery of easier tasks should be the prerequisite for acquiring harder ones (Gile, 2005). In consecutive mode, interpreters can pace themselves when they deliver, and no real attention split is required on operation except for note taking, while notes can help with production at later stage. In comparison, SI can be more demanding in that the delivery is speaker-paced and the concurrent presence of both source and target languages in the working memory increases the cognitive load. The process of transiting from CI to SI, as Gile (2005, p. 134) points out, is "sensitive and critical" because some qualities and skills required in SI are absent in CI. To address this skill absence, the "training wheels" (Déjean Le Féal ,1997) in SI

are useful in that they encourage the techniques of interpreting obtained in CI to be fully utilized as the departure point and the consequent continuity guides trainees through the initial stage of SI (Peal, 1995, p. 180).

At a more micro-level, the didactic exploration focuses on finding useful and applicable didactic resources, tools or exercises that can be conducive to effective SI teaching. For instance, Weber (1984) offers teaching suggestions including teaching resources, curriculum design, instruction and testing in the discussion; while others bring attention to more specific aspects of SI teaching such as quality assessment (Buhler, 1986) and skill acquisition (Moser-Mercer, 2005). Pearl (1995), Pöchhacker (1999), Seleskovitch (1999) and Moser-Mercer (2005a) all present insightful reviews of SI teaching practice with critical comments. On the earlier teaching practices, researchers either affirm or oppose these with empirical evidence (e.g. Gerver, 1976; Lederer, 1981), or identify gaps and possibilities for improvement by suggesting new tools or exercises (e.g. Kalina, 1994). So far, many instruction manuals for teachers have been made available, such as works by Andres and Behr (2014), Gile (1995a/2009), Gillies (2013), Jones (1998), Pöchhacker (1995), and Setton and Dawrant (2016). Outlined here are major works compiled in English, while works in other languages are also available, such as Matyssek (1989), Kautz (2000) and Tryuk (2006). Among the latest works of this kind, *To know how to suggest…approaches to teaching conference interpreting* (Andres & Behr, 2015) and *Conference interpreting: A complete course (*Setton & Dawrant, 2016) both strongly signify the trend of formalizing SI teaching in the institutional context. The former book is clearly positioned as a guide for institutional teaching practice by the editors, offering very elaborate and specific didactic decisions to be made by trainers in teaching, including preparatory exercises, text selections and teaching of strategies, among other very important topics. The latter outlines the full curriculum arrangement and specific didactic settings to teach SI in institutional contexts. In addition to individual researchers' efforts in searching for SI didactics, collective work from the industry, including practicing communities or peak bodies, is also contributing to an increasingly systematic SI teaching practice. For instance, as the largest user of conference interpreters, the European Commission and Parliament started to formalize their interpreter training over a decade ago, transforming previously semi-formal in-house training into a six-month training course organized by the European Commission's Joint Interpreter and Conference Service (Niska, 2005). The same trend is also evident in the brochure published by the International Association of Conference Interpreters (AIIC), *Advice to students wishing to become conference interpreters* (1997). In this brochure, many details of training frames are formalized in terms of entrance criteria, specific training objectives, training modes and courses

delivered. Another good example is the European Master of Conference Interpreting (EMCI)[1], which prescribes common programs and procedures for member universities offering conference interpreting courses.

All the contributions discussed above enrich the understanding of SI teaching and bring institutional SI teaching to a more systematic track. The value of previous work is incontestable, in that it provides trainers, especially new trainers, with ready-to-take recipes so that rookie trainers can start their teaching practice relatively more easily. Kalina (2015, p. 26) affirms the usefulness of these works, as "collections of practical classroom experience [which] are useful especially for less experienced trainers".

2.1.2 Current trends in SI pedagogy

The evolution of SI teaching is continuing to keep up with trends, in a broader higher education sense, and in interpreting itself as a profession and a service in the evolving market.

Firstly, pedagogy in higher education generally has been changing. Cooper (1993) identifies the gradual style transition in designed instruction as being one from behaviourism to cognitivism, to constructivism. He then quotes Jonathen (1991), who groups behaviourism and cognitivism as objectivism. The core idea of objectivism is that reality or knowledge is external to knowers while the mind only functions as a processor of input in the learning process (Jonassen, 1991). Such a teaching style is considered to be teacher-centred, which means that the roles of instructors include being both source of knowledge and class activity organizers, and that they decide what to teach and how to teach (Tudor, 1993). Regarding this style as the traditional way of teaching, Van Lier (2007, p.61) considers that it involves no more than "transmission of knowledge and information punctuated by periodic high-stakes tests". By contrast, constructivism holds that personal experience constructs reality/knowledge in terms of how the reality is defined and perceived, so that the learning is personal and socially interactive (Grabinger & Dunlap, 1995; Lebow, 1993). Grabinger and Dunlap (1995) commend that the constructivist approach provides an environment for active learning that is more stimulating and productive. In higher education, Bostock (2000) argues that, to create such an active learning environment, the design of instruction should reflect five features: authentic learning context; student responsivity and initiative; generative learning strategies; co-operative support; and authentic assessment. In this spirit, higher education as a whole has been witnessing a transition from instructor-centred to learner-centred learning (Steffe & Gale, 1995).

[1] http://www.emcinterpreting.org/

Van Lier (2008, p. 53) also observes that "a person does not learn by receiving 'input' that is 'delivered' via some instructional mechanism, but by picking up information in the environment on the basis of and guided by organismic needs and purposes". This implies that, while the instructions are directed by the learning goals, the instructional implementation should also be compatible with the way in which learners "pick up" information, to make sure that the environment can facilitate knowledge acquisition. This learner-centred instruction is also neatly embedded in the five principals of pedagogical design raised by Lebow (1993) maintenance of space for learners to reduce potentially damaging effects of instructional practices; support for learning featuring autonomy and relatedness; inclusion of the reasons for learning into the learning activity; promotion of skills and attitudes that enable learners to take more responsibility for the developmental process; and encouragement of intentional learning processes, emphasizing strategic exploration of errors.

This constructivism orientation featuring learner-centred teaching has also been echoed in and followed by the T & I teaching community (Kiraly, 1995). After some pioneering translation educators advocating learner-centred teaching, such as Holz-Mänttäri (1984), Ladmiral (1977), and Sainz (1994), Kiraly (1995/2000) integrates social constructivism to translation pedagogy in a systemic way. Kiraly (2000) points out that, in the traditional translation skill instructions, the teaching and learning is in a "transmission and reception of knowledge" mode, where teachers arrange all class activities and assignments while students simply accept the instructions inactively, do the work alone, get corrections, and demonstrate the received knowledge in their exams. By contrast, Kiraly (2000) emphasizes empowerment of learners through constructive learning, so that leaners can acquire expertise to make professional decisions, assume responsibility for their actions, and develop autonomy for life-long learning. Two techniques to achieve such constructive learning are highlighted by Kiraly (2000): scaffolding and socio-cognitive apprenticeship. Scaffolding means the measured support and guidance provided by teachers to learners before they can accomplish a task independently; and such assistance is realized through "a flexible structure as a function of ongoing negotiations between the teacher and the learners" (Kiraly, 2000, p. 46). Socio-cognitive apprenticeship refers to the pedagogical interaction where students can acquire, use and develop cognitive tools in authentic activities, during which teachers first model strategies for and acknowledge to learners, then support is provided to help students make attempts and actively reflect on their own performance (Kiraly, 2000).

Guided by such constructivist thinking, Kiraly (2000, 2001) conducted a two-year research program. The teaching approach experimented with by Kiraly is characterized by great

empowerment of the learners, by encouraging much discussion and negotiation among learners, while having the teacher as advisor and project coordinator. With good learning outcomes obtained from the program, Kiraly (2001, p. 53) concludes that the learner-centred approach inspired by constructivism is beneficial to translation teaching:

> By recognizing the inherently personal and social nature of knowledge construction, and by negating the possibility of transferring objective knowledge from one mind to another, the approach inherently promotes a more equitable distribution of authority in the classroom and higher levels of motivation and active participation. It also encourages students to assume responsibility for their own learning.

The advocacy of constructivism can also be found in interpreting research work (see Class & Moser-Mercer, 2013; Ficchi 1999; Sainz, 1995), even without use of the term constructivism. For instance, Van Dem (1989) advocates that the process of skill training in interpreting teaching should involve cooperation between instructors and students, in which the roles of instructors are for providing appropriate tasks and offering feedback when monitoring, rather than dictating the learning. Takeda (2010) also argues that teaching should be improved and adjusted based on expectation and feedback from the learners' perspective, instead of solely decided by teachers.

Secondly, the increasing diversity in SI teaching is another new feature requiring the expansion of existing didactic practice. This increasing diversity can be found in two aspects. It is firstly found in the larger number of interpreting training courses offered in non-European countries and institutes worldwide (Gile, 2014). With SI teaching spreading out into different areas, it is inevitable that adaptation is required to fit into local circumstances and for particular language pairs. Consequently, earlier SI didactics, which were monotonous in being Euro-centric, have been developing into various styles and approaches. Several models have been identified in addition to the European model featured in established academic courses at universities (Niska, 2005). These models include the British/liberal model, market-oriented model, and Scandinavian/flexible model (Niska, 2005, pp. 38-40). Besides this, the increasing diversity is also reflected in the higher degree of heterogeneity of student profiles at universities and thus in translating and interpreting courses (Kelly, 2005). Kelly (2005) names internationalization and enhanced inclusion of varied groups as the main contributing factors to this increased diversity, and continues that higher heterogeneity of students leads to more diversified learning needs. With further spreading of SI teaching featuring the increasing diversity in terms of the two aspects stated above, it is imperative for instructors to choose or reinvent existing teaching models and didactic methods to meet specific conditions and needs.

2.1.3 Gaps in current pedagogy

From the review above, it is reasonable to argue that existing didactics provide good sources to learn from, but that gaps also do exist.

To start with, the learner-centred approach is not adequately taken to be a norm in the current interpreting pedagogy. In many cases, the pedagogy practiced still follows the old way: a teaching plan is solely decided by the teacher, and it is conducted as prescribed year after year. As Kiraly (2000) observes, in the traditional teaching activities in translation classrooms, the teacher is the only one identifying problems, setting exercises and deciding solutions. Ignoring heterogeneity among learners leads to the possibility that the learning is passively imposed on learners without considering their different characteristics and learning speeds, which can hardly motivate learners to become "constructive, goal-oriented, situated and collaborative" (De Corte, 2000, p.254). To address this issue, thinking from the trainees' perspective is important. For example, Moser-Mercer (2008, p. 8) concludes, after years of teaching and research, that a common weakness of novice learners is their difficulty in identifying patterns quickly to make decisions for the next steps and making knowledge "more routine and implicit" when they face novel situations or issues. The particular features and needs of these unexperienced trainees must be considered, so that support can be provided to help them draw lessons that can lead to stable performance in similar circumstances afterward (De Groot, 2000; Moser-Mercer, 2008; Sternberg, 2003). To replace the rigid and passive transmission frame as identified above, interpreting pedagogic research that embodies "reflective action" (Kiraly, 2000) should be conducted to answer to the new trend of a constructivist orientation in education.

Secondly, the traditionally acknowledged interpreting pedagogy, including specific didactic tools, might not be fully applicable to emerging new language pairs covered in current teaching. The review above shows that previous SI pedagogic research mainly took place in Europe or America, thus the relevant research has concentrated on languages in use in those regions. With the rising number of institutes teaching SI in different languages, some traditionally applicable didactic findings need to be subject to testing as to whether they are still generically applicable or whether changes are required to be more language-specific. As Gile (1994, p. 153) notes: "Interpretation theory remained very Eurocentric in the West, with ideas that would probably have developed differently had the dominant stream been aware of problems posed by Japanese, Chinese, Arabic and other non-European languages as well as some East-European languages". Therefore, SI pedagogic research should include more language pairs to close such a gap.

Finally, some changes in markets require the development of pedagogy in terms of both teaching approach and didactic tools. Nowadays, conferences have become more challenging and complicated (Kalina, 2014, p.8). As a good example, Kalina observes that the larger variety of subject topics, involvement of a large amount of new knowledge from technological fields, and unpredictability of speakers all impose challenges and pressure on interpreters. Besides this, with new developments in technology and media, the evolving market that novice interpreters are exposed to can be dramatically different from the one their trainers worked in, so that mere experience and reflection from trainers could be insufficient or even obsolete. As noted by Sandrelli and Jerez (2014) concerning impacts on interpreting practice and training by new technologies, information communication technology dramatically changes the work settings for interpreters, with the presence and prevalence of video conferencing or remote interpreting. In the face of these changes in the market, both teaching orientation and didactic tools must be innovated. In terms of teaching orientation, rather than being confined to imparting solutions to the current issues, it is more important to empower learners to become autonomous learners and build their capacities for interpreting as an evolving profession independently. Didactically, innovation through including necessary new components in the teaching becomes imperative. For instance, Gile (2005, p. 149) stresses that conference interpreting teaching in the new millennium must take into account new trends in interpreting demands, such as interpreting on broadcast, via satellite or on the Internet.

2.2 Teaching SI - the cognitive path to skill acquisition

Interpreting has been defined as an activity from various perspectives, and the cognitive perspective stands out. As summarized by Pöchhacker (2009, p. 133), the three most fundamental conceptualizations of interpreting are interpreting as linguistic transfer, interpreting as cognitive processing, and interpreting as social mediation activity. Among these perspectives, Pöchhacker (2016) identifies that studying interpreting as cognitive processing is the most popular perspective in research, especially for conference interpreting. To explain this, Pöchhacker (2009, p. 135) observes, "given the unquestionable centrality of human mental faculties in carrying out whatever type or variant of this complex communicative task, the basic component processes of comprehension and production in two different languages are fundamental to any account of interpreting".

A Review of the literature indicates that the development history of interpreting studies has been closely connected with psychological and cognitive science, since considerable research efforts have been devoted to understanding the mental processes in interpreting (Pöchhacker, 2010b). The first attempt in studying interpreting can be dated back to the 1950s, when Herbert

(1952), Rozan (1956) and Ilg (1959) published works mainly based on personal experience and thus claimed limited scientific validity (in Gile, 1994). Gile (1994, p. 149) recognizes Paneth (1957) as the first scholar conducting academic study which heralded the "experimental psychology period". During this period, expanding from the 1960s to early 1970s, experimental interpreting research was conducted by a few psychologists and psycholinguist (see Gerver, 1976 for a detailed review). Within the same period, the first empirical research on SI was conducted by psychologists. It was done by Oléron and Nanpon (1965), who published their research on a psychological journal (Pöchhacker, 2002). Gile (1994) identifies the focus of research at this stage as being to explain the interpreting process and the influence of and reaction to various factors in interpreting. Then, from the early 1970s to 1980s, Gile (1994) finds active participation of interpreting practitioners in research, with the main research achievements still showing a strong cognitive nature. These research include the theorization of interpreting processes based on cognitive foundations, such as the development of the "Théorie du sens"; establishment of information processing-based models (for instance Moser-Mercer, 1978; Gerver, 1976); and explanation of cognitive difficulties and suggested strategies in interpreting, such as Gile (1990), who establishes capacity-based effort models, Kirchhoff (1976) and Chernov (1979). Moser-Mercer (2005) also observes that research into the cognitive base of SI and its skills had begun by 1987. This period was then followed by what Gile (1994, p.151) calls a "renaissance" period where some significant events pushed interpreting studies forward. Among these significant events, the conference by Scuola Superiore per Interpreti e Traduttori of the Universita degli Studi di Trieste in 1986 and Translation Congress 1992 are considered as turning points, which challenged certain dogmas and initiated the push for interdisciplinary research in translation and interpreting studies (Gran & Dodds, 1989; Pöchhacker, 2009a, 2009b). Afterwards, the scientific research in interpreting that featured cognitive psychology as the guiding discipline also responded to the appeal by Gile (1988, 1995b), that the scientific exploration of conference interpreting should enhance collaboration with researchers in cognitive psychology and cognitive-linguistics (Pöchhacker, 2017). Such a cognitive base is also acknowledged by Setton (2013), who concludes that, among interpreting models established so far, more have drawn on psychology and information theory than on translation studies or linguistics.

The strong influence of cognitive and psychological science is also found in the development of interpreting pedagogy (Seleskovitch, 1999; Moser-Mercer, 2005c). Both Seleskovitch and Moser-Mercer note that the theoretical foundation for the interpreting process was underpinned by cognitive explanation, based on which instructional practice is built (Pöchhacker, 2010b).

It is undeniable that the act of interpreting is a communicative action involving linguistic, cognitive and social factors, and research has been conducted from all these perspectives. Nevertheless, the cognitive perspective presents more achievements, and has been a continuing tradition in interpreting research from its origin until the present time; thus, the discussion of its processes and pedagogy should have a cognitive perspective as the point of departure, and the following discussion of SI pedagogy will follow this line.

2.2.1 The cognitive theories of skill acquisition

Cognitively, interpreting is considered as a highly skilled, multitasking cognitive activity that can only be performed successfully with a high degree of concentration and specific skills (Massaro & Shlesinger, 1997; De Groot, 2000). SI is especially cognitively demanding given the extreme time pressure and sub-processes occurring with simultaneity (Pöchhacker, 1994, 1995). As a manifestation, Lonsdale (1997) reviews previous work on cognitive studies of SI and lists 10 characteristics of SI cognition in terms of skills and strategies involved. As a result, skill acquisition becomes a central topic in SI teaching.

In SI, acquiring those complex skills follows the general rules and patterns of skill acquisition commonly observed in other domains (Schneider, 1985), thus the skill acquisition theory provides a good source of reference. For instance, according to Vanlehn's (1996) review of research on skill acquisition, learners normally experience three phases to finalize the learning cycle, namely the initial, intermediate and final stages. He points out that the initial stage is a prerequisite, which provides the learners with basic understanding of the domain knowledge, mainly through reading, discussion or some other information-acquisition activities. However, it is not until in the intermediate phase do learners begin to apply this knowledge for problem solving. In this phase, learners gradually improve their knowledge by removing misunderstanding and acquiring missing knowledge. Therefore, their performance can be free from conceptual errors; but with the presence of unintended mistakes or slips (Norman, 1981). When learners enter the final stage, continued practice improves their accuracy and speed, known as "power law of practice" (Vanlehn, 1996, p. 531).

In different terms, Anderson (1982) also describes skill acquisition in three stages, namely the cognitive, associate and autonomous stages; distinguished by two types of knowledge acquired: declarative and procedural knowledge. Briefly put, the difference between these two types lies in that declarative knowledge is remembered, retrieved and stated verbally, while procedural knowledge is internalized, which is at a more advanced level (Singley & Anderson, 1989, p.198). The contribution to skill development by these two types of knowledge can vary due to

their different natures. Psychologists have demonstrated that declarative knowledge is more sensitive to erosion over time, while procedural knowledge can endure longer (e.g. Bunch, 1936; Bunch & Lang, 1939). Furthermore, the practice of the skills that turn into procedural knowledge does not require conscious utilization but more of a reflex action, thus the stable base level of performance is more associated with procedural knowledge (Singley & Anderson, 1989). The didactic application of this theory is that, to internalize a skill through training, the teaching can start from the declarative knowledge, but once the declarative knowledge is acknowledged as quintessential to learners, the teaching should move on to facilitate the internalization of the knowledge and problem solving, advancing to procedural knowledge.

Based on this, Anderson (1982) argues that an adequate learning process should enable and facilitate such a transition and progression from declarative to procedural knowledge. To start with, students acknowledge the skill and remember declarative facts or knowledge at the cognitive stage. Then they progress to the associate stage where they start connecting the declarative knowledge to practice and making endeavours to detect and reduce errors in their performance. In addition, students enhance the links among different elements required in the skills. At this stage, Vanlehn (1996) particularly emphasizes the importance of demonstrated solutions to problems: introduction of principles or knowledge to students is not the end of the teaching; rather, teachers must provide examples of how problems are solved first before students do their own work to apply the knowledge and principles to problem solving. Vanlehn (1996, p. 517) restates the value of examples in the intermediate stage of skill acquisition by quoting studies conducted in various instructional situations, and concludes that "students learn more from studying examples than from other forms of instruction". Finally, students enter the autonomous stage in which the procedures in the task gain more automaticity with more practice. At his stage, practice is expected to enhance speed and accuracy.

In the continued practice at the autonomous stage, the final stage, one cognitive phenomenon possible is transfer. Transfer is a long-studied topic in the educational psychology arena. Vanlehn (1996, p. 532) defines it as gain on one task (the transfer task) due to earlier training on a different task (the training task). The traditional theories of transfer consider that cognitive transfer occurs across different domains regardless of common cognitive elements shared (e.g. Higginson, 1931; Woodrow, 1927). Taking a view from a different angle, Thorndike (1906) proposed an identical-element-dependant transfer theory, arguing that a mental function or cognitive skills fostered through one activity can only be transferred to another when the two share at least some similar elements. To define the identical elements, Thorndike (1922) seemed quite stringent in that he required exactly similar stimuli-response pattern in a task pair to enable

the transfer and maintained that any variation in the input can impair the transfer. He conducted a series of experiments involving related tasks and subjects to test these views, but evidence in these experiments show that both general and specific transfer occurred, going against his overly absolutist theory. Later, with further proof and validation, many researchers adopted a milder stance, claiming that, while transfer may be limited in scope with certain common representations, wider transfer is possible among different tasks as long as proper instructions and organized skill sequence are provided in the training (Coxe, 1925; Dorsey & Hopkins, 1930; Judd, 1908; Orata, 1928). On top of this, one further finding is that the extent of transfer can be positively correlated to the number of pieces of knowledge shared between two tasks (Bovair, Kieras & Polson, 1990; Sinley & Anderson, 1989). That is, the more two tasks share in terms of knowledge and skill components, the better transfer can be, even between tasks in different domains (Singley & Anderson, 1989). Besides this, it is also argued that the transfer efficacy from easier to more difficult tasks may be better than that in the opposite transfer direction (Stevens, Anderson, O'Dwyer, & Williams, 2012)

The availability and premises of transfer can direct the teaching design of skill acquisition. Based on the above findings, if one skill is obtained and later developed with practice in training task A, it can continue to be available in task B when it is also a subskill in task B. Besides this, to maximize such a transfer effect from Task A to B, two requirements should be met: 1) to make sure the training task A can share as much knowledge as possible with Task B; and 2) Task A should be easier than Task B. As Salvucci (2013, p. 855) puts it, "in the learning of new tasks, skill acquisition can in many ways be better characterized as skill composition-the composition of already-known component skills in novel ways to enable the performance of new skills and tasks".

One problem worth noting here, though, is the difficulty in measuring the exact extent of transfer. As Singley and Anderson (1989, p. 28) note, it is a fact that "all cognitive skills are learned not in isolation but rather against a backdrop of well-practiced support skills which go virtually undetected in any measurement of learning and transfer". The main concern Singley and Anderson hold for measurement of the transfer effect of a component is that it is difficult to single out one component as the exclusive factor in skill development. Any positive transfer effect of a component can hardly be proved to be a result of the sole contribution of this component rather than a consequence of combined factors, or that the one component plays the major role in such a combination. Therefore, it requires very sophisticated research design and two groups of subjects to calculate accurate transfer ratio (Roscoe & Williges, 1980).

The skill acquisition theory provides an effective guidance for the design of teaching and choice of teaching tools in SI. As for all other cognitive skills, new skills in SI can be acquired and developed by following the general path drawn from cognitive science, and this should be followed in the initial learning stage of interpreting (Moser-Mercer, 2008, p. 13). As one of the most prominent researchers in interpreting and SI studies, Moser-Mercer (2008) sets a good example of the integration of the cognitive skill acquisition theory into the interpreting domain, applauding that learners also experience cognitive, associate and autonomous stages in acquiring interpreting skills. She (Moser-Mercer, 2000a) also identifies learners at different stages in the interpreting learning, based on the description by Klein and Hoffman (1993), as naivettes, novices, initiates, apprentices, journeymen and finally experts. In SI learning, naivettes are learners who are completely ignorant of SI, and novices refer to those who have previous study in CI with some exposure to and understanding of SI interpreting. In early stage of a SI course, the first type is rare while the second is more common. Occasionally, some learners can even be initiates, who have already acquired or are exposed to some subskills of SI in their previous interpreting study (Moser-Mercer, 2000a).

To facilitate skill acquisition for these learners at early stage, the skill acquisition theories above inform the teaching design and teaching practice for the present study in three ways. Firstly, the learning requires instructions and guidance from the trainers to access rudimentary knowledge and application of knowledge in problem solving; while repeated use of the knowledge is a responsibility of students to transform declarative knowledge into procedural knowledge via practice. Secondly, the learning must follow a sequential and progressive arrangement to make sure that the learning is a systematic process and students are well prepared to proceed with the assistance of trainers. Such an arrangement can help learners obtain skills and then gain proficiency in executing a skill or performing a task (Moser-Mercer, 2005a). Thirdly, the mechanism of skill transfer can be theoretically feasible in the SI domain, that a skill practiced in training tasks as transitional can be transferred to SI as the target task, as long as similar skill components are ascertained between the transitional tasks and SI.

Accordingly, training tasks designed for skill acquisition in SI must share overlapping skill elements with SI, be arrayed in sequence to achieve knowledge iteration and progression, and give space to both heuristic teaching and students' internalization through practice and reflection. The teaching design directed by these principles will be detailed in the following chapters.

With the general understanding of cognitive skill acquisition, including the cognitive base, evolving stages and necessary conditions, discussion can proceed to the next topic, as to what

is the optimal teaching approach to facilitate skill acquisition when multiple subskills are included. Interpreting pedagogy should always draw on the interpreting studies for inspiration, even interpreting studies not intended for a pedagogical purpose (Pöchhacker, 2010b). For instance, Kalina (2000) comments that interpreting research that aims at developing models to describe what interpreters do and explain why they succeed or fail can provide directions for teaching. An interpreting model should describe skill components, with a number of subskills to be identified (Moser-Mercer, Lambert, Darò & Williams, 1997); and the defined skill components can inspire training methods for better efficacy in those skill components, in order to help to achieve the results desired (Kalina, 2000).

The emphasis on training skill components leads to one issue to be addressed first: the choice of a whole-task or a part-task training approach. Whole-task training means presenting a complete task to learners so that they practice the task in its entirety from the beginning; while part-task training advocates decomposing a task into sub-tasks for learners and allows them to practice subsets of a task before the whole task (Teague, Gittelman & Park, 1994, p. 2). The part-task vs. whole-task training distinction is the same as that of componential vs. holistic (Sawyer, 2004) teaching, thus these two pairs of terms will be used interchangeably. There is a debate over the choice of these two approaches for training in complex cognitive skills (see Teague, Gittelman & Park, 1994 for a detailed review), including in interpreting teaching (De Groot, 2000). The choice has a significant ramification for SI training, since it will direct trainers to adopt different teaching arrangements and apparatuses. The two approaches are reviewed from a cognitive perspective in the following discussion.

2.2.2 Part-task teaching

Cognitive theories provide a useful reference to reveal the advantages of the part-task approach in complex cognitive skill training. According to the cognitive load theory, initial training with learning tasks that represent the full complexity of an authentic task can hardly succeed, because the complexity can easily overload learners' cognitive system (Mayer & Moreno, 2003; Paas, Renkl, & Sweller, 2003; Paas & van Gog, 2009; Sweller, 1994; Wickens, Carolan, Hutchins, & Cumming, 2013). This can negatively affect learning, performance and motivation (Salden, Paas & van Merriënboer, 2006; Sweller, van Merriënboer & Paas, 1998). Therefore, part-task training has been proposed to improve training effectiveness (Adams, 1960); and its advantages have been identified and explained (Wightman & Lintern, 1985). These advantages can be more prominent in the context of SI training, where the multitasking feature adds to the cognitive complexity.

First of all, part-task training can reduce possible task interference in the multitasking process. Interference exists among concurrent tasks, but being skilful in one task allows reduced possible interference to other tasks and impact on the overall performance (Allport, Antonis, & Reynold, 1972; Wickens & Gopher, 1977). That is to say, in a task involving multiple subtasks, good performance in some or each of subtasks can facilitate the execution of the whole task.

To apply the above cognitive findings in skill acquisition to SI involving multiple subskills and operations, the cognitive loads can be relieved or even bypassed by adopting the part-task approach. "Due to the complex nature of the overall process", as Andres, Boden and Fuchs (2014, p. 59) state, "it can be useful to identify and isolate individual operations, to practice them separately and to automate them as fast as possible". The function of individual skills in the whole task of SI is agreed upon by several researchers. For instance, Setton (2001), in spite of his opposition to decomposing SI, also admits the role of a component skill such as the linguistic skill, arguing that those strategies based on textual clues help interpreters walk on the "tightrope" (Gile, 1995a, p. 192) in SI. Another example is Chmiel (2006), who quotes the theory of speed retrieval (Chase & Ericsson, 1982) and applies it to SI. She argues that if some subtasks of SI are performed in a faster and more effectively way, this can contribute to the overall quality of interpretation. Without any intention to go into detailed and sophisticated cognitive theories here at length, the following remarks can serve as a useful summary of the benefits of acquiring subskills first, "thanks to automatization of procedures, no attentional resources are needed for acquired subskills. These resources may in turn be allocated to more demanding semantic or morphological processing, activation of appropriate vocabulary and self-monitoring, etc." (Chmiel, 2006, p. 61).

Empirical data and experience drawn from class teaching also lend strong support to part-task/componential approach in SI teaching. By quoting the experimental results from Wightman and Lintern (1985), De Groot (2000) affirms with empirical data that componential training can be more effective than whole task training, criticising the irrationality of employing whole task teaching at the initial stage of learning, since it is more likely to cause panic and frustration in trainees, which can influence the learning effect afterward. In China, experiments were also conducted by interpreting trainers to compare the efficacy of different approaches. For instance, Han's (2006, 2008) exploration with a skill-oriented design in CI teaching, among other recent studies, shows that such design generates better performance compared with students in a control group instructed with the topic-focused method.

Skill decomposition in SI has a good theoretical pointer – the interpreting models based on the information processing model (Sandrelli, 2005). As the name suggests, the strings of models

under an information processing model focus on the cognitive processes of SI, covering the flow of process components from the perception of messages to the delivery of interpretation. The information processing model has been modified and refined by researchers who try to identify and explain the cognitive components in SI, providing a foundation for skill decomposition for the sake of part-task training in SI.

Massaro (1975), who set up the fundamental framework of information processing in interpreting, established the primary model. Massaro describes the process of interpreting as a language processing flow of auditory information. According to Massaro, interpreting starts from the delivery of a speech by a speaker. When reaching a listener, the received messages are processed and they end up as mental representations in the listener's mind. This model is essentially a conceptual simplification of the interpreting process, modelling the listener and the interpreter as the same person. However, it is obvious that such a model is describing interpreting as a generic concept rather than having SI as the focus of discussion. Therefore, Massaro's simplified model is too general to describe and explain the cognitive black box in SI. Its implications for SI teaching and training are, therefore, quite limited.

Gerver (1976) later modified Massaro's model and established an improved full processing mode with specific reference to SI. Compared with the preliminary model devised by Massaro, Gerver (1976) extends the model by specifying more sub-processes and stressing the importance of the working memory (hereafter, WM) in performing SI, with focused reference to the simultaneity of various forms of processing. He postulates that an interpreter decodes and stores incoming information by understanding the messages and putting them in the temporary zone as a buffer storage, for later retrieval to complete the previous message; then the interpreter either considers the fitness by comparing the production with the memory of this information he still holds or chooses to produce immediately. In this process, Gerver emphasizes two functions of WK in SI: to store information, and to control the allocation of attention to different processing. Although admitting that this is not a perfect model for SI, Gerver did specify some stages and components with more details in this conceptual model.

To provide a more refined theoretical model for SI, Moser-Mercer (1978) establishes a more systematic and staged information processing model for SI, building upon the models by Massaro and Gerver. In Moser-Mercer's (1978) hypothetical model, she divides the sequence of SI processing steps into several linking stages, emphasizing the temporal flow of the processing auditory information through types of cues, progressing from phonics rules and lexical stress to syntactic and semantic recognition, to move from primary recognition to secondary recognition. Moser-Mercer (1978) claims that this message processing proceeds in

continuous decision-making and evaluation. In the initial processing stage, acoustic sounds are received by interpreters and features of the words are identified for storage. At this stage, everything heard is processed without any rejection or screening, and the identified words are stored for further analysis and retrieval. In the second stage, which Moser-mercer names as the generated memory stage, identified words are further processed into strings of words and chunked into more meaningful units (through combination and recoding), and the contents are stored in short-term memory, waiting to be connected to certain conceptual constructions. Moser-Mercer (1978) indicates that these connections are of a dual nature, both intralingual and interlingual. She also argues that, the more difficult it is to come to this point, the more the speed of output will be influenced. At the final stage, the semantic structure is to be organized for delivery of interpretation. This model hypnotizes in more detail what cognitive processes may be involved in the "black box" of SI. From this sense, Moser-Mercer's model is more sophisticated and comprehensive in decomposing SI into possible cognitive components and explaining how each stage transits to another. In addition, she manages to theoretically describing information processing at different levels, accounting for how an interpreter proceeds in execution of the task, not only cognitively but also lexically, syntactically and semantically. Although Moser-Mercer indicates that this model pertains more to skilled interpreters rather than beginners in terms of its application, it can still provide a theoretical ground to the knowledge of what may happen in the whole process. This can, to some extent, help researchers to decompose the SI task into smaller units for a didactic purpose.

To further demonstrate the feasibility of a componential skill approach in the context of SI teaching, Gile's effort model for SI (1995a/2009) can be quoted as a support (Patrie, 2004). Gile's effort models aim at describing the cognitive process and explaining difficulties and solutions at any given moment in T & I tasks for a didactic purpose. Proposed by Gile in 1995 and then modified in 2009 with improvements, the effort model for SI breaks SI into several efforts, mainly based on cognitive processes, including listening efforts, production efforts, memory efforts and total effort. The first three are quite self-explanatory by their names, while the last means the effort to coordinate all efforts involved. Gile suggests that most errors and omissions are the result of cognitive failure or saturation and saturation occurs when an interpreter possesses insufficient processing capacity for individual efforts or he/she fails to manage and coordinate the efforts as a whole. This model is based on one prerequisite: the overall mental resources at disposal at any given moment are limited for an interpreter. This means that it is a crucial issue to resolve as to how the finite mental resources can be reasonably divided and allocated to different "efforts" to prevent or minimize the possibility of saturation, and Gile therefore raises the point that specific skills and use of strategies must be in place to

avoid mental saturation. Following Gile's explanation of failure in performing SI tasks, Patrie (2004) also argues that, without a firm skill basis, more effort is required in processing, which can easily lead to fatigue. When fatigue increases, more errors are triggered accordingly. Therefore, the development of skills that enable the implementation of all efforts involved in SI becomes the prerequisite for performing SI tasks.

At the didactic level, quite a few researchers show their support for a skill-based componential approach, such as Moser-Mercer (1978), Lambert (1992a), Kutz (1992), Kalina (1992), Camayd-Freixas (2011) and Gile (1995a/2009). Sandrelli (2005, p. 3) notes that exercises proposed by these researchers are in the same spirit of the componential skill approach and these researchers advocate a "preparatory phase" in the training. The purpose of the preparatory phase is to develop and forge specific skills separately via various exercises before the whole task of SI is introduced. Kalina (2000) justifies this approach by arguing that it is more sensible to break SI down and conduct highly purposeful training targeting certain skill/skills first, at the initial stage, before integrating them to perform SI. She (Kalina, 2000, p. 20) insists. "[it is helpful] if this complex activity (SI) is to be decomposed in individual processing steps or stages to be taught separately. Only then does it seem reasonable to expect students to cope with the real task in its entire complexity". More recently, Moser-Mercer (2008, p. 14) also considers that "…breaking down of the interpreting process into sub-tasks which can be tackled one by one and ultimately be brought together again when performing the whole task" or "structuring of sub-tasks" can be an effective method for skill acquisition.

Thinking from the perspective of the learner psychology, Gile (2005) adds that the skill-based approach is more suitable for the classroom reality and characteristics of new trainees. In the 2009 edition of *Basic concepts and models for interpreter and translator training,* first published in 1995, Gile made changes and updates in other areas but his advocacy of skill-based teaching remains the same. From his own experience in teaching, Gile (2005) points out that it can be a crucial time when trainees are initially introduced to the mode of SI, since imposing the SI task on them without proper preparation may lead to nothing but unsuccessful learning, given the complexity of the task. Gile is concerned that such an early setback can dishearten and demotivate trainees in their further study.

2.2.3 Examples of skill–based training practice in SI

With the theoretical basis established for the use of a skill-based componential approach in SI, componential teaching has already been practiced in teaching, reflecting the acceptance of the componential skill-based teaching approach and its effectiveness in practice.

One good example is Van Dam (1989), who applied this approach in a subject named Strategies of simultaneous interpretation offered at the Monterey Institute of International Studies[2]. Two premises for her teaching of this subject were: regarding SI as a skill; and adopting a teaching approach based on concepts and techniques of skill-based training. Then, Van Dam divided the process of teaching into four steps. The first step is separation or isolation of task, i.e. skill being taught is reduced to subskills as reflections of different aspects of the skill, and exercises representing these sub-skills are decided. Then, students practice these exercises in a controlled and monitored way. One principle followed is that only one new (sub) task should be presented to students at one time and the new tasks should be combined with or be built upon previously practised tasks. The third step is "internalization of task" (Van Dam, 1989, p. 169), which means that students practice a task repeatedly until they fully master the task by performing it without conscious efforts or thought. Ideal as this is, it is admitted that full automation may not be always realized, especially when the training time is limited. The final step is the "integration of task" (Van Dam, 1989, p. 169), during which the skill is restored by putting all sub-tasks together so that students will practice the whole task. Following such a teaching design, the subject, "Strategies of simultaneous interpreting", included a variety of exercises such as abstracting and anticipation first, before integrating these into the whole task of SI. Of the use of these exercises, Chimel (2006, p. 58) shows support by commenting "…the skill-based approach to interpreting has direct methodological implication and entails the development of successful training techniques".

Another good example is the teaching practice of Conference Interpreting Trainers (CIT). As Patrie (2004) records, as an internationally-known organization devoted to conference interpreting education, CIT started documenting componential task-based teaching in 1984 and established its own instructional materials following this approach. Patrie (2004) specifies that the same approach is adopted in *The Effective Interpreting Series* compiled as a series of teacher's guides and textbooks for interpreter education.

A more recent example is a Computer-Assisted Interpreter Training tool (CAIT tool) for SI teaching of EMCI, named "Black box". In describing the rationale of this tool system, Sandrelli (2005, p. 6) explains that the design is based on the information processing model, in which exercises included aim at developing subskills separately that are "deemed to be necessary in simultaneous interpreting". As a computer software supplementing classroom teaching, CAIT

[2] The institute has been renamed as Middlebury Institute of International Studies at Monterey.

has been employed by quite a few universities offering SI courses, and positive results have been affirmed.

Use of componential teaching in SI can also be found in China. As reported by Zhong (2001), there are two main streams of teaching approach in the institutions offering SI courses in China. One stream is training based on areas of topics with emphasis on specialized glossaries; while the other stream, represented by prestigious Chinese institutes such as Guangdong University of Foreign Studies and Xiamen University, emphasizes skill training. The first stream is following the holistic approach, while the second steam adopts a typical practice of a componential approach. Zhong considers that componential skill training is more useful and effective, given that topics can be various, which can make it practically impossible to exhaustively study them in training, while skills developed are generally applied regardless of topics involved.

2.2.4 Whole-task training

At the same time, a whole-task approach is also in practice in SI teaching. The main argument for this teaching approach is to maintain the intricacies and interconnections among the processes in SI (Pöchhacker, 2016). Shlesinger (2000) argues that decomposing SI may compromise the integrity and simultaneity of the task, holding that decomposition of SI is an overly simplistic method because it ignores the communicative purpose and pragmatic features of SI, which can only be achieved when the whole task is dealt with in a specific context. Within the framework of whole-task teaching of SI, Setton (2010, p. 9) also states that the whole-task teaching should be incremental and continues with how the incremental whole-task teaching should be implemented in SI teaching:

> The trainees are initiated in a simple version of the integral task, in a protected environment which already elicits the same reflexes, excitement, risk and rewards as the full task, but without most of the more notorious difficulties and hazards of real life. These hazards can then be added incrementally.

Setton (2009, p. 9) commends such holistically incremental teaching as “well-orchestrated apprenticeship”, explaining his preference for incremental pedagogy as a theoretical and evidence-based choice. Theoretically, he considers that the lack of research specializing in sub-task analysis in SI makes a componential approach less grounded. Among cognitive interpreting models that may provide a basis for componential analysis, Setton is concerned that none can accurately capture interpreting activities comprehensively, normally focusing on the cognitive side but leaving the linguistic and social sides of activities behind. Moreover, he considers that,

since the other alternative pedagogies did not produce appropriately documented track records of successful training, it is more secure to follow the traditional whole-task apprentice with improvements in theory and techniques. At the same time, Setton (2001) criticizes that the componential approach treats different components as separate tasks and teats SI as a simplistic sum constituted of those components, while such a perception eliminates the integration and interactions of different components directed by one communicative goal in the context. Setton's (2001, p. 6) criticism, "component-task paradigm fails to capture goal-directed synergies between components in a 'complex' but single task", summarises this concern about component-tasks. Therefore, he (Setton, 2001) proposes that all trainers should try to identify problems of different aspects, namely linguistic, representational and strategic issues, all at the same time with specific reference to the task passage, when teaching SI.

As Setton (2001) insists, an SI task should be discussed as a communicative phenomenon in a specific context, as his cognitive pragmatic-based discourse processing in SI suggests. The pedagogical implication of this is that, compared with training on basic cognitive skills such as concentration and working memory, better understanding in pragmatic sense and verbal agility is considered as a priority in training. Setton further claims that, if a decomposition approach can have any advantages, the effect can only be seen in verbal agility.

Setton may have made relevant points in his concerns of the impact of decomposition on SI, but the discussion should be brought to a more practical level for novice SI learners. The question is, how can the purpose of communication to be achieved and intention be kept intact as a more demanding requirement when trainees can barely handle the task cognitively at a more basic level? Riccardi (2002, p. 117) thus puts it, "we should always consider the actual level at which our students are working, rather than think in terms of the ideal level we wish them to attain". Although Massaro and Shlesinger (1997) question the possibility of fully understanding all components and processes in SI, given its complicated nature, it is proven that the interpreting process is isolatable within the interpreting process (Frauenfelder & Schriefers, 1997). As the review above on the cognitive perspective indicates, it can be safely argued that multitasking is enabled by skill acquisition and proficiency in executing those constituent skills separately first and in a coordinated way later.

Besides this, the opposition to componential teaching is not unconditional, and the concerns are not unresolvable. In Setton's (2001) argument, what he opposes is overly isolated exercises that aim at automating only one skill regardless of its interaction with others in the whole task. For instance, Setton (2001) voices intense criticism of componential exercises such as word-recognition and word-to-word transcoding. However, he (Setton, 2001, p. 20) also announces

that an SI task is an inseparable integration of the following sub-skills and competences: comprehension of source language at all levels (including pragmatic clues); context acquisition; meta-representation (empathy and acting); and syntactic agility and a rich vocabulary in the target language. Arguing that the traditional apprenticeship teaching featuring observation, imitation and practice should be complemented with new didactics, Setton (2008) describes his improved version of whole-task as a progression in teaching. He mentions the inclusion of exercises that can simulate SI in certain way, and emphasizes that exercises only designed for research purposes are counterproductive. Then, he specifies his criteria of exercise selection as follows: tasks that relate to real-life interpreting but in a simplified form; clearly demonstrating progressive techniques; and showing good record of accomplishment in the form of successful results or students' recognition. The same stance is taken in Baxter (2014), who designs a simplified yet whole task-based training model for SI teaching.

This can be considered as a reconciliation that concurs with the point that choice between part-task and whole-task training does not have to make them exclusive of each other but that they can otherwise be complementary under the concept of scaffolding in social-constructivist pedagogy (Calvo, 2015; Kelly, 2005). For the teaching of translation, Risku (2002) and Calvo (2015) both argue that scaffolding, which in the constructivist sense emphasizes providing progressive coaching to novices via simple to complex global tasks, can be more flexible by specifying the focus, especially at the initial stage. This is because the complexity of the translation process makes it unlikely for the novices to comprehend the rich context and acquire the competence in its entirety. Rather, focus on specific problems and identification of rules and procedures as solutions are more appropriate (Calvo, 2015). In apply this to SI, this focus can be reflected in attention on sub-skills at the beginning, followed by progression to global tasks.

Both part-task training based on skill components and whole-task teaching rooted in task integrity are supported by cognitive theory and empirical facts at the initial stage of learning, so that advantages of each can be combined. On the one hand, as Behr (2014) states, a successful training in interpreting should not only involve explanation and demonstration of skills required, but also needs to make students understand how these skills are required. Behr (2014, p. 207) thus suggests that the most effective way to do this is breaking down the complex task into subtasks based on skill components intended to be acquired. Accordingly, initial teaching should be built around skill acquisition via some conductive devices to guarantee that the skill components as the basis of task execution are available. The crucial consideration is how to make sure the decomposed tasks that are preparing for integral execution are not overly separate.

On the other hand, it is also crucial to bear the communicative and pragmatic features in mind, as Setton suggests. This has been agreed by Patrie (2004) that the concerns about context should be noted in componential teaching, but that this does not negate the possibility of componential teaching. Patrie thus suggests that this point should be kept in mind by creating a context for interpreting exercises, such as the setting, participants and logistical factors. Once the prerequisite skills are developed, it is time to bring back the incremental approach so that all skills can be integrated, which is more appropriate for later study.

Therefore, the approach adopted in the present research attempts to strike a balance between the two approaches: practicing componential skills with designed exercises; while heeding to the integrity of interpreting as a multi-facet activity and including integral exercises at the later stage of learning. This tries to fit into the curricular arrangement of the MCI at Macquarie University that integral exercises are intensely practiced in the second semester.

2.3 A cognitive tool for skill acquisition - deliberate practice

Cognitive apprenticeship is a very important didactic method in skill training (Duffy & Cunningham, 1996). In interpreting instruction, Moser-Mercer (2008) suggests various techniques that are available to achieve cognitive apprenticeship, such as modelling, coaching, scaffolding, articulation, reflection and exploration, used either synchronously or asynchronously for positive teaching outcomes. One relevant technique in the present research is scaffolding, which refers to the act of providing temporary support to students in order to solve difficulties in certain aspects. To demonstrate how scaffolding can function in interpreting training, Moser-Mercer (2008, p. 14) explains that it may include *"*the breaking down of the interpreting process into sub-tasks, which would be tackled one by one and ultimately be brought together again when performing the whole task. It may also involve the structuring of sub-tasks to facilitate their acquisition". This statement can be considered as a perfect manifestation of scaffolding as a teaching technique guided by the skill-based learning principle. Since successful scaffolding depends on the right sub-tasks to facilitate skill acquisition, deliberate practice comes into view as a suitable tool.

The role of deliberate practice in skill acquisition has long been studied by cognitive science. Ericsson (2008, p. 998) defines deliberate practice by referring to activities in which teachers or coaches design special training arrangements targeting the improvement of particular tasks, and provide "immediate feedback, time for problem solving and evaluation, and opportunities for repeated performance to refine behaviours". Schafer (2011) identifies four components in a deliberate practice: goal setting, design of training activities accordingly, engaging in practice

activities, and providing feedback. One may assume that the improvement of a skill level must take a long time to accumulate the necessary experience and knowledge, before superior performance is possible, by following the prescribed "power law" or "100,000-hour rule" (Newell & Rosenbloom, 1981). However, it has been confirmed that, except for the accumulation through numerous practice hours, superior performance is also the result of consistent engagement in deliberate practice, which is structured activities with the special purpose of enhancing specific aspects of the performance and developing these skills (Ericsson, 1996, 1998, 2001; Ericsson, Krampe & Tesch-Romer, 1993). For instance, Ericsson (2008) studies experts' superior and reproducible performance in standardized and measurable scenarios, in order to establish the link of significance between deliberate practice and expert performance, and thus challenges the traditional belief that only ample experience can lead to performance of excellence. Ericsson's focus on the underlying mechanisms of superior performance arouses doubts of Gog, Ericsson, Rikers and Paas (2005). The latter group argues that Ericsson's research provides good knowledge on skill development but lacks the particular aim to translate the results to educational settings. In addition, the results are more useful in further development of skills than in the initial acquisition stage. To solve this problem, Gog et al. refer to cognitive load theory (CLT) research (Sweller, 1988) for an answer, with an attempt to provide help in developing effective instructional strategies to facilitate initial skill acquisition in the educational setting. The tenet of CLT is that instructional design should take the human cognitive architecture into consideration. Gog et al. (2005) identify that CLT and deliberate practice can be useful at different levels of skill development; and therefore propose that a combination of CLT and the mechanisms underpinning identified superior expert performances in expert research can cover all stages of learning, i.e. to facilitate tool design in the initial stage and to enable skill development at more advanced levels of learning. They venture to propose an instructional design based on deliberate practice, which is emphasized as a key to skill learning, regardless of the learning stages. To apply this, Gog et al. suggest that aspects of skilled performance on representative tasks in a given domain should be identified first, along with performance criteria corresponding to different skill levels. Then tasks aiming at improving performance on those aspects can be adapted (from existing ones) or designed (by devising new ones) as deliberate practice. In spite of different forms of exercises, one thing shared by these deliberate exercises is that these practices all help with skill development by directing the attention of trainers to the targeted areas or aspects that are pivotal to skill acquisition and development. Through the process of deliberate practice, performance can be improved due to changes in psychological and cognitive mechanisms (Schafer, 2011, p. 19).

The application of the cognitive theories above provides a guidance for the design of teaching and choice of teaching tools in SI teaching. Pöchhacker (2004/2016) notes that, in the pedagogical literature about SI, prime attention has centred on preliminary exercises that are employed to introduce and guide students to meet demands of simultaneity and other crucial skills in interpreting. Many researchers also advocate that, as in complex tasks, skill acquisition in SI is highly reliant on practice and exercises that can produce cognitive changes facilitating circumvention of cognitive constraints (Moser-Mercer, 2000a). Behr (2014, p. 207) makes the point that the most effective way to show students how to acquire certain skills can be "through helpful exercises". Gile (2009, p. 191) also contends that fundamental skills in interpreting are taught "within the framework of practical exercises". With all the emphasis on the role of exercises in skill development, it is worth delving into appropriate and useful exercises that enable skills to be acquired and developed within novice learners. For such useful exercises, Moser-Mercer (2000. p. 340) considers that a novice should have "tactic learning… (to) learn specific rules for solving specific problems". When knowledge is better organized, strategies can be devised for optimal solutions to difficulties encountered in interpreting. This description of the process matches the transition from declarative knowledge to procedural knowledge as discussed earlier.

In fact, deliberate practice is found in the current practice of conference interpreting teaching in various countries. As Andres, Boden and Fuchs (2014, p. 69) put it: "There is a consensus in the literature that students should be introduced to the process of interpreting step by step and should be familiarized with sub competencies first. Preparatory exercises are a suitable tool for this purpose". Except for the use of "preparatory exercises" (Andres et al., 2014; Kalina, 1992), there are also 'training wheels' (Déjean Le Féal, 1997). Based on a review of the definitions and roles of deliberate practice in generic skill development, these terms can be all considered as a form of deliberate practice in SI teaching. This is because the common purpose of these didactic tools is to facilitate componential skill acquisition before all skills are integrated. The different names simply suggest that trainers may not be aware that what they are adopting is actually deliberate practice by nature.

A good example of deliberate practice in teaching can be found in Faculty of Translation and Interpreting (FTI). As one of the most prestigious interpreting institutes, the cognitive function of deliberate practice is taken as the rationale for its tutoring program from 2001 onwards (see Motta, 2006). As reported by Motta, the belief is held that deliberate practice can improve specific aspects of performance; while the tutoring program established around deliberate practice can help students structure their skill acquisition. Besides this, as a part of

deliberate practice, specific peripheral exercises are also designed and involved in the teaching at FTI.

Under the concept of deliberate practice, some popular exercises are utilized, while their validity is open to judgement. For example, "dual-tasks" are suggested, including listening while reading aloud or counting down (Moser-Mercer, 1978, p. 363; Seleskovitch & Lederer, 1989, p. 168). However, Déjean Le Féal (1997) and Kalina (1998) challenge these exercises, arguing that tasks without cognitive relevance can hardly resemble the processing demands in SI. Another common exercise suggested is shadowing, which is also quite contentious. Some researchers argue that shadowing and SI share one significant skill: simultaneity of listening and speaking (Christoffels, 2004, p. 26), while such simultaneity can be developed as an acquired skill in shadowing and then function in SI (Lambert, 1991, 1992a). However, opponents challenge that simultaneity by itself may not be enough to make shadowing an ideal tool for SI practice. Their main argument to disapprove the adoption of shadowing in SI teaching is that shadowing does not include translation process and thus leads to possible tendency of parroting which does not require lower level of information processing than in SI (such as Moser-Mercer, 1978, 2000; Seleskovitch & Lederer, 1989). This is supported by performance comparison between SI and shadowing where shorter ear-voice span (EVS) and lower information retention rate, which jointly indicate shallower information processing, is detected in performance of shadowing (Gerver, 1974). In addition, neuropsychological findings concerning the activated brain areas are quoted to prove the lack of cognitive approximation between shadowing and SI (Kurz, 1992). More recently, Rinne, Tommola, Laine, Krause, Schmidt, Kaasinen & Sunnari (2000) employ PET images to show different cognitive requirements between SI and shadowing. By comparing the different brain areas activated in two tasks, Rinne et al. (2000, p. 467) locate specially activated areas in SI by subtracting the similar areas activated in shadowing, finding that those areas are related to the functions of lexical retrieval, working memory and semantic processing. Christoffels and De Groot's (2004) experiment further confirms that only the feature of simultaneity does not make shadowing an adequate exercise for SI by comparing performance in delayed shadowing and SI. By comparing measures of parameters such as EVS and latency, Christoffels and De Groot conclude that simultaneity of listing and speaking must be combined with recoding the source language, i.e. reformulation process, to be the real source of difficulty.

By this token, paraphrasing is considered cognitively approximate to SI, but is still controversial in its use in SI. On the one hand, the commonality between these two tasks is considered more

prominent that because SI and paraphrasing both involve reformulation, unlike shadowing, where the output is sometimes considered as merely a parroting repetition (Lambert, 1992a).

On the other hand, the resemblance between the two is still challenged on two grounds. Firstly, while SI is a trans-language activity, paraphrasing does not involve different languages, being "unilingual" or "intra-language" interpreting (Anderson, 1994; Malakoff & Hakuta, 1991). To determine to what extent the intra-language factor can differentiate the performance, Anderson (1994) compared performance quality of twelve professional interpreters in SI and intra-language paraphrasing but barely found difference in the two tasks, thus concluding that inter-language element in reformulation does not cast much influence on the performance in SI. This is agreed by the finding from Christoffels and De Groot's (2004) study, where delayed paraphrasing which is closer to SI in terms of the tempo was compared with SI. Again, the general performance in SI and delayed paraphrasing does not show significant difference.

Secondly paraphrasing is considered more cognitively demanding than SI in some way. As one supporting evidence, larger EVS was detected in paraphrasing in Christoffels and De Groot's (2004) study. Malakoff and Hakuta (1991) attribute the difficulty to a higher vocabulary requirement in paraphrasing, arguing that it takes a larger vocabulary in the same language to perform paraphrasing. Christoffels and De Groot (2004) add that searching for different grammatical structures while maintaining the semantic essence and avoiding repetition of original input requires monitoring effort. They (Christoffels & De Groot, 2004) thus conclude that, paraphrasing still has something to be desired as an ideal exercise in SI.

Other exercises are devised to bring practice exercises closer to SI as much as possible. In a detailed review by Andres, Boden and Fuchs (2014), these exercises include simultaneous paraphrasing, and shadowing combined with cloze exercise (see Kalina, 1992, 1998), and SI of familiar fairy-tales (Seleskovitch & Lederer, 1989) etc. Although incurring less criticism, the efficacy of using these exercises in SI is still questioned from time to time, mainly because of the difficulties in measuring their efficacy. As Déjean Le Féal (1997) points out, it is simply difficult, if not possible, to measure the effectiveness of any method in SI training. As true as that is, it still makes sense to tap into existing exercise types before completely negating the usefulness of any type.

Compared with the above exercises, conventional sight translation (CST) is also widely used but seldom discussed. Previous literature about CST simply offers a general account of the use in general interpreting teaching, including in SI. Built on some didactical suggestions and theoretical discussion, the present study tends to explore whether and how CST, as a deliberate

practice, can extend its role in facilitating skill acquisition and development in SI training. It must be noted that the use of CST is intended to be a supplementary component embedded in the current SI curriculum. By adding new features to CST, it is intended to make the new variants of CST. Intended to simulate SI, the new variants should be less challenging yet with shared or overlapping skill component(s) with SI, constituting the prerequisite of skill transfer and the effect of deliberate practice.

3 COGNITIVE AND PEDAGOGICAL RELATIONS BETWEEN ST AND SI

ST is a mode of interpretation commonly demanded in various settings in the interpreting market (Stansfield, 2008). The National Association of Judiciary Interpreters and Translators (NAJIT) in the United States, for instance, lists ST as one of the basic modes of interpreting services in parallel with consecutive interpreting and SI for federal and state statutes and court rules[3]. In Australia, interpreters who work in legal or medical settings are often required to perform ST for written documents on the site. ST, therefore, is included in many accreditation tests around the world, such as in the NAJIT test in America, the NAATI test in Australia and the accreditation tests hosted by Junta Comercial, Board of Trade in Brazil. To prepare trainees for the market, ST is thus incorporated in the general interpreting curriculum. On the basis of its popularity and practicality, the current discussion focuses on its extended role for skill acquisition in SI during conference interpreting training.

This chapter provides a theoretical and practical basis for the extended role of ST, namely why and how to manipulate ST features in order to design new variants. To that end, Section 3.1 first reviews various definitions of ST, its existing variants and skill requirements as compared to those of SI. Pedagogically, there are several types of ST in use. To distinguish the new variants of ST, all the previous types of ST are encapsulated into the so-called CST category that includes ST with or without preparation time. Section 3.2 presents a full review as to how CST has been used in interpreting teaching, particularly in SI teaching, with a view to identifying good practices and deficiencies for skill transfer and development, and highlighting some of the features of CST that can be potentially manipulated in designing DST, the so-called new variants of ST. Section 3.3 presents an analysis of CST in terms of its cognitive processes and required skills in relation to SI to demonstrate critical similarities shared by CST and SI and thus justify the value of developing new variants to CST as tools for deliberate practice at the early stage of SI teaching and training. Section 3.4 identifies skill components required in SI from different perspectives in order to profile common skills between CST and SI in section 3.5. These identified common skills constitute a skill pool in which some are to be targeted in the exercise designing for the present research.

[3] See details on https://najit.org/.

3.1 Profile of ST

3.1.1 ST - a translation or interpreting mode

ST is described in detail by the earlier research, but ST varies in terms of its process description and task nature. Some researchers define ST as a hybrid of translating and interpreting tasks. For example, Déjean Le Féal (1981, p. 95) defines ST as simultaneous oral translation of a written text. Similarly, in their private communication with Moser-Mercer, Ilg and Lambert (1996, p. 77) agree with its mixed nature, which is well captured in their ST definition:

> (ST) involves the transfer of a text written in one language into a text delivered orally in another language. As it involves both aural and visual information processing, sight translation could be defined either as a specific type of translation or a variant of interpretation.

More recently, Agrifoglio (2004, p. 43) affirms the mixed nature of ST by emphasizing the different input and output modalities, i.e. source information in text and target production in oral rendition. The three definitions above all focus on the hybrid nature of ST, that is, visual input as the start and oral output as the end.

Meanwhile, some scholars define ST as an interpreting activity. Jean Herbert (1952) first defined ST as a kind of SI activity, which has laid the foundation for defining ST as an interpreting mode. Weber (1990) affirms that ST is an interpreting mode due to its oral delivery as the final product. Agrifoglio (2004, p. 44), in spite of her description of ST as a mixture, decides to include ST in the interpreting group on the ground of identified similarities between ST and SI. So too does Lambert (2004, p. 298), who quotes her personal communication with Moser-Mercer to indicate their shared understanding that, from a human information processing perspective, ST shows more proximity to SI based on shared variables including time pressure, necessity of anticipation, reading for idea closure and oral delivery. From these descriptions of ST, it can be safely drawn that ST is considered as having more of an interpreting nature, with a closer tie with SI. It is this categorization that is adopted in the present research, and which forms a foundation of the research objectives.

3.1.2 Definitions of ST and its variants

There are various definitions of ST focusing on certain feature(s) of this interpreting activity based on different purposes of the researches, but all fail, for various reasons, to take ST as an activity of various forms. McDonald and Carpenter (1981, p. 231) describe ST as “simultaneous

translation from a written text into speech in another language", as they focus on two features of ST: immediacy in delivery, and a shift between modes of input and output. Howard (1986), instead, labels ST as interpretation with text, which suggests that ST can take place with both audial stimulus and visual text input at the same time. Compared with McDonald and Carpenter, Howard includes an extra mode of information input - audial stimulus but does not include simultaneity in delivery. Later, in Viezzi's (1989b, p. 66) experiment comparing ST, SI and listening, ST is described as an activity where "[the subjects are] to start translating as soon as possible when the text has been handed to them". In this experiment, the input signal turns back to text only, and the emphasis on "as soon as" indicates that no time is given for preparation. Therefore, the focal point of this definition is placed on immediacy of interpreting and text-only input.

The definitions above show that ST is partially described with only a limited number of variants included. The main variables mentioned in previous definitions include allowance for preparation time, input and out modes, and time lag between receiving source texts and delivery. These variables are selectively included in previous definitions to suit individual studies with specific purposes, while the question of inclusion or exclusion of different variables may lead to different variants of ST. As Moser-Mercer (1995) speculates, the multiplicity of ST forms might be one factor contributing to the difficulties in defining it in a comprehensive and consented way.

Some researchers have noted the multiplicity of ST variants, and they have tried to reflect this variation in their definitions of ST. For instance, Lambert (1988) briefly distinguishes two types of ST, namely unrehearsed ST, and ST in SI mode or the mode of sight interpretation. The main difference lies in that the former is delivered at the interpreter's pace, that is, as "internally controlled"; while the latter is delivered at the speaker's pace, that is, as "externally paced" (Lambert, 1988, p. 77). Moser-Mercer (1995) further classifies ST into four types: 1) oral translation of either parts or the complete written texts with preparation allowed; 2) oral translation of the gist of texts without preparation; 3) detailed translation as what is included in the texts; and 4) simultaneous ST with texts in hand with or without preparation. The first three types are delivered at the interpreter's pace, while the last one is at the speaker's pace. Besides this, Moser-Mercer (1995) includes an additional variable in this categorization: conformity between source and target texts, namely summary or detailed delivery. However, she still reminds that the list may not exhaust all possible forms of ST tasks. Largely agreeing with Moser-Mercer, Jimenez (1999) categorizes ST in a somewhat similar way, but with more defining conditions and a new variant: 1) prompt ST without preparation allowed; 2) prepared

ST with text obtained beforehand and preparation allowed; 3) consecutive ST in the form of either a summary of a written text or an explanatory reformulation by adding some necessary information; 4) ST in consecutive mode, i.e. consecutive interpreting with transcript, while diverging from the transcript caused by impromptu changes by the speaker is possible; and 5) ST in SI mode, that is, sight interpretation or documented SI. Compared with Moser-Mercer's classification, Jimenez includes similar variables and adds ST in consecutive mode as an extra variant.

The understanding of ST variants benefits the pedagogical studies of ST in SI teaching in identifying proper variants of ST as didactic tools for specific skill development purposes in SI. By combining the previous definitions of ST and factoring in various variables, a working definition for this study is thus formulated: ST is an interpreting activity, where a visual text serves as one input stimulus that is orally summarized or interpreted in the target language with or without preparation. The following matrix in Table 3.1 outlines possible ST variants with different combinations of variables.

Table 3.1 - Matrix of variables of ST

Input mode		**Lag between receiving and delivering information**		**Conformity between source and target text**		**Preparation**	
Visual only	Visual & audio	Consecutive	Simultaneous	Summarized	Detailed	Prepared	Unprepared

3.2 ST in interpreting teaching

ST is a common element in interpreting teaching (Angelelli, 1999; Chen, 2015; Lim, 2006; Pöchhacker, 2010b; Sawyer, 2004). In North America, for instance, ST is widely included in the aptitude test for SI programs and in the standard curriculum of interpreting programs (Weber, 1990). For example, in the curricula in Ottawa University and in Middlebury Institute of International Studies at Monterey (MIIS), ST is included as a unit (Lambert, 1991, p. 591). In European Masters in Conference Interpreting (EMCI), ST is included in the course structure as a compulsory unit that is mandatorily followed by all participating institutes[4]. In the Australia Training package, ST is included as a unit (unit code: PSPTIS613A) for the qualification of

[4] See http://www.emcinterpreting.org/.

advanced diploma of interpreting[5] . The same case can be found in China: as a curriculum template for the master of interpreting in Mainland China published by the authorities, ST is included in the 2nd semester as an additional option (Wang & Lei, 2011, p. 161).

Arguments still exist about when and to what extent ST should be involved in the teaching of interpreting (Jiménez Ivars, 2001; Sampaio, 2015; Sandrelli, 2003). Some interpreting trainers prefer to involve ST at a specific period. Either they tend to involve ST at the very beginning of interpreting training (Agrifoglio, 2004; Gran, 1990; Ilg & Lamber, 1996; Mikkelson, 1994; Pöchhacker, 2004/2016; Sampaio, 2007; Weber, 1984, 1990) or in the transition period, for example from CI to SI (Déjean le Féal, 1998; Gile, 2009; Kalina, 1992; Lamber, 2004; Lee, 2007; Song, 2010; Viaggio, 1995; Viezzi, 1989). They use ST as a "subsidiary or complementary component aimed at providing students with at least an overview of one more possible application of their newly acquired or developed communicative skills" (Sampaio, 2015, p. 63). This description reflects the use of ST as a preparatory transition tool only for a limited period. Similarly, Li (2015a) notes that, in interpreting courses in China, ST is only included in SI programs at postgraduate level, before students advance from consecutive to SI training. At undergraduate level, ST is normally not included. Therefore, Li also proposes a ST course for undergraduate students to develop general interpreting skills.

Meanwhile, some interpreting trainers believe that ST should be given more weight in the teaching programs. On the one hand, it is suggested that ST be included in the teaching in a more formal manner. For instance, Viezzi (1989b) calls for a proper ST component in the interpreting curriculum to increase its proportion in the teaching. In Kim's (2001) study at the MIIS, it is suggested that ST be an independent discipline in the curriculum. On the other hand, there has been a call for ST to be included over an extended period in the teaching. For example, Weber (1990) suggests that ST span the entire training period, using various ST exercises with different levels of difficulty. This proposal is agreed upon by Martin (1993), who presents her case study in teaching to demonstrate the significant status of ST in interpreting teaching. Martin compares teaching outcomes from classes with regular ST practice, occasional ST practice, and a total absence of ST, finding that ST as a regular exercise indeed leads to better teaching outcomes than the other two groups. This result buttresses the argument for the necessity of involving ST as a substantive and systematic component in interpreting teaching.

It is also noted that ST is included in teaching for different reasons (Li, 2005a). In some cases, the practice of ST is mainly for the purpose of performing ST per se in the field (Lee, 2012;

[5] See http://training.gov.au/Training/Details/PSP61110.

Thawabteh & Territories, 2015). In other cases, ST is applied as a useful tool for skill development in other interpreting modes, whose value has been acknowledged by researchers such as Chung (2007), Kalina (1992, 1994, 2000), Lambert (2004), Liu (2012), Moser-Mercer (1994), Sampaio (2015), Song (2010), Wan (2005) and Weber (1990). The following section specifically reviews the didactic use of ST as a teaching tool for skill development in SI teaching, with different views on its current involvement and existing research gaps.

3.2.1 ST as a didactic tool in SI

ST is commended and recommended for its great value in SI teaching. To start with, it is argued that ST has enough proximity to SI to be a didactic tool in SI teaching (Gile, 2005). Viaggio (1995, p. 33) highly commends ST in general as "perhaps the most effective and complete prelude to and preparation for attacking simultaneous interpretation". In a report of the European masters project group, Donovan (2002, p. 213) confirms the overall resemblance between ST and SI to justify the incorporation of ST in SI teaching:

> Sight translation is widely viewed as a useful transition between consecutive and simultaneous [interpreting] to the extent that the original speech (text) is present during rendition, albeit in written form, just as in simultaneous [interpreting]. Scanning the written pages is in many ways a visual analogy to the thought process involved in simultaneous [interpreting].

The specific benefits of ST in SI training have been identified by researchers. For instance, ST helps students to develop "swift eye-brain-voice coordination" (Weber, 1984, p. 27); and ST involves all skills required by a conference interpreter, including rapid textual analysis, awareness of staying away from the temptation of word-for-word interpreting, quick cultural conversion between source and target languages, and public speaking techniques (Curvers et al.,1986; Mikkelson, 1994; Weber, 1990). Furthermore, ST is deemed to be conducive to developing the agility and confidence to solve problems and formulate interpretation that is proper in language and faithful to the communicative objective, which is extremely crucial for SI of speeches read out of script at high speed (Weber, 1990). Additionally, Bacigalupe (1999) reinforces the usefulness of ST by adding production techniques to the benefit list, thanks to ST's contribution to public speaking and expressional flexibility required in SI.

With the didactic value of ST acknowledged, research has been conducted to improve the role of ST in SI training, by exploring different types of ST exercises. For instance, Kalina (1992) reports the inclusion of ST in her teaching at Heidelberg University to help students deal with adverse conditions encountered in SI. Bacigalupe (1999) suggests a progressive use of ST

featuring different preparation times. According to him, three types of ST can be arranged by following the order of "Traducción a vista" I, II and III, i.e. ST with long preparation, ST with short preparation and ST without preparation (Bacigalupe, 1999, p. 259). Baxter (2014, pp. 354-355) also proposes ST exercises as the "backbone" for his simplified multiple-model approach for SI training and suggests "synchronized ST" to enable students to acquire simultaneity and crucial strategies at the same time. The most current account of ST application in conference interpreting teaching can be found in Setton and Dawrant (2016). In their work outlining a proposed complete course of conference interpreting, ST is used as a crucial component whose value is argued to "pay off for SI" (Setton & Dawrant, 2016, p. 205). Setton and Dawrant (2016, pp. 212-216) also offer a detailed instruction to direct the use of ST in four progressive steps as pedagogical preparation for SI.

The recognition of value of ST in SI teaching is not only seen in European languages but in other language streams as well. For instance, Setton (1993) sheds light on use of ST in English-Chinese interpreting teaching. Based on his teaching experience in Fu Jen Catholic University in Taiwan, Setton discovers unique constraints among Taiwanese trainees, including environmental and culture-related challenges, as well as task-related problems and curriculum design. He thus proposes an introductory stage in the first two to three months of a training program. The goals for this introductory stage include enhancement of trainees' language comprehension and proficiency, memory training, fostering of sensitivity to different types of discourse and register, and foregrounding the necessity of resisting possible interference. To achieve these goals, Setton suggests specific introductory exercises for assistance, among which ST is earmarked. He establishes clearer links between ST-based tasks and the corresponding skills to be developed. For example, Setton uses at-sight paraphrase and gist extraction as a good method for enhancing language capacity and agility.

Even in the new era of technology-impacted teaching, ST still proves to be as useful as ever. In the computer-assisted interpreter training system named Black box, designed by Melissi Multimedia for the University of Hull in 2002, ST is included "as a preparatory exercise for SI" (Sandrelli, 2005, p. 7). The designers provide two modes of ST available for exercise, namely traditional and timed ST. For the second type, the texts are scrolled up at a pace controlled by the trainer in order to simulate the time pressure under which simultaneous interpreters work (Sandrelli & Jerez, 2007).

3.2.2 Existing gaps in research on ST and its didactic value in SI

Research gaps do exit in terms of research on ST per se and on its use for other modes of interpreting. Li (2014) notes that although the interest in ST research has picked up recently, with studies conducted from process, product and pedagogy-oriented perspectives, gaps remain in terms of, say, research methodology, consideration of cognitive features of ST, and specific discussion of pedagogical use of ST and assessment.

In existing pedagogical interpreting studies, ST seldom becomes a focal point of discussions (Mikkelson, 1994). Among the existing interpreting didactic studies, the majority are devoted to consecutive interpreting and SI teaching (Moser-Mercer, 2005d), with only a small proportion on ST (Angelelli, 1999; Lim, 2006). Even though some researchers have touched upon ST at some point, specific skills and strategies required for ST have not been thoroughly examined (Lee, 2012). Just as Pöchhacker (2004, p. 186) points out, ST in most pedagogy literature is simply mentioned in brief and it has not been properly discussed as a "curricular component".

Among such limited number of studies on ST, the research focusing on its use for SI pedagogical purpose is even less, especially on its use as a didactic tool for CI-to-SI transition. Setton (1993) stresses that students at the transitional stage need assistance in resisting morphological inference of the incoming language and claiming sovereignty of the formulation by either using acquired skills or developing new skills. For such purpose, ST has been mentioned as a didactic tool for preparation for or transition to SI (Gile, 1995a; Pöchhacker, 2013) and as a tool in aptitude tests (Lambert, 1991; Moser-Mercer, 1994) only briefly. Nevertheless, no systemic direction is offered about how to manipulate a cohort of ST exercises for specific teaching purposes in SI (Li, 2015a), evidenced by the fact that the pedagogical discussions on ST are primarily exclusively for the use of CST.

To fill some of these gaps, it is worth exploring ST by examining its potential new variants to CST so that ST can be further developed into a set of deliberate practices in SI teaching. As being expected, pedagogical benefits of ST can be clarified and wrong practices or perceptions rectified through the present research project. Therefore, the following section aims at providing a theoretical basis from a cognitive perspective for confirmation of the value of CST and identification of possible space for the extension of its role as a useful didactic tool in SI teaching.

3.3 Cognitive analysis of CST and its relation to SI

This section reviews the relations of CST to SI in terms of cognitive processes and skill components. This is to justify the systematic involvement of the ST component for the purpose of skill development and to identify the claimed inadequacy of CST in relation to SI pedagogy, with some of the CST features to be potentially changed.

3.3.1 CST - an easier task with shared features with SI

As some researchers consider, CST shares overlapping features with SI. In comparing CST with SI in an experiment aimed at exploring the processing requirement involved in each, Lambert (2004) finds that CST is quite close to SI because of several variables, including time stress, necessity of anticipation, reading for idea closure, and the oral nature of output. Out of the same purpose, Biela-Wolonciej (2007) conducted another experiment based on Lambert's experiment, to study a new form of translation, recorded translation, which is done in the form of CST. In this research, critiques on Lambert's experiment were raised concerning defects of the experimental design. Biela-Wolonciej argues that Lambert's experiment failed to put all the tasks on an equal footing, because subjects were allowed to prepare for ST but not allowed to do so for the SI task, and that such a difference in prerequisites may cause bias in the final results. In Biela-Wolonciej's experiment, therefore, the CST was performed in one prescribed form – to interpret from a written text without any other stimulus or preparation time and the interpretation was recorded. By analysing the translating process, Biela-Wolonciej provides a useful description of similarities between CST and SI, offering more evidence for the proximity between the two. She lists some activity commonalities shared by CST and SI, and three aspects are particularly noted, namely information processing, resources required while performing, and the nature of output. In terms of information processing, it is stressed that CST and SI are similar because of features such as synchronized input and output; meaning chunks as processing units; necessity of anticipation; and focus on sense. As for resources required when performing, both activities rely on an interpreter's immediate memory, but not solely. In terms of the output, the two tasks share similarities, in the oral form of production, possible presence of imperfections, on-the-spot interpretation, and involvement of intonation and sentence stress as additional sources of information. To perform the two tasks, therefore, Biela-Wolonciej (2007) holds that an interpreter should be equipped with some overlapping skills, such as good speaking ability, information chunking, anticipation, reformulation, flexibility to handle on-the-spot difficulties, and good working memory.

Gile's updated effort models also serve as a good support for similarities between CST and SI. Based on Gile's (1995a, 1997) earlier version, the effort formulation for CST is ST=R+P, where reading (R) and production (P) efforts only can guarantee the completion of the task. Compared with SI, whose equation is SI=L+M+P+C, the efforts of memory (M) and coordination (C) are absent in ST. However, Gile (2009) modified his effort model for CST with the equation becoming ST=R+M+P+C. Compared with previous version, two efforts are added: M and C Efforts. Gile explains that, when interpreters need to deal with long sentences and embedded clauses in CST, they need to read more than one translation unit and store these in working memory (WM) before formulation is possible. In addition, effort is needed to manage and allocate the cognitive resources for all the efforts included (Gile, 2009, p. 173). In comparing the updated effort equations for CST and SI, the only difference lies in the input modality: listening effort and reading effort for SI and CST, respectively. The CST model of Wan (2005) echoes this readjustment. Having analysed English to Chinese CST with a focus on its sub-processes and skills based on Gile's earlier effort model, Wan argues that new empirical language-specific evidence calls for a modification to Gile's effort model for CST, in that both memory and coordination efforts are present in performing CST.

In terms of memory, Agrifoglio (2004, p. 45) consolidates the position of Gile (2009) and Wan (2005) with findings from an experiment, that an interpreter must memorize some contents (either segments or sentences) while delivering. Agrifoglio argues that, although all information remains visually accessible, it is impossible for an interpreter to always go back and forth for adjustment; otherwise, it can be extremely difficult to keep a smooth rendering since the eye-sight pattern is disturbed, which is difficult to restore within a short period of time. This is also proved by Dragsted and Hansen (2009) using the eye-tracking experiment. Dragsted and Hansen find that backtracking in reading simply places extra load on memory effort and coordination effort, leading to slower or even interrupted delivery in CST. Agrifoglio (2004) thus holds that every backtracking in the reading is at risk of interruption in delivery if memory is not in place to provide assistance. Only with WM functioning, can an interpreter make sure that the interrupted visual pattern is restored back to where the reading will resume and link the contents retrieved with the earlier message. WM, no matter how long it needs to endure, is required in CST to keep the information alive before interpretation is delivered. Gile (2009) stresses that memory can be especially important when syntactic differences between the source and target languages are considerable. With some language pairs sharing similar syntax structures (for example English and French), an interpreter may find it less imperative to consider structural adjustments or orders of segments in rendition, since not much change is

required. For other language pairs whose syntactic structures are different, as Agrifoglio's (2004) experiment shows, the interpreter cannot simply follow the original structures and orders in the source language. In this case, efforts must be made to rearrange some segments of information in the target language. When this happens, the interpreter needs to store information in WM and wait until the right time to insert the components in the delivery.

In terms of coordination efforts in CST, Gile (2009) never denies the existence of spontaneity in CST, and admits that an interpreter in CST needs to deal with different tasks concurrently, which requires allocation and distribution of mental resources. Consequently, a governing system managing the process has to be at play, which should be identified as the coordination effort in CST.

With acknowledgement of the similarities, it is also argued that CST is an easier task than SI (Gile, 1997b, 2009; Viezzi, 1989), due to the constant availability of input text and the lack of input/out channel interference.

The constant availability of text is claimed to make CST easier in two ways: in a lower level of information processing, and in freedom from time pressure. At the information processing level, Viezzi (1989) compares CST with SI in terms of information retention rate in his experimental research, in which participants were required to perform both CST and SI tasks before recalling the contents of the two tasks. The findings show that the information retention rate for CST is lower than SI. Viezzi explains, quoting Craik and Lockhart's (1972) theory, that the information retention rate is related to the depth of information processing in a correlative way, thus arguing that lower information retention rate in CST indicates that its information processing level is not as deep as in SI. This, Viezzi further claims, may be attributed to the lack of necessity of processing information deeply in CST, since everything is constantly visually accessible. As for time pressure, Gile (1997, p. 203) holds that an interpreter has more control in a CST task than in other interpreting tasks. According to Gile, interpreters have the input texts before them and they do not need to follow the speaker in CST, so they are under much less pressure and have more flexibility to deliver.

However, the view is contested that an interpreter is free totally from time pressure in CST. An interpreter has every intention to produce smooth delivery regardless of delivery modes (Gile, 1995a; Mead, 2002). Fluency is a crucial criterion held by the audience when they judge the quality of interpretation, among other things (Behr, 2014, p. 203; Bühler, 1986), though smooth delivery may not necessarily mean good interpretation (Shlesinger, 1997). Therefore, time pressure internally imposed is a constant factor to guarantee the smoothness of rendering and

to meet clients' expectation for fluency (Kurz, 2001). Consequently, it is fair to say that the interpreter in the CST task is not under time pressure exerted by the speaker, but is subject to pressure to finish the delivery within limited time as smoothly as possible, imposed by him/herself and the expectation from the audience.

Comparatively, channel interference is a more valid reason to make CST easier. In Lambert's (2004) experiment where performances of CST and SI are compared, one of the research objectives is to probe how different inputs may influence the final performance. The assessment of performance shows better results in CST over SI in all examined parameters. To explain the results, Lambert (2004, p. 300) claims that SI is a harder task than CST due to the "source of conflict". This is because, in a multitasking condition, subtasks in the same sensory channel can lead to conflict of resource allocation. In other words, although simultaneity of perceiving input and delivering output is a shared factor in CST and SI, CST involves visual and verbal tasks respectively for input and output that are of different sensory channels, while SI involves auditory input and output at the same time. What makes monitoring in SI particularly difficult is that two streams of language (input and output) of the same sensory nature come into play at the same time (Isham, 1994). Therefore, concurrent vocalization in SI gives rise to a higher degree of inference, while CST involves two channels that are distinct enough to avoid similar interference to that occurring in SI. This corroborates the position held by Shaffer (1975) and Baddeley (1992) that interference can be greater when the output and stimulus are of the same nature. To resist such interference in SI, when auditory input and vocal output are simultaneously involved, the function of articulatory suppression is required (Christoddels & De Groot, 2004). Comparatively, CST is free from such impact due to the absence of sources of conflict.

3.3.2 CST as a mode with unique features and difficulties

One of the main reasons for opposing the inclusion of CST in SI is that CST presents unique features and difficulties that are inappropriate for SI teaching. It is held that in addition to similarities with SI, CST also involves unique features requiring specific skills and capacities to perform it (Agrifoglio, 2004; Mikkelson, 1994). Mainly, two aspects are noticed by earlier researchers as the source of difficulties, namely the input features and visual interference.

In terms of input features of CST, two elements are included in the discussion. Firstly, Agrifoglio (2004) underscores the difficulties arising from input features of CST by elaborating the differences between written and spoken texts. According to her, written texts are more complicated than oral texts, lexically, syntactically and stylistically. For instance, in addition to

more complicated sentential structures, more delicate textural features such as cohesive devices and rhetorical structures can be common in written texts but not necessarily in oral texts. Secondly, Gile (1997) argues that CST can be more demanding cognitively for comprehension in the reading efforts. According to Gile, prosodic features in the spoken language such as tones, hesitation and pauses are of great help in comprehension. However, these elements are absent in reading a written text, so that interpreters can rely on no more than their mental analysis to detect and arrange segments of information for delivery. With texts of complicated sentences and embedded clauses for CST, interpreters need to comprehend the source text by detangling and unpacking the complex structures without out assistance form prosodic features while interpreting aloud with fluency. Another acknowledged factor making CST more challenging is constant visual interference resulting from the text available in writing before interpreters. This potentially leads to two issues: linguistic interference in the target language from the source language, and the temptation of focusing on words rather than meaning (Mikkelson, 1994). As such, the implications can be both linguistically and cognitively related.

Linguistically, the constant availability of texts in ST makes it more difficult to break free from the source language. Martin (1993, p. 404) suggests that the hybrid nature of CST "requires more efforts to be put into attaining independence from the source language texts than the case with written translation and interpretation". Gile (1997, p. 204) echoes this by noting that linguistic interference can be stronger in CST with the source text available in front of an interpreter, whereas the source language can be quicker to fade from memory in other forms of interpreting tasks with auditory input. Especially in the language pairs with distinct syntactical divergence, such interference can be particularly devastating. Under the influence of the pattern of the source language, the interpretation that is more source-language-framed rather than target-language-oriented can be more noticeable.

Besides this, the higher risk of being drawn to words over meanings in reading is another more significant cause for extra difficulties in CST. Many cognitive psychological studies (e.g. Crowder, 1972; Hildyard & Olson, 1984; Sache, 1974) prove that interpreters choose to focus on different elements in reading and listening to respond to different cognitive processes in two cases. To summarize the findings from those cognitive studies, interpreters have more control over pace when reading, with opportunities to go back and double check. In listening, however, they become speaker-oriented due to the requirement of following the speaker's pace and a lack of opportunity for backtracking during listening. Therefore, listeners tend to focus on grasping the gist of the audio message, while readers tend to notice and recall the actual words from the written text. The consequence of this different focus is that interpreters in ST may be more

tempted to linger over what is seen, so that the risk of transcoding is higher, as compared with SI. To prove such a higher influence of the source language in ST, Brady (1989, p. 182) concludes:

> As regards source-language interference, sight translation is a considerably more hazardous operation…It should be more difficult to retain only the meaning of the message when the words that carry it are in black and white in front of one's eyes.

As Gile (2005) points out, textual interference from the source text can easily lure students into word-for-word translation. The oral nature of production in CST requires renditions to be as natural as in other modes of interpreting despite such temptation of word-for-word translation in CST. Therefore, an interpreter must work harder to fight against such a "literal" tendency and to keep the interpretation syntactically, semantically and culturally appropriate. Some researchers thus consider CST exercises a good tool to combat interference, like Setton and Dawrant (2016, p. 105) who name CST as "the classic interference-busting exercise".

The above review shows that CST and SI share considerable commonalities in terms of cognitive components and processing efforts. In addition, there are differences identified. CST should not be deemed as overly simple or difficult when it comes to its role in SI teaching. The discussion should focus on how to properly use new variants to CST with some features purposefully manipulated to minimize its potential difficulties and maximize its simulation to and thus benefits for SI.

3.3.3 Skill requirement in CST

With knowledge of the cognitive components of CST, it becomes less difficult to identify skills required to perform the tasks. Lee (2012) summarizes the significant skills required in CST mentioned in earlier works, which cover stages of reading, translating and delivering. These skills largely include speed reading with quick textual analysis and comprehension (Curvers et al., 1986; Weber, 1990), simultaneity of reading and translating (Agrifoglio, 2004; Weber, 1990), short-term memory and coordination (Agrifoglio, 2004; Gile, 2009), resisting textual interference (Agrifoglio, 2004; Martin, 1993), avoiding literal translation (Agrifoglio, 2004; Martin, 1993; Weber, 1990), quick search for equivalents (Jiménez Ivars, 2008), agility in reformulation (Curvers et. al, 1986; Moser-Mercer, 1978) and public speaking (Angelelli, 1999; Weber, 1990). For a more comprehensive skill list, Wan (2005) also quotes the CST skill list compiled by Hung (2005), who sets out 14 skills which are more detailed derivatives from earlier literature. Wan (2005) finds that some of these are actually overlapping, thus she

categorizes the skills into four skill groups, as efficient reading, memory, interference resisting, and coordination. In addition, Wan accentuates strategies that are necessary to perform English-Chinese CST, such as segmentation, anticipation and syntactic linearity.

3.4 Skill components in SI

All discussion of ST is guided by one objective in the present study, that is, to facilitate its use for the purpose of skill development in SI. Therefore, SI skill components should be identified first, to direct and guide the use of ST. The complexity of skill identification lies in that the skills cannot be studied directly but are drawn from different sources. Chabasse and Stone (2015) suggest that the study of competencies and skills should start from dividing SI into sub-processes which then can be studied individually. Gile's effort model of SI (1995a/2009) can help shed some light, since it aims at conceptually describing the cognitive processes and explaining difficulties and solutions at a given moment in SI for didactic purposes. The effort requirements can be viewed as indicators of skills demanded, i.e. skills for comprehension, processing and delivery, memory, monitoring and coordination. Besides this, as Riccardi (2005) and Paradis (1994) conclude, by viewing some process components in SI, what constitutes the set of skills can be presented as follows: the ability to keep a right distance from the speaker; the divided attention between production and processing the following speech segments; constant and concurrent activation of both source and target languages but at different levels to avoid interference; and short-term memory for storing information in the source language and retrieval in the target language. The cognitive indicators of the skill set of SI has also been discussed in the wider psycholinguistic field. A good example is the research by Macnamara, Moore, Kegl and Conway (2011), who have tried to establish links from general cognitive abilities to SI skills. Those cognitive abilities studied include fluid intelligence, reasoning, working memory capacity, processing speed, psychomotor speed, cognitive control and mental flexibility.

This section, however, reviews skill components in SI from different perspectives that are beyond cognitive decomposition or individual cognitive component descriptions. Christoffels and De Groot (2005) classify the existing SI research into three approaches: 1) as a product of processing, by examining effects of various conditions on the performance; 2) as a complex task, by comparing it with other tasks sharing common cognitive components; and 3) as a complex skill, by comparing between expert and novice interpreters and proficient bilinguals. Approaches 1 and 3 involve studies that are not cognitive component-bound. Besides, the present review intends to be pedagogically relevant. Therefore, it is conducted in terms of the

following three aspects: aptitude tests for SI at admission; influencing factors in SI performance; and performance comparison between novice learners and professionals.

It should also be noted that the purpose of the review is not to establish a comprehensive set of required skills to perform SI. Instead, its intention is to identify crucial skill components of SI, based on which the overlapping skills shared by CST and SI will be discussed. The overlapping skills will then be targeted for development for SI via a cohort of designed ST exercises.

3.4 1 Aptitude tests for SI

Aptitude is defined as a set of characteristics of an individual that can be used to predict the chance of success under a given condition (Cronbach & Snow, 1977). In Russo (2011), aptitude is defined as a general term including ability, skills, and cognitive and psychological traits of individuals. To establish links between aptitude testing and skills, Chabasse and Kadar (2014) explain that aptitude testing is a procedure to assess the potential to learn knowledge and acquire skills; and Caroll (1981) argues that tasks included in aptitude tests resemble processes described in information-processing accounts. The main purpose of the aptitude test is to assess the potential of a candidate, including for relevant skills, as Kalina (2000, p. 12) argues, "[s]kills are partly acquired during the training stage, but some of them must be present even before training is started". This statement suggests that although some skills are only acquired during the training, the revelation of some pre-existing qualities can be taken as signs of or precursors to skills required in the future learning. In SI aptitude testing, similarly, qualities desired in aptitude tests either are skills that can immediately contribute to good performance, or are prerequisite to skills that are expected to be developed later.

Aptitude test in conference interpreting has been a popular topic. Researchers such as Alexieva (1993), Bowen and Bowen (1989), Lamber (1991), Moser-Mercer (1994), Pippa and Russo (2002), Russo (1989) and Russo (1993) all contribute to outlining qualities to be sought in an aptitude test. Among all aptitude indices included, some scholars show particular emphasis on certain aspects, for instance: ; Gerver et al. (1989) emphasize memory capacity and verbal fluency; Skaaden (1999) highlights lexical knowledge; while Russo and Salvador (2004) value text strategies, just to name a few. These aptitudes mentioned, useful as they are, are too dispersive to indicate whether the elements discussed are commonly considered important or are simply points of interest in individual research. Russo (2011), therefore, notes that a summary of characteristics repeatedly mentioned by researchers can be an important indicator for an ideal interpreter's profile. As such, the common aptitude preferences that are repeatedly mentioned in previous studies form the focus of the present review.

Overlapping qualities are sought and summarized by comparing the researchers' named aptitudes in the literature. For instance, Longley (1989), Mackintosh (1999) and Moser-Mercer (1994) commonly stress language and cultural knowledge, general knowledge, memory, mental agility in comprehension and processing, concentration, communication skills, ability and confidence in delivery, and stress tolerance, as expected qualities in the aptitudes. In addition, Moser-Mercer et al. (2000) summarise the desired parameters in aptitude tests from several researchers and compile a list that shares much in common with that given by Lambert (1991). The common skills include: language and cultural proficiency in both source and target language; agility in comprehension and rendition; public speaking; general knowledge; acquisition of new information; and team work ability. A more recent and comprehensive description of expected aptitudes is by Gómez, Molina, Benítez, and de Torres (2007, p. 77), who divide aptitudes into two types, namely cognitive and personality aspects. The indicators mentioned in cognitive aptitudes again echo those mentioned by earlier researchers. In summary, the cognitive aptitudes commonly mentioned include: efficient input segmentation; divided attention; use of language-specific strategy; processing speed; good long- and short-term memory; concentration; and verbal fluency.

3.4.2 Influencing factors in SI performance

There are many variables in an SI task that can impose difficulties on performing SI, and to address these variables requires skills. Researchers place SI interpreters under various circumstances featuring different difficulties for interpreting, and then examine possible changes of performance and how interpreters function cognitively in handling these various difficulties. For instance, variables such as input rate (Gerver, 1976), information density (Triestman, 1965), quality/noise of input (Gerver 1974b), and text features such as special text difficulties (Andres, 2014; Darò, Lambert & Fabbro, 1996) and redundancy and predictability (Adamowicz, 1989; Chernov, 1994), have all been covered in previous studies. It is found that different influencing factors can impose disproportionate impacts on various cognitive stages of SI, namely comprehension/input or translation/output, or on both. Therefore, the following review will focus on input and output factors. The recommended solutions in the literature will also be reviewed as manifestations of relevant skills.

At the input stage, comprehension is recognized as the most significant cognitive process (Kohn & Kalina, 1996; Seleskovitch & Lederer, 1989) which can largely influence the performance. From the studies of input parameters affecting comprehension, Setton (2001, p. 1) applies the findings to the text selection for the source materials in interpreting teaching, emphasising that trainers must understand what makes the source texts easy or difficult under different conditions

for students. Although it is not easy to get a clear-cut formula, since many factors are involved and their interactions can produce compound effects, interpreting trainers still try to identify the influencing features so that appropriate materials can be selected to meet the students' levels. For instance, Hönig (2003) compiles objective grades of textual difficulties by considering the impacts of 1) topic and structure, and 2) linguistic and paralinguistic features. In terms of topic and structure, Hönig (2003, p. 73) argues that "standard ritualised speeches", or homologous speeches about familiar topics arranged in an anticipated structure, can be easy, whereas the opposite can be hard. In terms of linguistic and paralinguistic features, elements of speech acts, and redundancy level, cohesion, presentation and number/figures, are all influencing factors. In addition, Janikowski (in Bogucki & Deckert, 2012) lists in detail the criteria to evaluate the difficulty level of teaching materials. More recently, Andres (2014, p. 107) offers a detailed and systematic review of input parameters by presenting them in "parameters internal to texts" and "presentation-based difficulties factors" (Andres, 2014, p. 113), which approach is quite clear and straight-forward. Therefore, Andres' (2014) categorization of influencing features is adopted here to integrate the relevant findings of other researchers.

In terms of parameters internal to the source text, Andres (2014) mentions six factors that can cast a heavy influence on comprehension phase. These six factors comprise: topic and structure; speech act and redundancy; cohesion; number and proper nouns; expressive effects; and cultural speciality.

Among the "difficulty parameters internal to the text" (2014, p. 107), the first three parameters are about the topics and how the information is organized, which follows the framework built by Hönig (2003). In this regard, Andres (2014, p. 107) identifies that familiar topics and logical structures (including formulaic expressions) make the source text easier to understand, and that clear structure can function than a familiar topic. This means that pattern recognition of certain types of speech is crucial for trainees (Hönig, 2003). Andres (2014) also notes that direct speech (compared with indirect speech) and redundancy makes comprehension easier. Besides this, Andres (2014) devotes considerable attention to the relation between redundancy and comprehension in SI. In this regard, Chernov (1994, 2004) is quoted who primarily discusses and confirms a positive relation between the degree of redundancy and SI performance. Higher degree of redundancy, both grammatical and thematic, can allow interpreters more time to make analysis of the input information, while lower degree of redundancy means higher information density with more meaningful and unrepeated information segments that leads to frequent difficulties for interpreters (Gile, 2009; Setton, 2001). Chernov (2004) adds that anticipation is a key tool to solve the issue of high information density by reducing the processing load of SI,

a view that is shared with Anderson (1994) and Gile (1997). The importance attached to the use of anticipation is also suggested by several other researchers such as De Bot (2000) and Moser-Mercer (1997a). Another a proposed strategy to handle high information density is omission. However, Andres suggests that omission can easily lead to incomprehensibility while anticipation functions as a better strategy (2014, p. 109). As a whole, pattern recognition and strategy use are recommended to address the variables mentioned above.

On top of above text-internal parameters already identified by Hönig (2003), Andres (2014) brings in special forms of contents to the internal-text difficulty parameters, stating that inclusion of numbers or proper nouns, use of expressive effects (such as quotes, idioms and humours), and culture-specific contents can all impose more burdens on listening and analysis efforts.

All these internal parameters above can require additional cognitive resources from the definite cognition, therefore requiring particular skills to alleviate the cognitive load. Topical knowledge, mental agility, pattern recognition, and processing strategies such as anticipation and omission are suggested by researchers as solutions, from the review above. From the didactic perspective, these can be the skills to be forged in order to address the difficulties arising from the relevant parameters.

The second group of parameters discussed by Andres (2014, p. 113) is presentation-based or external-text parameters relating to how source information is physically presented. Within this category, possible areas that can cause difficulties in interpreting include visual aids, paralinguistics or nonverbal properties (for example, speaking velocity/presentation rate, and accent or dialect), style of speaking, and errors of speakers. Among these factors, Andres briefly discusses that deficient visual aids and speaker errors can make interpreting harder, while the discussion on other elements is greater in length. Velocity/ presentation rate, in particular, is a greater concern for interpreters (Gerver, 2002; Meuleman & Besien, 2009), since higher input rates contribute to higher loss of information in interpretation, partly due to the strained working memory (Shlesinger, 2003). According to Gerver (1976), once the English input rate exceeds the range of 100-120 words/minute, this results in compromised accuracy and increased EVS, or decalage. With more noise and manipulation of information density, Gerver (1975) and Triestman (1965) both found that the EVS was maintained the same but the accuracy was negatively influenced to a significant extent. Gerver (1975) explains this as a trade-off made by interpreters who attempt to keep a relatively constant EVS at the cost of accuracy. The length of EVS is important, because an overly short span may lead to higher possibility of misunderstanding, while an overly long span can cause disruption of perception, hence into

omission (Barik, 1975). Therefore, the EVS should be long enough for the identification of meaning segments, thus avoiding miscomprehension, but not too long to overrun the capacity of WM to store the information queued for delivery. Obviously, the key appears to lie in the control of EVS to reach an optimal balance between the lag and accuracy. In this regard, what training should target is well expressed in Camayd-Freixas's (2011, p. 6) study, who argues:

> Training has a two-pronged approach: to build up capacity to stay just one segment behind the speaker for extended periods, and to push the capacity for handling a longer decalage without losing the thread of meaning: in other words, to minimize and to maximize the decalage by shortening and expanding segments.

These remarks indicate that the relevant skills required should include quick information processing to identify meaning segmentation, efficient use of WM, and regulation of the EVS for necessary adjustment.

In terms of speaking style, Andres (2014) points out that some language styles can impose difficulties for interpretation because of their unusual linguistic forms or associated textual features. For instance, emotive, religious or culture-influenced speaking styles can present obstacles in understanding; or in a very formal style, such as the one for a planned speech of a high register in a conference, the sequent linguistic features of written or literate style are naturally expected. Déjean Le Féal (1978) identifies that the formal style is more associated with low redundancy and high information density, complex syntax, more sophisticated expressions, or more topic-specific knowledge, which can all pose difficulties to interpreters. To handle these challenging variables, linguistic competency and skills are required to decode complex structures and alleviate cognitive load of processing dense information.

In addition to the influencing features on the input front, parameters on the production side can also influence the SI performance, mainly including directionality, language combination and production speed.

Directionality is a theme of controversy in both SI practice and pedagogy. The question often raised is, which is easier to perform, A language (the native language) to B language (non-native or working language), or otherwise (Dose, 2014; Rinne et al., 2000)? Researchers have different views based on the claimed superior quality of interpretation in the different directions (Bartłomiejczyk, 2004). One view is that it is easier to interpret from A to B in SI, mainly due to advantages including better input comprehension, decision making, process control, and higher chance of a full delivery of the source message in A language (Denissenko, 1989).

Denissenko's position is supported by Tommola and Heleva (1999), who have found that trainees achieve better propositional accuracy in A-B interpretation of complex texts, in a small scale empirical research. However, for the other view in support of the B-A direction, Herbert (1953), for instance, insists that an interpreter should always translate into his mother tongue with only few exceptions; and Seleskovitch (1978, p. 100) holds the same stance, that "simultaneous interpretation can only be done properly into one's native language". Institutionally, the preference for B-A direction is adopted by many international institutions such as the UN and EU, and the standard practice for SI interpreters only working into their native languages is observed (Nicholson, 1992). Similarly, professional peak bodies such as AIIC also show their consistent support for B-A SI (Bartłomiejczyk, 2004). Their main argument is that interpreting into the native language can be less challenging due to the strength of the native language and deficiency in B language (Nicodemus & Emmorey, 2013).Besides the two views above, a limited number of researchers hold a neutral stance in the debate. For instance, Barik (1973, 1994) reports that professional interpreters show no remarkable difference in the two directions. Regardless of the choice of directionality, it is obvious that language proficiency and competency in both source and target language are crucial, which can influence interpreting performance (Tzou, Eslami, Chen, & Vaid, 2012). In the present research, B-A direction is agreed to be an easier direction by the researcher and more details are provided in Chapter 5.

In terms of language combination, larger deviations between the source and target languages are likely to increase interpreting difficulties at the lexical, syntactic, semantic and pragmatic levels. Goldman-Eisler (1972) compared the interpreting performance between two language pairs: English and French vs. English and German. With longer EVS found in the English-German combination from the data, Goldman-Eisler claimed that the different position of the verb in English and German was the cause of the issue. MacWhinney (1997) observes the same phenomenon between Arabic and English. Christoffels and De Groot (2003) associate this phenomenon with the load on WM, and explain that remarkable language disparities impose higher demands on WM, which taxes its efficiency in use. To solve this difficulty, Mizuno (2017) uses the findings from his experiment to propose that solutions to overcoming these difficulties lie in strategies such as anticipation and language-specific syntactical reformulation strategies.

As for the speed of production or the interpreter's output rate, how fast the interpreter can orally deliver the rendition in the target language can also influence the performance. Darò (1994, p. 255) finds that, in experiments on speaking speed as a parameter, higher speaking speed is a

typical feature in SI more so than in other interpreting modes. Even though this does not mean fast rendition is compulsory in SI, it reflects that rendition agility can be a desirable skill in SI. Darò also identifies six factors impacting the production speed: speaker's speed, translation direction (depending on the numbers of phonemes involved); types of texts translated (since technical ones can be more difficult than rhetoric ones); strategies adapted by interpreters (e.g. transcoding or meaning-based); language proficiency; and physiological abilities (e.g. Darò finds that females are better at speech fluency and agility than males). To address the influence of these factors, enhancement in linguistic knowledge and proficiency and development of production strategies can all contribute to an agile and fluent delivery of interpretation.

As a whole, influencing factors in the input and output stages of SI signpost skills such as cognitive agility, segmentation, monitoring and strategies of different kinds are to be addressed in order to perform the task successfully.

3.4.3 Novice vs. expert performance

Another perspective in skill identification for the didactic purpose is the examination of expert performance for patterns of traits leading to satisfactory performance within cognitive studies (Motta, 2006). Starting from the mid-1990s, cognitive psychology has been introduced into SI research for the exploration of expertise (Tiselius & Jenset, 2011); and most of these studies focus on the relative expertise by comparing the performance of different groups, mainly including bilinguals without interpreting experience vs. interpreters (e.g. Barik, 1973; Dillinger, 1989, 1994; Gerver, 1969; McDonald & Carpenter, 1981), and novice interpreters/students vs. professional interpreters (e.g. Ivanova, 1999; Liu, 2001, 2008; Liu, Schallert & Carroll, 2004; Moser-Mercer, 1997b; Moser-Mercer, Lambert & William, 1997; Sunnari, 1995). All these research confirm that expertise is associated with higher skill levels, and identify some honed skills that lead to better performance.

To start with, performance is both statistically and qualitatively better among experienced interpreters than amateur bilinguals (Dillinger, 1994). Interpreters have special skills that do not come naturally with bilingualism (Gerver, 1969), and these skills are associated with their expertise. For example, Nida (1969) hypothesizes that interpreters can short-circuit the semantic analysis. Barik (1973) claims that interpreters omit less and add more, while they are less influenced by the language direction of interpretation. McDonald and Carpenter (1981) consider that interpreters are able to manage larger chunks in processing and therefore produce less literal interpretation. By comparing quantitative data on performance parameters of comprehension, including syntactic processing, proposition generation and frame-structure

processing in experiments with specified presentation rate and text types, Dillinger (1989, 1994) draws the conclusion that interpreters present more flexibility and tactics in deploying their mental resources for comprehension.

Through the novice vs. professional interpreter performance comparison, researchers prove that the qualitative differences in performance are a combined result of linguistic and cognitive flexibility and special skills, by focusing on particular skills (Liu, 2001).

De Feo (1993) conducted an experiment involving both interpreting students and professional interpreters, to study their strategy use. The results explicitly reflect different strategy use caused by skill level. For instance, De Feo finds that substitution is commonly adopted where generalization is the most frequent among professional interpreters. Although omission is used by both students and professional interpreters, students are more likely to omit the whole relative propositions. In addition, to simplify the output, fusion of information is quite common in both groups but professional interpreters favour subordination. Besides this, professional interpreters make better use of extra-linguistic knowledge shared by the audience. The findings indicate that use of strategy can be a skill component that differentiates interpreting performance quality, which should be acquired during learning.

Ivanova (1999) explores skill difference from the perspective of discourse processing. She provides a detailed description of how interpreters with different expertise levels behave when problems occur. The conclusion is that experienced interpreters display better problem-solving skills and strategies with specific reference to the context.

Moser-Mercer, Lambert and William (1997) compare the performance of novice and professional interpreters for level of simultaneity in comprehension and speaking, resilience to interference in language production, strategy use, verbal fluency, and WM. With expert interpreters showing superior performance in most aspects, it is proved that expert interpreters perform better and more stably thanks to a series of cognitive sub-skills, even though expert interpreters do not necessarily master all those skills equally well. Liu (2001) considers that expert interpreters have developed domain-specific skills, including selective decoding, better monitoring and more efficient use and allocation of WM.

Liu (2008) also makes a novice-professional comparison in comprehension and production processes and mainly attributes the better performance displayed by professional interpreters to better mastery of three cognitive skills: concurrent articulation and articulatory suppression; WM; and attention. In concurrent articulation and articulatory suppression, Liu (2008, p. 169) argues that a “short-cut” approach in information processing (i.e. input stimuli are processed

and stored in a more semantic-based manner rather than in a verbatim way) and better articulatory suppression developed during extended experience and practice of concurrent listing and speaking jointly contribute to more efficient comprehension in expert interpreters' performance. In terms of WM, Liu find no consistent results from either previous studies or her own experiment to establish a definite positive correlation between larger WM span and higher level of expertise in SI, therefore hypothesizing that that the efficiency of WM use, among other factors, might be a factor making a difference (Liu, Schallert & Carroll, 2004; Liu, 2008). For instance, strategy use, such as synthesis, anticipation and ambiguous formulation, is observed among expert interpreters as common means to circumvent possible saturation of WM (Díaz, 2005). As for attention which is considered as a part of the human memory system (Baddeley, 1986), Liu (2008, pp. 171-172) reviews different explanations for how attentions functions in multitasking processes and concludes that the expert interpreters develop a good ability to manage their attention allocation by considering both specific task needs and the overall situation. This conclusion is consistent with Gile's (1995a/2009) effort model for SI, where the resource management ability is coined "coordination effort" to indicate its importance. It is certain that the ability to manage mental resources is crucial to expert performance.

To review the studies on SI expertise in a more systematic way, the review can follow the cognitive flow of SI, comprising comprehension translation and production stages. Liu (2001, p. 159) holds that expertise is "the result of well-practiced strategies in each of the comprehension, translation and production processes, and the interaction among these processes, which are specific to the needs of the task of simultaneous interpreting". Liu thus studies performance differences caused by various skill levels in comprehension, translation and production processes by combining reviews of previous major research results in expertise studies in interpreting, and her analysis of performance differences from her own experiments. The following review examines performance differences in the comprehension, translation and production, and identifies the relevant differentiating skills in the full-flow processes, from the body of existing literature.

In the comprehension process, noticeable differences lie in two aspects: semantic focus, reflected by selection of incoming information; and integration of information (Liu, 2001). As revealed in Dillinger's (1989) experiment, expert interpreters show superiority in matching the syntactic importance to semantic importance, indicating that they are more sensitive to the conceptual framework of information rather than constrained to the surface information. Therefore, expert interpreters are more selective in information processing at the comprehension stage, being able to make more sensible decisions as to what is to be maintained

and what discarded. This finding also finds support in Barik (1975), who examined omission types in experts' and novice's performance and found that a large proportion of omissions made by experts can be categorized as minor types, i.e. purposeful skipping, rather than induced by failure to comprehend or to keep up with speakers. This means that omission is more often employed by experts as a voluntary strategy on the basis of rational analysis of incoming information. To further explore the omission types, Liu et al. (2004) study the way experts and novices select information under circumstances where omission is imperative. The results corroborate earlier findings and show that expert interpreters can identify significant information more accurately and leave secondary information out when necessary. On the contrary, the novices, i.e. interpreting students in the study, showed less discrimination between primary and secondary information when making omissions.

In terms of information integration, it is found that higher skill levels are positively correlated with better flexibility of integration choice (Liu, 2001). This finding is primarily supported by the result of a recall test conducted by Isham (1994) that bilinguals tended to follow the original clause or sentence boundary in retelling, while interpreters tended to integrate the information in their own way, depending on the need of comprehension for the interpreting purpose. Davidson (1992) and McDonald and Carpenter (1981) provide more SI-relevant insight for how the expertise level can influence information integration. They both argue that higher levels of expertise and skills are more likely to lead to larger chunks for processing, and found it true in comparison between more experienced trainees and novice trainees and between interpreters and bilinguals respectively. Two possible explanations for such difference could be: that experts are superior in detecting the semantic interrelation and the overall structure of the input information (Liu, 2008); and that experts are able to more efficiently use working memory to enable buffering and storage of longer information strings (Liu, 2001).

In the translation process, SI expertise features better identification of equivalents in the target language (Liu, 2008). As Liu (2008) argues, although production process is largely directed by the way input is processed and segmented in comprehension process, how equivalent is identified can in turn influence segmentation (Liu, 2001). Since retrieval of translation equivalents takes time (Cheung, 2001), segmentation means more frequent equivalent retrieval in interpreting which leads to longer time to translate and thus further lagging behind the speaker. Therefore, Liu (2008) argues that those with interpreting expertise tend to employ strategies to enlarge the segments when searching for equivalents.

In the production process, expert interpreters show specific styles in their delivery, mainly in terms of speed and length in rendition. It is noted by Gerver (1969) and Shlesinger (1994) that

SI delivery cannot be as smooth as usual speech, but features more pauses and fluctuations in the output rate. Gerver (1969) set the average output rate for SI at 95 to 112 words per minute as the normal range, with the upper limit depending on the interpreter's working memory capacity at any given moment. In spite of the set range, Kirchhoff (1976/2002) finds that expert interpreters show less variation in the output rate, delivering at more stable pace than the novice do. Liu (2001) also finds that the delivery of expert interpreters is more coherent and meaningful, featuring better fluency and naturalness at the same time. Liu's explanation is that instead of succumbing to cognitive and physical limitations, expert interpreters use strategies to overcome these challenges. For instance, control of attention can be used to share or switch attention among different tasks to deal with the interferences among these different tasks. In addition, strategies are employed by expert interpreters to improve production efficiency to better keep up with speakers, such as syllable reduction via lexical or syntactical compression in the output (Chernov,1979) provision of plain production by replacing superfluous words with shorter/easier words and sentences in the output (Sunnari, 1995).

Aside from research attention on skills in single cognitive processes contributing to expertise performance, some researchers have more global findings. Moser-Mercer (1997) finds that professional interpreters outperform novices, not only locally but also globally. In addition to sharing the opinion that professional interpreters prevail in memory capacity, anticipation, control skills, more refined cognitive representation and organisational schemes, Moser-Mercer (1997) also notes that professionals have a more global view of situations or problems and can analyse the input information faster and more accurately. Another advantage is their better use of knowledge (Moser-Mercer, 1997). Experienced interpreters have more organized knowledge structure so that they can retrieve it more efficiently and even more quickly, by learning from the past or elaborating strategies and solutions, which can be further integrated into their knowledge base.

The research findings above have important implications for interpreting pedagogy. Moser-Mercer (1997), together with many other researchers such as Bransford, Brown and Cooking (2000), Ericsson (2000, 2002, 2005, 2009) and Ericsson and Lehmann (1996), argues that, in both domain-general and -specific contexts, consistent features distinguishing experts from novices can be examined and used as teaching objectives to be achieved. In SI teaching, similarly, the distinctive yet reproducible features drawn from expertise research can constitute learning objectives for novice students (Motta, 2006).

In this spirit, some research on SI expertise has been done in ways that are more pedagogically relevant. In these research, instead of comparing the performance of professional interpreters

and bilinguals, the subjects have been mostly students, but at different skill levels. These studies are valuable in that the comparison of novice performance at different levels on the way to expertise provides insights into the "progression of skill acquisition" (Mankauskienė, 2018, p. 6). The superiority in some skills that contribute to better performance demonstrated by more advanced students can be suggestive of targeted skills components during the skill development. To address current research only, only the main studies from the 1990s onwards are reviewed here.

One example is Schjoldager (1993), who conducts an empirical investigation to detect some skill difference among SI students at different learning stages. The language pair involved is English-Danish, and two groups of subjects were included for comparison: final-year undergraduate students (fifth year) from the faculty of modern language at the Arhus School of Business, and trainees in the six-month postgraduate course at the Centre for Conference Interpretation, Copenhagen. Schjoldager argues that deficiencies in any of the following, such as natural aptitude, techniques and ethics, linguistic competence, general education and world knowledge, will influence the quality of the target production. However, to keep the study manageable, she only focused on the comparison of linguistic aspect in her study, with grammatical issues as the indicator. Schjoldager empirically proves that different masteries of grammar can make differences both semantically and pragmatically, and can even affect the conveying of a speaker's intention on some occasions. This indicates that linguistic skills are an important element of teaching in SI.

Arumí Ribas (2012) studies the problem-strategy relationship in CI at different stages of training. By comparing problems identified and strategy use reported by two groups of students, divided into a novice group (students newly admitted into the interpreting course) and an advanced group (students that have attended around 300 hours of practical interpreting sessions), Arumí Ribas found both similarities and differences between the two groups when they performed the same CI task. In terms of problems identified by the subjects, the two groups reported different difficulties they encountered. Compared with the advanced group, the novice group reported more prominent problems with listening and comprehension, and they found it more challenging to render the delivery in the target language. In terms of strategies used, the two groups shared some strategies, which can be explained in accordance with Gile's (2009) conclusion that the choice of strategy is not at random but subject to some problem-strategy patterns. However, Arumí Ribas also found a different feature of the advanced groups that the students in this group generally showed a larger variety of strategies at their disposal. Besides this, the advanced group tended to use strategies such as omission, summarising and

paraphrasing more often compared with the novice group. Arumí Ribas's explanation is that these strategies require better decision-making and ability in discourse analysis, which can only be developed through practice. Arumí Ribas also admits that this research has its limits in two ways. Firstly, there were two groups of people involved with an array of different features, making it difficult to conclude that the differences are the exclusive result of skill levels at different stages of training. Secondly, the small number of sampling involved makes the findings less likely to be representative. Nevertheless, the findings reflect the importance of strategy teaching and the practice of relevant cognitive skills in the teaching. Furthermore, the methods adopted to extract subjects' perceptions, such as retrospection and questionnaire, and aspects of performance analysed by Arumí Ribas can all be drawn on for the present study.

A most recent example is the study by Mankauskienė (2018) who compares the SI performance of interpreting students and professional interpreters, respectively comprising participants at different levels. The student group involved students in 1st, 2nd and 3rd semester of their interpreting course and the professional interpreter group comprises less-experienced and more-experienced interpreters. Performance variations were found among the three sub-groups of students and the performance of the 3rd -semester students was the closest to that of the less-experienced professional interpreters, on parameters analysed such as perceived difficulties, error types and fluency. Although the results reported were from an incipient exploration in a broader research program, the variations of performance among three student subgroups could provide a preliminary indication of what skills students need to develop to progress on the continuum of skill acquisition during the learning process.

Longitudinal research has also been done to compare the same students' performance at different stages of their learning, to specify the aspects of expertise to be taken as the teaching objectives. Research of this type tends to focus on specific skills that manifest performance differences, and thus renders to the teaching design some extra attention to skill development. For instance, Moser-Mercer (2000a, 2000b) conducted a long-term study on skill acquisition among students enrolled in an intensive post-graduate program, and identifies problems posing significant challenges to these learners at various stages of the program. The detected challenges include sustained attention, interference of the other language, fast retrieval of equivalents, and processing speed and prosody, which reflect cognitive deficiencies preventing novice interpreters from moving forward and making inroads in skill development.

3.4.4 Summary of skills required in SI

With the review of SI skills from various perspectives above, a skill list can be compiled. The purpose here is not to attempt a comprehensive skill list but to identify crucial SI skills for the pedagogical purpose. As Moser-Mercer (1997) points out, skill components emphasized can vary among researchers; and according to their research focuses, some crucial skills for SI can be drawn. As Alexieva (1983) summarizes, the difficulties of SI mainly lie in the following four aspects: the non-stop inflow of information awaiting processing; incomplete revealing of incoming information; simultaneity being involved; and time limit imposed on the interpretation that must be finished within a certain time frame to avoid hindering following cognitive processing. Accordingly, skill components that can tackle the challenges mentioned by Alexieva should be paid special attention. Another useful reference can be found in Zhong (2001, p. 32), who produces a table to share his thoughts on useful skills that should be included in the teaching of SI. According to his observation, skills such as split attention, listening comprehension, reformulation, use of strategies (which include simplification, generalization, omission, summarization, and anticipation, etc.), conference preparation, public speaking (manipulation of intonation, pronunciation, stress and pause), teamwork, and use of equipment are mentioned. As a whole, skills can be categorized into language skills, cognitive skills and public speaking skills. Cognitive skills can be further specified as skills for comprehension, translation and production, and coordination of all tasks.

3.5 Common skills between CST and SI

With skills required for both CST and SI reviewed above, common skills can be identified for the didactic discussion of the present research. Acknowledging that some ST skill components are similar to those in SI, Mikkelson (1994, pp. 382-383) specifies the common skill components including: good command of source and target languages and their linguistic differentiations impacting interpretation, mental agility to quickly analyse incoming information and producing translation, and skills to achieve equivalence at all levels. Li (2015a, p. 179) also summarizes, on the basis of a review of earlier literature, that the value of CST in skill development for other modes of interpreting (namely CI and SI) lies in equipping students with skills that can be transferred, including: public speaking, psychological preparation (confidence and readiness), flexibility at linguistic and strategic level, fast discourse analysis, multi-tasking, and brain-voice coordination. However, it is unlikely that limited training time can be evenly distributed to all common skills. As a result, some priority skills should be selected based on two rationales: overlapping skills required by both CST and SI; and the significance of the skills to making progress in learning, i.e. the biggest barriers that novice

students encounter or the ones that can influence SI quality significantly at the initial stage of SI learning. This is to maximize the match between the prioritization of skill development in teaching and the need for skill development of novices. Lambert (2004, p. 298) identifies four common features between CST and SI as: time stress, anticipation, reading for idea closure, and the oral nature of the output. Accordingly, skills associated with these common features are selected from the earlier skill lists, and summarized in Table 3.2.

Table 3.2 - Common skills required in both CST and SI based on similar features

Skill / Required Features	Cognitive	Linguistic
Time stress	Simultaneity; Strategy use for quick comprehension (segmentation/condensation/omission)	
Necessity for Anticipating	Use of strategy-anticipation	Use of strategy – anticipation
idea closure	Strategy use for unfolding messages (segmentation, anticipation)	Pattern recognition Use of strategy-reformulation
Oral nature of output	Avoidance of source language interference; Monitoring of output	Use of strategies – reformulation; Public speaking

3.6 Conclusion

The review in this chapter justifies the incorporation of CST into SI, and identifies the potentiality in further exploring variants of CST for the didactic purpose in SI.

Given the criticisms towards CST reviewed in relation to its role in SI training, it is reasonable to argue that CST can be either easier or more difficult than SI in some ways, but that such easiness or difficultness does not negate the relevance of CST to SI teaching. The cognitive review shows that CST shares some common features, cognitive processes and skill requirements with SI, justifying that CST can be a useful tool for skill scaffolding in SI teaching. The didactical review of CST used in SI teaching proves that although some task differences may give rise to extra challenges in CST, the CST discussed in most literature is only one variant of ST. After all, ST has so many variants, some of which can either offset the effect of differences or even make use of the differences for the benefit of SI teaching. For instance, to address the issue of textual interference, Gile (2005) suggests a special form of ST, i.e. to deliver

the output at a fast speed so that students could be pushed to reduce the dependence on written text. In so doing, they must go beyond the words and avoid simple transcoding so that the delivery can be carried out naturally and intelligibly.

The review in toto provides a direction to change the status quo of the pedagogical use of ST in SI. As it shows, the current ST variants in use are all considered as a categorization of CST. The differentiations between CST and SI on the one hand, and the current teaching practice of using CST in SI on the other hand, indicate that the role of CST in SI training is limited if it is kept to the current forms. Therefore, action is required to explore some new variants of ST to facilitate skill acquisition in SI. To serve this pedagogical purpose, the present inquiry intends to achieve two objectives for the new variants. One objective is to increase the approximation of cognitive processes between ST and SI by manipulating some features of CST in order to increase the potential of skill transfer. The second objective is to take into account the crucial skills of SI and the novice students' needs for skill acquisition at the initial stage of SI learning, in order to make the new variants both well defined for the targeted skills and appropriate difficulty-level for the novices' needs. To these ends, the review of SI skill set, cognitive differences between CST and SI, and novice students' skill status in terms of their skill levels and gaps in transition all provide a foundation for the designing of new ST variants and sequencing of exercises based on the new variants to fit into the teaching purposes of skill development for SI novices. The detailed design informed by the review in this chapter is presented in Chapter 5.

4 ACTION RESEARCH AS A RESEARCH FRAMEWORK

Action research (hereafter referred to as AR) is adopted as the research framework for this study chiefly due to its ongoing inquisitive characteristics. Reason (2003, p. 106) clearly describes AR as "an orientation to enquiry". Agreeing with Reason, Chandler and Torbert (2003) have expanded the definition further by using AR as a guidance in providing a framework for the organization of everyday research activity. As a "methodical, systematic and rigorous process of enquiry" (Norton, 2009, p. 31), AR, therefore, becomes a system of research, not a single method.

In this chapter, the history of AR development, and its definitions, features and application in T&I studies are reviewed. The overarching purpose is to demonstrate the comparability between the characteristics of AR and the objectives and features of the present research.

4.1 Profile of AR

4.1.1 Development and definition of AR

AR is believed to have originated from Aristotelian thinking (Boog, 2003; Defoer, Budelman & Toulmin, 2000). The first AR practice is identified as a derivative of a scientific method that dates "back to the Science in Education movement of the late nineteenth century" (Mckernan, 2013, p. 8). Hart and Bond (1995) find that AR was utilized in a variety of applied research fields and even gained ground in some fields in the decades after its introduction. However, given its time-honoured history, AR was only popularized as a complete research theory in the United States after World War II when it emerged in the work of Kurt Lewin, a German psychologist working in America (Holter & Schwartz-Barcott, 1993; Kemmis & McTaggart, 1988; Zuber-Skerrit, 1992). Finding experimental methods unsatisfactory for the study of social issues, Lewin introduced AR by launching social change programs on, for example, minority emancipation, social democratisation, and improved status of women (Boog, 2003). Although Lewin was not the pioneer in using AR, let alone writing about it, he was the first to "construct an elaborate theory" and "made AR a respectable inquiry for social scientists" (Mckernan, 2013, p. 9). Lewin considered AR as a "comparative research on social actions and effects of various forms of social action, and research leading to social action" (Smith, 2001, p. 9). The claimed purpose of constructing AR, for Lewin, is that "to understand and change certain social practices, social scientists have to include practitioners from the real social world in all phases of inquiry" (in Mckernan, 1991, p. 10). As a landmark figure in AR development, Lewin is recognized for his innovation in use of AR in several aspects (Boog, 2003). Most saliently, in

Lewin's work, researchers changed into participants, from previously being observers, with an open system view and a new model of cyclical social change being built for the first time (Greenwood & Levin, 2006). The significance of these contributions is well summarized in Boog (2003, p. 430) that "ever since, group work to facilitate social change and adult learning following the cyclical development has been central to the methodology of all kinds of action research". Obviously, these unique features of Lewin's AR theory have laid the foundation for the further development of AR.

There are different types of AR thanks to the historical and philosophical impacts from social movements (Masters, 1995) or the main areas in which it has been utilized (O'Brian, 1998). For example, O'Brian (1998) identifies four streams of AR, as traditional AR, contextual AR, radical AR, and educational AR, which are used in inquiries in different contexts. While based on philosophical perspectives underpinning AR, McCutcheon and Jung (1990) categorize AR into three types, respectively, from positivist, interpretivist and critical science perspectives. To make the three types easier to understand, Grundy (1982) names these three types as technical, practical, and emancipatory AR; whereas Mckernan (1991) labels them as scientific, practical and critical AR. Norton (2009) analyses the types of AR identified in the three categorizations and finds that they are the same by nature despite their different names (Norton, 2009). Norton explains in detail what each type of AR involves, and how they are differentiated from one another. Positivist/technical/scientific AR refers to AR research as a collaboration between expert researchers and practitioners. In such collaboration, experts offer research expertise while practitioners emphasize improvement in current practice with technical support and findings from research experts. For interpretivist/practical AR, with collaboration between researchers and practitioners remaining in place, practitioners take more initiative and play a major role in interpreting and changing the practice with their knowledge and understanding of current practice. With regard to the critical science/emancipatory/critical AR, the research purpose switches from individual practice improvement to knowledge enhancement of the social and political context for the current practice. In this type of AR, critique and reflection are made on existing theories and practices, contributing to improvement in both.

Due to there being so many types of AR with various emphases and orientations, different AR definitions are provided to capture its purpose and process from different perspectives (Greenwood & Levin, 2006). For instance, McMahon (1999, p. 167) defines AR generally as "strategic action" that involves a "deliberate and planned intent to solve a particular problem (or set of problems)", thus laying emphasis simply on change of practice. With more focus on individual impacts, on the other hand, Rudduck and Hopkins (1985) and Ebbutt (1985) define

AR as an inquiry process that aims at improving and reforming through inquiry at individual level. Foregrounding collaboration and increase in knowledge, Greenwood and Levin (2006, p. 1) define AR as "a set of self-consciously collaborative and democratic strategies for generating knowledge and designing action in which trained experts in social and other forms of research and local stakeholders work together". To emphasize the importance of life-long learning, Carr and Kemmis (1986) and Taggart and Kemmis (1988) defined AR as a self-reflective inquiry. Although seemingly on an individual level too, they highlighted one of the critical purposes of AR: that it be conducted in a context that can in turn influence the context where people operate individually, by enabling cultural and social changes attributive to such inquiry and reflection. Obviously, it is impossible and unnecessary to find a standard definition to embrace all types of AR. That being said, it is helpful to identify different strands of AR and find the similarities in all forms and shapes of AR despite their different focuses or emphases. By nature and in principle, AR is about "learning by doing" (O'Brian, 1998, not paginated), and the ultimate goal is to emancipate, empower and change (Boog, 2003).

At its origin, AR involves the application of anthropological research methods to investigation and resolution of social problems (Argyris & Schön, 1989; Whyte, 1991). Although started as a radical form of inquiry into social action, current AR inquiries have a broader purpose and aim at providing data on which to act (DePoy, Hartman & Haslett, 1999). AR is most frequently used as a prerequisite to planning and enacting solutions to community problems or service dilemmas (Ervin, 1996). Among these applications, Norton (2009) notes that an important stream called pedagogical AR in the education field is gaining momentum due to the fact that characteristics of AR serve the purpose and demands of pedagogical studies well.

4.1.2 Characteristics of AR

Boog (2003) argues that AR has developed into a fully-fledged social research practice, and that different approaches of AR have become more convergent with increasingly shared theoretical and methodological elements. Researchers such as Carr and Kemmis (1986), Cravo and Neves (2007), Kember (2000), Norton (2003) and O'Brian (1998) have all discussed characteristics of AR. Different scholars provide different numbers of characteristics, and quite often they are school-based or discussed in the research of specific social fields. Given the heterogeneity of characteristics in the literature, only common ones mentioned repeatedly by researchers are selected for review here. These characteristics are: disruptive and change-driven; socially situated and democratic; cyclical; and collaborative.

4.1.2.1 Disruptive and change-driven

Change and improvement are considered as the prime commitments of AR (Kember, 2000). Brydon-Miller, Greenwood and Maguire (2003, p. 15) prove that the fundamental motivation of AR is to change because "the social world can only be understood by trying to change it". Norton (2009) argues that the origin of AR gives it an avowed purpose, that is, to bring about change and improvement. Therefore, an AR research project is meant to disrupt the status quo.

What can be changed during AR has dual elements. AR, as the name suggests, shows a juxtaposition of two elements (McKay & Marshall, 2001) so McDonough and McDonough (2014) point out what can be improved through AR also has a dual nature, that is, improvement in both knowledge/theory and in practice. Reason and Bradbury (2006) further claim that the AR process also reflects such an integration of knowledge/theory and practice. They state in their work that AR is a participatory process that "seeks to bring together action and reflection, theory and practice" (Reason & Bradbury, 2006, p. 1). In this description, the dual nature of AR is manifested in the real action and development of empirical or theoretical insights about the situation under investigation.

These two elements that AR naturally integrates are inseparable to research. The notion is that theory can inform the practice of action and the practice of action can lead to generation or enhancement of theory (Brydon-Miller et al., 2003). Such a dialectical relation between practice and theory is well explained by researchers. On the one hand, a theory provides theoretical grounds and strategical tools for designing and conducting actions, interpretation and evaluation theory, and there is "nothing as practical as a good theory" (Lewin, 1951, p. 169, in Brydon-Miller et al., 2003). On the other hand, actions contribute to knowledge gain, leading to improved theory. Elden and Chisholm (1993) and Shanks, Arnott and Rouse (1993) stress that the action of seeking solutions to practical problems generates new knowledge or better understanding. Susman and Evered (1978) also maintain that actions guided by existing or previous theories can be evaluated and the result can be used to support, supplement or revise the existing theories. De Beaugrande (2003, p. 27) holds that action and theory should be dialectical and interactive in the form of "theory-driven practice" and "practice-driven theory". Obviously, AR reflects, as much as it is, such a desirable connection in both process and results.

4.1.2.2 Socially situated and democratic

Originally used as a research approach for social changes with an emancipatory goal, AR, as Brydon-Miller et al. (2003) have argued, poses a completely different view of knowledge generation to that of traditional/positivist research. Instead of conducting research in an

objective and value-free way, AR has a more open system in viewing the role of participants (Brydon-Miller et al., 2003). Therefore, AR is more suitable for dealing with, rather than hard science, such as in physics or biology involving stable laws, fluid problems in a specific social context where all factors, such as events and people and the relations among these factors, are taken to define and are subject to the context (Susman & Evered, 1978). Such an understanding gives rise to another set of two special features of AR. One is, as O'Brian (1998) declares, that AR researchers do not attempt to be objective but consider and acknowledge their personal interpretation and bias as an important part of the research. This is in line with the constructivism trend in education, which emphasizes the role of social construction and the contributions of all elements constructing the context. Besides this, an issue studied in AR must be context-specific, which emphasises the importance of local relevance. This means AR is conducted to seek solutions for concrete local problems for a specific group within a particular context (McNiff & Whitehead, 2011).

AR, being a democratic approach is also reflected in its openness to mixed method approach. Tran (2009) maintains that standards of scientific research aiming at generating universally applicable theories through induction and deduction may not apply to AR, nor the related research methods. Different from quantitative methods typical in scientific research, qualitative methods are considered to take knowledge as a complex totality involving many uncertainties and variables, which cannot "be broken into discrete variables that can be studied or controlled" (Schwalbach, 2003, p. 5). This may explain why Norton (2007) and Taylor, Bogdan and DeVault (2015) all identify that common research methods adopted in AR basically fall within the qualitative research paradigm, to find solutions to complex social issues involving interrelated variables under specific contexts, including questionnaire surveys, documentation collection and analysis, observation records, interviews, case studies, and researcher's journals or participants' observation records. In pedagogical research, the suitability of qualitative methods is advocated by Strauss and Corbin (1990), on the grounds that, since pedagogical inquiries inevitably involve experiences, feelings, thoughts or other human-related reactions, qualitative methods embedded in AR are perfect for capturing rich and in-depth descriptive details and narratives that are most valuable to such inquiry. Nevertheless, in studying complex social phenomena, advocacy of combined research paradigm involving diverse research methods and tools has been on the rise for complete understanding (Greene, 1994; House, 1994). In the same vein, Newman and Benz (1998) and Eisner (2017) raise that there shall not be an absolute dichotomy between qualitative and quantitative methods in contemporary educational research. As they see it, the two research paradigms can be combined in educational studies. As proponents for the integration of the two paradigms, Phelps and Hase (2002, p. 518) state that

AR is "inherently open to mixed methods". Christ (2010) also sees the inclusiveness of AR by identifying it as mixed method research of a special form, because it allows the use of various methods and tools beyond traditional methods to collect multiple facts from different sources and angles for interpretation. Due to such openness, AR is therefore considered as a holistic approach frame with multiple methods available to solve complex problems, such as the ones in pedagogical studies (O'Brian, 1998).

4.1.2.3 Cyclical

AR involves a cyclical system (Carr & Kemmis, 1986). According to Greenwood and Levin (1998), such a cyclical model was invented by Lewin with a view to achieving social changes, and involves three stages, namely dismantling the old structure, changing the structure, and making a new structure. In addition, Greenwood and Levin also find such a cyclical model in all types of AR as the central structure. According to Burns (2010, p. 82), the developed cycles in AR are "characterized by dynamic movement, flexibility, interchangeability and reiteration", referring to planning, action, observation and reflection, which continue in new cycles. This means that, instead of being conducted as a one-off process, AR involves an upward spiral development in which refined knowledge or theory can be drawn from the current action and then be applied and tested in new rounds for validity and further improvement (Elliot, 1991; Parsons & Brown, 2002). Such a spiral trend featuring reflection upon previous action and refinement in the next cycle is also emphasized by Norton (2007) and Smith (2001), who hold that this is the key to form a holistic yet dynamic view of practice and all ever-evolving factors involved.

The spiral development available in AR is compatible with the purpose and need of pedagogical research involving great complexity. It is argued that the teaching and learning is an emergent process because events and ideas occur in a non-linear and unpredictable fashion, making absolute prescription impossible (Phelps & Hase, 2002). In a pedagogical research program aiming at reflection and improvement on teaching and learning, it requires more than simply a one-off experiment, but much longer time for the "unfolding of understanding" (Davis & Sumara, 1997, p. 111). Kember (2000) also notes that a plan-directed action may see diversion due to unseen issues, and thus paralleled cycles are necessary. Only from the repeated cycles, can a more holistic view be obtained based on which refinement and progress can be possible (Norton, 2009). Therefore, to establish a proper teaching method requires enough time to test the effects and space for adjustments to manage emergent situations, and thus calls for a research method that allows flexibility and adaptability, which can all be satisfied by the cyclicality of AR.

In the same vein, reflection in cycles of AR is considered an essentially conducive feature for teaching in general and higher education in particular. Schön (1983) has coined the term of "reflective practitioner" to highlight reflection as an integrated part for all professions in that it is inevitable for any practitioner to handle unexpected and new problems for which no previous training is able to offer solutions. This concept has gained so much advocacy in teaching that Brockbank and McGill (1998) name reflective practice as a core element for teachers in higher education, arguing that this not only realizes the teachers' professional development through reflection and improvement of their practice but also sets the model of reflection for students, who are encouraged to be lifelong and autonomous learners. With these benefits offered by reflection and reiterate cycles available in AR, Parker (1997) argues that pedagogical AR enables a systematic reflection on teaching practice. To reinforce the notion, Postareff (2007) further affirms that such a systemic reflection can be realized at three different action stages in a cycle: that is, prior to, during, and subsequent to one action cycle. In each of the three stages, reflection functions to prepare for, monitor and retrospect on the actions, making actions better designed, flexibly implemented and enlightening for changes and improvements.

4.1.2.4 Collaborative

In AR, collaboration in AR means engaging subjects or other community members in the research (Creswell, 2002), and the interdependence among all participants is crucial (Susman & Evered, 1978). In other words, all participants are considered as co-researchers as equal parties in the research, so that their input to AR, in terms of opinions, suggestions etc., are equally important (O'Brian, 1998).

Norton (2007) finds that AR has long been used in pedagogical research, and considers that pedagogical AR is a complete synonym for participatory AR. The collaboration characteristic is in accordance with the needs of pedagogical research. As Schwalbach (2003) notes, collaboration in pedagogical AR starts from the fact that the researcher is also the subject, whose teaching practice is reflected and acted upon. While the purpose of pedagogical AR is accepted as being "to systematically investigate one's own teaching/learning facilitation practice, with the dual aim of improving that practice and contributing to theoretical knowledge in order to benefit students learning"*(* Norton, 2009, p. 59), pedagogical research should involve teachers, researchers, and student-researchers, who are aware of different theories drawn from relevant subjects; teachers that want to have reflective thoughts on current practice; and students who are recipients and joint constructors of current teaching practice. To Cochran-Smith and Lytle (1993), such engagement of different multi-stakeholders and the equal relations among the parties make pedagogical AR completely different from traditional research in

teaching where researchers observe and study the behaviours of other teachers or students as completely objective outsiders. The interaction of stakeholders and significance of such cooperation in pedagogical AR are elaborated by Cochran-Smith and Lytle (1993). The researcher is the instructor, so that students' first response can be immediately observed and taken into consideration when the teaching takes place in the classroom. This provides the researcher with uncontaminated data for analysis and reflection with reference to students' reactions. In addition, as a participatory process, pedagogical AR enables students to engage, participate, contribute and construct. As such, instead of being passive subjects to be studied, students are also co-researchers in pedagogical AR, whose input, understanding or reaction also constitute the action and construct the context for action. Cravo and Neves (2007) stress that the significance of collaboration in AR lies in bringing together multiple parties concerned, and especially those who can finally benefit from the collaboration. This suggests that only by engaging and benefiting teachers and students as the mostly immediately concerned parties can AR adds its unique value to pedagogical studies.

Characteristics of AR show in a significant measure the compatibility between AR and pedagogical studies, in that the findings of pedagogical AR can be informative for understanding and changes in teaching, learning, and content design, which thus almost touches all aspects of teaching and learning (Nolen & Putten, 2007). It is little wonder why pedagogical AR has been embraced by educators to investigate their own teaching practice and students' learning, since AR was introduced into educational research in the 1950s.

4.2 Criticism and concerns to pedagogical AR - contentions and precautions

While AR is recommended as a methodological approach in pedagogical research, proponents of AR also note that there are some concerns to be mindful of to improve the accuracy and validity of this research approach. This section reviews common criticisms towards pedagogical AR from researchers who are not in favour of AR. This is aimed at dismissing possible doubts, if any, in the use of AR, and arguing for it as part of the research framework in pedagogical studies. As Norton (2009) does, pedagogical AR and participatory AR are used interchangeably in this thesis.

4.2.1 Contentions to criticism

In spite of the merits of AR reviewed above, studies also show that criticisms of AR have existed ever since its introduction into research (Neves, 2016). The irony is that what has attracted criticism are the typical characteristics of AR that distinguish it from the conventional

positivist research orientation. As Brydon-Miller et al. (2003, p. 25) indicate, while conventional researchers worry about objectivity, distance and control, action researchers worry about relevance, social change and validity tested in action by the most at-risk stakeholders. Dickens and Watkins (1999, p. 131) summarize that the main criticism towards AR concentrates on two areas: the way AR is conducted with different methods, participants and different relations among participants; and AR's validity in terms of its results and implications for knowledge and practice. Meanwhile, McTaggart (1994, p. 322) identifies criticism as hinging on "method" and "theory". More specifically, Neves (2016) identifies four criticisms of AR as a methodological framework in research: 1) AR endangers objectivity and neutrality due to its close involvement or intervention in the research process; 2) AR places too much focus on personal or social improvement and changes over definite scientific outcomes; 3) AR's results are confined to solving specific problems in the local context; and 4) AR is a practice-oriented and practice-based approach, being weak at theorizing.

To make the discussion of criticism of AR more relevant to pedagogical research, Norton (2009, pp. 60-61) identifies two criticism worth arguing on. One criticism questions the legitimacy of pedagogical AR in university, doubting the validity of teacher-researcher collaboration and that of other participants. The other criticism questions the value of data as untheorized description of practice with local focus. To defend the applicability of AR in pedagogical exploration, evidence can be found from three perspectives to contest the claims against pedagogical AR as included in the two criticism.

Firstly, to respond to the major criticism towards teacher-researcher in AR for their lack of research skills and close involvement or intervention in teaching (Roulston, Legette, Deloach & Pitman, 2005), Norton (2009, p. 59) argues that "the fundamental purpose of pedagogical AR is to systematically investigate one's own teaching/learning facilitation practice, with the dual aim of improving that practice and contributing to theoretical knowledge in order to benefit student learning". To achieve such objectives, no one else is more suitable than the teachers themselves, who can contribute to exploration in the real practice by integrating changes and development within the process (Somekh, 1993). Teachers, by mobilizing their professional and local knowledge, are most likely to understand the process, design an action, and interpret the result along with other participants (Brydon-Miller et al., 2003). In this process, Neves (2016, p. 244) comments that "the agent and the action are both the objects of the research itself".

Secondly, it is argued that the local focus of pedagogical AR does not dismiss its legitimacy (Norton, 2009). Participatory AR is criticised for being improper given that it is too limited in

scope, inward looking and lacking in generalizability (Seider & Lemma, 2004). The relevant feature of pedagogical AR under attack is that the primary purpose of AR is to solve local issues in a specific context and that solutions obtained through action are merely locally applicable (Cohen, Manion & Morrison, 1997). To this, Neves (2016, p. 244) challenges that all research is about "a special case" to some extent. Besides this, Bartlett and Burton (2006) retort that, while focusing on special case in a local context is a crucial feature of AR, this does not eliminate the potential implications of findings for a wider context. Bartlett and Burton elaborate that, although each AR is unique in the sense that it is designed to solve tailored issues in a specific circumstance whose generalization is not guaranteed for all cases in the community, cases with approximate circumstances may still find the results relatable and useful with certain adaptations when necessary.

Thirdly, the descriptive data collected in pedagogical AR is considered a strength rather than a weakness (Bartlett & Burton, 2006). As the relevant criticism claims, the data collected from participatory AR are mainly description of practice by nature and such data can hardly constitute robust evidence base for meaningful educational changes (Hargreaves, 1997). To rebut this stance, Bartlett and Burton (2006) argue that the abundant descriptions of class practice are essential to pedagogical research because classroom practice is the very process for practitioners to enhance their understanding of issues requiring improvements and construct new knowledge. This is echoed by Cotton and Griffiths (2007), who also acknowledge the importance of descriptive data involved in participatory AR, by stating that the collaborative production and articulation of numerous accounts set the context and provide the explanation for how teachers and learners engage in the active inquiry on pedagogical issues and solutions. In the same spirit, Clarke, Thorpe, Anderson and Gold (2006) argue that collection of a portfolio of description makes data inclusive and flexible, and thus nominate a series of data collection methods available in pedagogical AR. This practice can also enhance data validity, because different data sources constitute triangulation (Mills, 2000) and Schwalbach (2003) suggests that at least three ways of data collection can help with validating the conclusions drawn from the data. Schwalbach further enumerates methods in qualitative data collection that are quite similar to those nominated by Clarke et al. (2006). That is to say, rich description of practice is crucial to pedagogical AR, while the use of diversified data collection tools can generate descriptive data that are valid.

4.2.2 Precautions to take in pedagogical AR

In spite of the affirmed value of participatory AR in pedagogical studies, Norton (2009) also sees ethical concerns that must be addressed to guarantee the quality and authenticity of the

research. These issues are associated with three general principles for ethical research informed consent, privacy and confidentiality, and protection from harm. To avoid the breach of these principles, counter measures are suggested by researchers to minimise or eliminate ethical concerns in pedagogical AR.

First, consent must be obtained from participants other than the teacher-researcher. Norton (2009) specifically stresses the importance of observing this principle when the participants include students. Norton points out that the teacher-student power relationship may have a potential impact, in that if the teacher-researcher is conducting AR with his own students, the authority associated with the "teacher" status may constitute potential coercion to students and push them to take part in the research. To avoid possible negative impacts, Norton (2009, p. 183) suggests a long list of precautions to take, including how to obtain consent, what relevant information to be provided to student participants, and how to provide the information.

Secondly, anonymity and confidentiality must be minded. Norton (2009) emphasizes that it is imperative to conceal the identity of participants in all research findings and dissemination of the findings. To achieve this, it is suggested that names should be eliminated from the data record, and different identifiers, such as a code or numbers known to teacher-researchers, can be assigned. As for confidentiality, this means all data must be stored safely and making sure that only the researchers have access.

Thirdly, it must be minded that student participants must be kept from harm. Norton (2009) stresses that such harm is not confined to physical harm but includes psychological harm or harm to students' self-esteem or academic self-confidence. McKay (2006, p. 55) suggests some practical measures to offset or avoid such possible impacts. Firstly, teacher-researchers are urged to pay close attention to detecting emotional changes in students, including awkwardness and nervousness. Secondly, feedback and reinforcement to participants throughout the process in the form of support and appreciation should be provided to make students feel themselves to be equal and valued participants.

In general, the literature has confirmed the legitimacy and value of AR and its compatibility with pedagogical studies. As Ferrance (2000, pp. 2-3) puts it, AR is "a quest for knowledge about how to improve…it involves people working to improve their skills, techniques and strategies…is not about learning why we do certain things, but rather how we can do things better". To embed AR in pedagogical studies, the purpose is to do better in the teaching and learning, by seeking how to achieve it in the teaching and learning practice. With AR's

characteristics and purpose understood and critiques and concerns addressed in the reviews above, it can be argued that AR is a beneficial inquiry approach in pedagogical studies.

4.3 AR in TS and IS

AR has been employed in various fields over time (Brydon-Miller et al., 2003). As Gile (in Fraser, 2004, p. 39) indicates, after its use in areas such as sociology, anthropology and educational science, AR is also increasingly seen in translation studies (TS) and interpreting studies (IS). Although the number of AR studies in TS and IS is still small compared with in other types of studies (Cravo & Neves, 2007), the value of AR in TS and IS is acknowledged by researchers, such as Cravo (1999), Chesterman and William (2002), Cravo and Neves (2007), Hale and Napier (2013), Hatim (2014), Hubscher-Davidson (2008), Kim (2013), Kiraly (2000, 2014), Lund and Moksnesfuru (2014), Napier, Leigh and Nann (2007), Neves (2016), Shlesinger (2009), and Slatyer (2006). In the following sections, evidence for integrating AR into TS and IS from literature is presented, with representative AR projects in TS and IS, especially on pedagogical AR, are reviewed,

4.3.1 AR in TS

As noted by Cravo and Neves (2007), AR can be a promising research model for TS, especially for pedagogical studies, thanks to advantages and relevance arising from AR's key characteristics. Cravo and Neves point out that two streams of research methods are traditionally applied in TS, i.e. structuralist or positivist approaches, conducting TS with quantitative methods in an objective and value-free manner vs. a post-modern approach that conducts TS with qualitative methods in a descriptive and subjective way. However, exclusive use of either stream of methods is too extreme for TS, given its complex nature involving multiple factors, such as different subjects and stakeholders, different theories introduced, and multiple aspects of problems associated with a wide range of knowledge scopes. Therefore, against the complete dichotomy of research method choices in TS, Cravo and Neves (2007, p. 96) argue that AR could be an ideal framework to combine merits from positivist and descriptive approaches by integrating "rigour of the former and the commitment of the latter".

To prove the suitability of using AR as inquiry frame in TS, Cravo and Neves (2007) list three precious assets of AR, stemming from AR's characteristics, which can contribute to TS. Firstly, the participatory nature of AR enables multi-sourcing of inputs from various perspectives and stakeholders on a specific issue; while with AR in TS is possible to involve all stakeholders, who can benefit from the research, including translators, students, teachers or even consumers

of the translation products. Secondly, the cyclic nature of AR in TS enables the repeated execution of data collection, interpretation, and intervention and testing, providing opportunities to initiate changes and then test their effects in real actions. Cravo and Neves (2007, p. 97) neatly capture such advantage of AR in the following remarks:

> AR seeks to interpret and describe, to explain and to predict. In fact, in AR this predictive hypothesis grows out of the fact that knowledge is the result of action in solutions are tested in use, thus allowing for some prescriptivism in that predictions might be seen as models for the improvement of practice.

Thirdly, AR connects theory and practice by forming a benign interaction between the two. Reflective practitioner-researchers can find solutions guided by a theoretical basis in action, while systematic data from action enable critical theorization with the understanding that theories do not stand still, and that further development of theories should lead to dependent understanding and potential changes (Kosmidou & Usher, 1991).

On the whole, the confidence in AR for TS can be well found in Cravo and Neves's (2007, p. 93) comment that "issues that have not been explained, practices that have not been described, bridges between scholars and practitioners that have not yet been crossed, gaps between theory a practice that remain to be covered, may be dealt with through AR".

Embracing such thinking, some researchers in TS started employing AR in their research projects. A typical example is that a number of researchers indicate that AR is particularly valuable in audio-visual translation (AVT) studies, which involve multimodal, multimedia and multidiscipline, such as Bogucki (2011) and Cravo and Neves (2007). In a review of AR in AVT by Neves (2016), researchers making such endeavours include Patiniotaki (2009), Remael and Neves (2007), Szarkowska (2010), and Walczak and Szarkowska (2012). The successful application of AR in AVT studies proves that AR is suitable for capturing and exploring complicated processes such as those of AVT.

On top of the proven success above, Monzó (2005) observes that the initial application of AR in TS started from its applications in pedagogical studies. Researchers such as Hatim (2014) and Kiraly (2001) voice strong advocacy for the AR approach in pedagogical TS and such advocacy is shared by researchers who conduct AR-based pedagogical TS, of which some recent ones are reviewed as follows in a chronological order.

Kiraly (2001) conducted a two-year AR to investigate the effect of constructivist epistemology on translation instructions. He searches for traits and difficulties in collaborative learning in

translation teaching and explores possible solutions with a constructivist orientation. The most recent example could be the AR project by Chang (2012) for her PhD thesis, seeking pedagogical design to achieve a life-long learning objective in translation teaching, by challenging and changing some perpetuated teaching practices. By planning, implementing, constant reflecting and refining, all researchers identified changes to traditional translation pedagogies for better teaching effects.

Hubscher-Davidson (2008) reports on her AR program testing the efficacy of a group-work approach commonly used in translation classroom, proving AR's value in respect to its local relevance and incentives for change. Hubscher-Davidson explicitly states that the aim of this AR project is to assess pros and cons of the traditional teaching practice of group work and gain better understanding of the perceptions towards this approach from both trainers' and students' perspectives. Upon reflection on the process and results of the AR project, Hubscher-Davidson exclaims that she is excited about the immediate impact of her research on practice, which can bring benefits to all participants, both teachers and students.

Hyejung (2009) conducts an AR study on translation evaluation in translation teaching. Under the AR framework, a survey was conducted among 40 undergraduate students to explore what to provide for feedback and how to, in order assist students to prove their translation skills and quality in a motivating way. The implication what that when teachers make translation quality assessment, the students' needs must be taken into consideration when the objectivity and reliability of assessment is considered.

To guarantee the continuation of TS benefiting from AR, researchers call for inclusion of AR in translator education/training to produce more profound influence. Cravo and Neves (2007) and Kiraly (2000) all argue that it is necessary to enable all prospective translators or instructors to conduct their own AR inquiries. Cravo and Neves (2007) reinforce that AR leads the translator-to-be to ponder over questions about their translation actions in learning and to take the initiative to search for reasons and solutions, progressing towards professional maturity with constant reflection. Sharing the same thought, Díaz-Cintas (2004) also acclaims the inclusion of AR in translation teaching, on the grounds that AR provides students with opportunities to be in direct contact with researchers, professional translators and even perspective clients, developing a clear view of their professional future.

4.3.2 AR in IS

Interpreting studies (IS), which is traditionally considered to be incorporated within TS (Venuti, 2000), has been spun off from the TS discussion and gained more independent status in research

(Pöchhacker, 2002). Pym (2006) points out that, despite some common ground between TS and IS, IS should be considered a separate category, in that the IS research community is unique, having different relations with disciplines such as neurology or psycholinguistics. In terms of the adoption of AR in research, Gile (in Nicodemus & Swabey, 2011) believes that the impetus of the "practisearcher" (Gile, 1990; Shlesinger, 2009) is stronger in IS, given that IS was initially started by interpreting practitioners and trainers, while practitioners and trainers are still the main authors in the field. By comparison, TS was started by scholars of literature who also held an interest in translation.

Examples of AR in IS can demonstrate that AR has been embraced by the IS community. Hale and Napier (2015) collected cases of AR in IS and found that it is particularly popular in sign language IS, such as Cragg et al. (2002), Dickinson (2002), Hema (2002), Hull (2002) and Leeson and Foley-Cave (2007). Besides this, Monzó (2005) reports on an AR program named ACTIVE to study the practice of Spanish legal interpreters with the purpose of improving the practicing conditions for professional interpreters in the Spanish context.

In IS, AR is mainly used for studies in interpreter education and assessment (Hale & Napier, 2015; Slatyer, 2006). To explain why this is so, Hale and Napier (2015) adopt five distinguished features of educational AR identified by Scott (1999), and integrate these into the interpreting education context to show the benefits of AR in IS. These benefits include constant identification and inquiry of interpreting practice; development of skills in problem identification and problem solving in interpreters; guaranteed translation of research results into interpreting practice; collaboration among interpreting professionals, instructors/researchers and students; and potential changes that aim at and are drawn from the local interpreter education context. To make the discussion more specific, Takeda (2010) nominates benefits of AR in interpreting pedagogical studies as being that AR can help teachers reflect on and modify teaching practice for constant improvement when necessary, with students' instant reflection and thoughts feeding into and thus constructing the teaching process simultaneously, ultimately leading to more tailored and needs-focused learning and teaching. Schjoldager (1994) particularly stresses that AR can fill an observed gap between theory and practice in current interpreting pedagogical research; a gap in that a prevailing theory has been taken as a foundation for many studies, but the adoption of the theory is pre-assumed to be unquestionable and few attempts made to test it. Such thinking echoes what Burns (1999, p. 205) raises, that to test the efficacy of current classroom practice and bring about potential changes, AR can function as a catalyst.

As the most relevant to this research, AR pedagogical projects for interpreter training/education are reviewed here in chronological order. Due to the short history of using AR in interpreting pedagogical studies, the inquiries found in literature were mainly reported after 2000.

Napier (2005a) reports her AR project aiming at making changes to a sign language interpreting program at postgraduate level. Slatyer (2006) uses AR to create a curriculum for teaching non-professional interpreters of languages that are less commonly used in the Australian context. Another interesting example is the AR project by Hansen and Shlesinger (2007) which explores the use of technology-assisted self-study and after-class practice in interpreting teaching. This project is interesting in that the researchers applied AR unintentionally, which reinforced the compatibility between pedagogical IS and AR: Hansen and Shlesinger admitted that they did not deliberately choose AR as the research frame at the beginning of their research. However, their attempt to address frustrations among students during teaching and unsatisfactory test results under traditional class teaching all directed them to the necessity of iterative and reflective cycles which are typical of AR spirals. When the researchers realized that the research process matched with AR characteristics, they decided to extend their research, and retested the intervention in multiple cycles, finally completing the research as an AR. This inadvertent experience of using AR further proves that the teacher-researcher in interpreting teaching can be naturally attracted to the path of AR as a way to solve pedagogical issues in the specific classroom context, restating the compatibility between AR and interpreting pedagogical studies. One more recent AR project is by Boéri and de Manuel Jerez (2011), who study the teaching of conference interpreting ethics.

Furthermore, an extra advantage of AR in IS is that it can alleviate the issue of data in IS, where a common problem is that sample scale is relatively small due to the limited pool of subjects available (Gile, 1990). To address the issue of a limited number of participants, Gile (1990) proposes so-called convenience sampling, which controls the selection of samples based on the researcher's knowledge of the field and relevant empirical data from observation or experimentation. However, Gile (1990) also admits that this may not be completely applicable to interpreting research, due to factors such as diverse conditions with too many uncontrolled variables, and variation in individual interpreting performance for unknown reasons. Therefore, Gile (1998) suggests another solution: to have observational and experimental methods supplementing one another; while more weight should be placed on descriptive data in pedagogical studies. Gay, Mills and Airasian (2009), on the other hand, suggest that replication can be a method. Although it cannot completely fix the problem of representativeness, replication can at least provide comparable data and be considered as an increase in sample size

in a loose sense. Dillinger (1994, p. 157) also discusses the same issue, arguing that techniques developed for small sample analysis can be quite helpful, such as for profile analysis.

The suggestions for AR design above are followed in the present study: the iterative cycles of AR loosely resemble a replication to expand the overall sample numbers; the coexistence of multisource inputs provides a diverse basis for discussion of comparison and discovery for changes; and emphasis placed on a special context and individual features in AR constitute the environment for case study which resembles profile analysis.

4.4 Conclusion

To sum up, unlike those researches that are conducted with defined and controlled variables, participatory/pedagogical AR is conducted by the teacher as researcher, to have an insight and reflection on the local teaching practice with changes and adjustments to be made accordingly (Norton, 2009). The above review establishes that AR has unique advantages to be a research framework for both TS and IS studies. Although the introduction of AR to TS is relatively new, it is increasingly embraced by the TS community, where AR or elements of it are embedded in TS studies (Pöchhacker, 1999). In the domain of pedagogical inquiries, AR is well proven to be a suitable method framework as the review above shows. Such recognition is consolidated by researchers such as Cravo and Neves (2007), who suggest that pedagogical AR conducted in the classroom should be encouraged among translation and interpreting teachers, helping them to question the methodologies and pedagogical choice and make changes to step towards a new teaching/training paradigm. A subsequent benefit can be the shift from a teacher-centred to a learner-centred model of teaching, and the constitution of a life-long education for teachers.

The review above on AR provides an inspiration for using AR as the methodological frame in the present pedagogical research. As Li (2014) argues, some existing research methods in ST-related research so far have questioned, due to excessive variables in experiments, insufficient consideration of pre-experimental differences, and inauthentic settings. AR, in comparison, shows its advantages since it is conducted in the natural teaching environment which "requires no manipulation of the variables, supplies a more systematic documentation of teaching practice, and takes the variability of the learners into account" (Li, 2014, p. 74). At the same time, it is also noted that challenges are involved in pedagogical AR research, because the nature and features of participatory AR make this approach demanding in terms of maturity of participants, self-reflection, mutual trust between teacher-researchers and students, and construction of new teacher-student relationship (Pöchhacker, 2010a, p. 8). With the comprehensive review of AR in this chapter, both advantages and potential concerns that may compromise research quality

are acknowledged, which will be taken into consideration in the research design of the present research, which is discussed in Chapter 5.

5 RESEARCH DESIGN AND DATA SYNOPSIS

This chapter describes the research design of this thesis, which consists of four parts: Background information; Skill profiling and corresponding indicators; The research design, inclusive of the exercise implementation plan and the AR action plan; and Data overview.

In Section 5.1, the background information helps place the present AR into a specific context with an account of the pedagogical arrangements for the Master of Conference Interpreting offered at Macquarie University (MCI), the profile of the student participants, and the researcher's in-class observations of ST-related teaching-learning interaction in 2013, which led up to her PhD candidature from 2014 to 2018.

Section 5.2 sets out to profile the skill components intended to be developed through the designed exercise component in the present study, explaining the significance and indicators of development of each skill component through literature reviews.

Section 5.3 details the research plan constituting the exercise implementation design and AR action plan. The exercise implementation design elaborates: the DST features and functions that are different to those of the CST; the necessary incorporation of DST with other non-ST interpreting exercises that are included in the DST-related exercise cohort for SI training, and their deployment in teaching; and measures taken to control cognitive load. The AR action plan, however, mainly explains what one full action cycle involves and how it is framed into the overall research timeline.

Section 5.4 presents the data review of this study. It first describes what data are collected, what collection tools are used, and how the data are analysed in terms of skill development and transfer. Then, a synopsis of the three-year action data is presented, focusing on how the collection and analysis of data reflect all the characteristics of AR.

5.1 Background information

To meet the defining characteristic of AR, all AR-based research should be context specific (Cravo & Neves, 2007), involving all participants, events and the relations among participants and events (Susman & Evered, 1978). The context of the present AR is specifically situated in SI course offered at MU, Sydney, Australia via the MCI program. As a training component in the MCI, a cohort of DST-related exercises was designed, practised, readjusted and redeployed in teaching with a view to effectively developing skills that can be transferred to SI.

5.1.1 Context of MCI course

The MCI at MU is a one-year two-semester program with eight core units and 32 credits required for completion. The MCI curriculum[6] is quoted in Table 5.1 with the units rearranged according to the order of teaching in the course.

Table 5.1 - Units of Conference Interpreting at Macquarie University (MCI)

	Unit Code	Unit Name	Credits
Semester 1	TRAN865	Introduction to Simultaneous Interpreting Theory and Practice	4
	TRAN889	Simultaneous Interpreting into English 1	4
	TRAN897	Simultaneous Interpreting into LOTE 1	4
	TRAN884	Advanced Consecutive Interpreting	4
Semester 2	TRAN898	Simultaneous Interpreting into LOTE 2	4
	TRAN890	Simultaneous Interpreting into English 2	4
	TRAN879	Mock Conference Interpreting and Research Project	4
	TRAN908 Or APPL902	Research Methods in Translation and Interpreting Studies Or Research Methods in Language Study	4

For MCI, CST is traditionally an ad-hoc task used only on an as-needed basis, never systemically employed as a fixed teaching component or practised. In other words, instructors of different units have the discretion to decide upon whether, when and how to include CST in their units. To situate the present research project in a proper unit, all the units were reviewed for their feasibility for experimenting on the newly designed DST-related exercises. TRAN 865[7], *Introduction to Simultaneous Interpreting: theory and practice*, was eventually selected. The rationale is that this unit is taught in the first semester when students are developing their skills with four teaching hours per week. And its teaching objective is two-fold. It introduces SI-related theories to arm the students conceptually and theoretically; and to make the theoretical teaching more interesting, it also devotes one or two hours to various supplementary exercises with which students are able to develop and enhance their cognitive, linguistic and extra-linguistic knowledge which enable scaffolding skill development for SI. Given this objective, TRAN865 is deemed to be most feasible and fitting for experimenting on using DST-related exercises to develop SI skills at the initial stage of conference interpreting training.

[6] Accessed from http://courses.mq.edu.au/postgraduate/master/master-of-conference-interpreting.
[7] See http://handbook.mq.edu.au/2019/Units/PGUnit/TRAN865 for details.

5.1.2 Participants

In the present AR, the participants comprise three batches of students enrolled, respectively, in 2014, 2015 and 2016, and the researcher herself as the teacher-researcher.

As a graduate from MCI too, the researcher is familiar with the pedagogy and course arrangement, and has shared many if not all difficulties experienced by the students, particularly during the transition from the mode of dialogue interpreting (DI) or CI to SI. During her PhD candidature at MU, the researcher decided to take a three-year pedagogical AR in the local context of MCI to answer the research questions (see Section 1.3). As a part of the AR, the researcher designed and taught DST-related exercises as one of the teaching components in TRAN865 in the first academic semester from 2014 to 2016, exploring their usefulness in SI teaching. In other words, the researcher is both an instructor and a researcher, who has reflected in and on the teaching and accordingly made changes to the teaching practice during the research.

The student participants, who agreed to participation in the research on a voluntary and informed basis, consist of those who enrolled in MCI in 2014, 2015, and 2016. To be admitted to MCI, students must meet some requirements[8]. To be eligible, they primarily must meet the language criteria by demonstrating their language proficiency in both native (A) and working (B) languages. In the Chinese language stream, students must provide evidence to show they are native speakers of Chinese and have been educated at least to the tertiary level in Chinese, their A language. For their B language, which is English, they need to demonstrate an adequate level of language proficiency with an IELTS overall Band reaching seven. All the students admitted to the program must have met these requirements, so their linguistic profiles could be consistent. Apart from their demonstrated language proficiency, these students must have already acquired a certain level of interpreting skill. Normally, students who apply for the MCI have undertaken an interpreting course at tertiary level in either Australia or China. In their previous training and education, DI and CI are normally the main modes trained. To take the postgraduate course of interpreting at MU as an example, the students had core units of TRAN 821 and TRAN 822 for interpreting practice. TRAN821[9] is designed to introduce the basic concept of interpreting and develop key interpreting techniques including skills in listening comprehension, text analysis, memory retention, note-taking and oral translation in various

[8] See http://courses.mq.edu.au/postgraduate/master/master-of-conference-interpreting for details.
[9] See http://handbook.mq.edu.au/2018/Units/PGUnit/TRAN821 for details.

topical contexts. As the extension of TRAN 821, TRAN 822[10] is designed to develop further generic interpreting skills such as comprehensibility, note taking, and long-term memory retention. Therefore, the students enrolled from 2014 to 2016 all had met the threshold requirements despite variations in gender and age distribution.

5.1.3 Class observation of teaching and learning interaction

To better understand the course for the pedagogical design of the present AR project, the researcher sat in on TRAN 865 for observation in 2013 for one semester. Of the four hours of TRAN 865 class each week, two hours were devoted to the introduction of SI-related theories while the other two were devoted to various skill scaffolding exercises, which predominantly included CST and shadowing. As an observer, the researcher attended the sessions together with the students, only taking notes of the teaching and learning interaction in class, including the students' class performance and their in-class feedback to the unit instructor, among others. Besides this, the researcher had some casual conversations with the students, inviting their comments on difficulties in transiting from CI to SI, and the effects of practising CST in addressing these perceived difficulties.

From these observations, the researcher found that CST could not sufficiently meet the demand of skill scaffolding for SI students at the initial stage of learning. Even though they could perform CST well, the students were panicky and unable to perform SI. The researcher discovered two main limitations of CST in addressing difficulties that novice students tended to experience during transition: a lack of simultaneity; and maladjustment to the external-paced mode of SI. These findings were supported by both the students' feedback and interpreting theories.

The lack of simultaneity in the concurrent processing of input and output, as the students reported, was the primary difficulty hindering their transition. The students highlighted that comprehension and delivery in previous training for both CST and CI are separate. In CST, as the students claimed, the texts were given for reading and preparation for a few minutes before delivery was required. Therefore, by the time of delivery, the whole text was possibly comprehended already; and the marked areas for structural adjustments would certainly help students in delivery. Similarly, in CI, the students could listen to the whole passage while making notes, and these notes that they made minutes ago, together with what they remembered, would help them complete the task. In both cases, as the students reported, they had an

[10] See http://handbook.mq.edu.au/2018/Units/PGUnit/TRAN822 for details.

opportunity to understand a part of or the whole passage before delivery was required. As shown in Table 5.2, the perception of input and production of output in CI are explicitly and seperately staged according to Gile's effort models (2009). In contrast, SI is an unnatural process in which listening comprehension and speech production must be concurrently executed, with only partial information available at one given time and concurrent interpretation grounded in the identification of meaningful segments (Bajo, 1998).

Table 5.2 - Gile's effort models for CST, CI and SI

Interpreting mode	Effort formula
CST=	**R**eading+**M**emory+**P**roduction+**C**oordination
CI=	phase 1: **L**isting+**N**ote taking+**M**emory+**C**oordination phase 2: **R**emembering+**R**eading+**P**roduction +**C**oordination
SI=	Listening+Production+Memory+Coordination

The change from an interpreter-paced to an external-paced delivery in SI was mentioned frequently as another defining difficulty by the students. In the face of the drastically different tempo requirement in SI as compared with non-SI interpreting modes, students reported that they were uncomfortable with the time constraint on the delivery. This is also noted by Gile (1997) as a common concern among novice students in SI, in that students in the non-SI interpreting tasks take full control of their delivery pace and thus have much more flexibility to manipulate delivery pace, allowing interruption activities such as reverse reading or pausing in delivery. Furthermore, students tend to resort to these activities to solve difficulties despite their intention to maintain fluency (Kurz, 2001). In SI, however, the pace of delivery is largely at the mercy of speakers and the time factor in SI becomes "the greatest language-independent constraint" because the speaker-paced nature of SI makes two executions imperative, adaption to external circumstances and interpretation "produced on-line" (Riccardi, Marinuzzi & Zecchinthe, 1998, p. 95), which imposes real challenges to novice students.

Theoretically, the two difficulties in the transition to SI can be interconnected, according to effort models (Gile, 1995a/2009). Just as Gile (1995a/2009) strongly argues, one major trigger of difficulties in interpreting is the higher processing capacity requirement, which either exceeds the total capacity available or causes misallocation of attention, i.e. overall or local saturation. SI features concurrent cognitive processes competing for allocation of finite cognitive resources, forming a zero-sum status in which too many resources required for one effort leads to insufficient resources left for other efforts. To intensify the resource competition, external-paced delivery in SI requires more production effort and results in reduced cognitive resource available for comprehension and coordination. Consequently, poorer comprehension

and interference among cognitive processes could occur, which may require extra cognitive resources for remedy, thus further intensifying the cognitive load and the resource competition.

The use of CST fails to address the defining difficulties in transition to SI. The students' comments and comparison of interpreting modes based on effort models indicate that skill gaps exist between the skill sets acquired from CST and CI and those required in SI. Therefore, CST needed to be tweaked in its present format in order to specifically address the prominent difficulties facing the novice and to boost its pedagogical value in SI teaching.

5.2. Skill profiling and corresponding indicators

Based on the review of common skills for CST and SI (see Section 3.5) and of the prominent challenges facing novice students in transition to SI, the selected skills for development comprise simultaneity, interference avoidance, monitoring of output, and use of strategies. Each of these is reviewed in terms of: its significance in SI; the subskills and parameters for assessment; and existing exercises suggested by earlier researchers if any. The review provides the foundation for the subsequent exercise design of the present research.

5.2.1 Simultaneity

Simultaneity constitutes a distinctive feature of SI because "it belies the axiom that the human brain is incapable of performing two complicated tasks at the same time" (Viaggio, 1988, p. 399). Ivanova (2000) identifies that simultaneity involves capacity to process synchronized source and target language and to manage attention allocated to each. This indicates that, on top of successful execution of comprehension and production, simultaneity is a skill for attention management to enable the concurrent execution of different cognitive processes.

To describe the extent of simultaneity, Setton (1998) summarizes some temporal features as clear indicators of simultaneity, including pause and lag between input and output. Pause and lag between input and output are indexes of simultaneity. Frequent and overly long pauses that lead to information loss or excessive lagging behind the speaker can hardly reflect good skill in listening and speaking at the same time. Admittedly, pausing may be caused by reasons other than cognitive deficiency to achieve simultaneity, such as waiting to accumulate more information due to unfamiliarity with the topic, high input rate, or drastic syntactic difference between language pairs (Oléron & Nanpon, 1965). In addition, the time lag, or EVS, varies among individuals and different circumstances, which makes it impossible to set a universal optimum length (Oléron & Nanpon, 1965, in Pöchhacker, 2002). Nevertheless, it is held that

comparative longer span can be associated with more expert SI (Herbert, 1952; Setton & Dawrant, 2016).

Ivanova (2000) reports that simultaneity can be a source of problems even to professional interpreters. To help novice learners to develop skills for simultaneity in SI, one effective way is to start with a task that involves simultaneity but imposes less cognitive load than SI (De Groot, 2000). Based on this principal, exercises suggested by De Groot are shadowing and intra-language paraphrasing, which involve the simultaneity of comprehension and production without the request for language conversion.

5.2.2 Interference avoidance

Another skill required in interpreting, especially in SI, is to defy the linguistic interference from the source text in the production (Agrifoglio, 2004). Researchers note various types of linguistic interference from the source text such as Lamberger-Felber and Schneider (2008) whose typology of interference is quoted here for its relevance to the present study. In their categorization, there are two groups of interference: non-specific and specific interference to SI. The non-specific interference to SI includes phonological, lexical and morphosyntactic interference present in all language-intermediated events; while the interference specific to SI includes simultaneous short circuit and grammatical agreement (Lamberger-Felber & Schneider, 2008). Kock (1993) coined, in German, the term "simultaneous short circuit", defining it as "temporal interference that originates in the SI process and that results in a wrong linking of information in the target text" (in Lamberger-Felber & Schneider, 2008, p. 220), where the constant incoming information exerts interference on the information that is yet to be delivered after processing (Lamberger-Felber, 1998, p. 114). Grammatical agreement means the agreement on number, person and gender between source and target language, which can be subject to the acoustic or visual influence in SI (Lamberger-Felber & Schneider, 2008). To discover the frequency of different types of inference in SI, Lamberger-Felber and Schneider (2008) conducted an experiment in which interpreters were required to do SI under three conditions: prepared SI with text (PT), unprepared SI with text (T), and SI without text (SI). The results show that the average number of interference in each 100 words is highest in SI. The major types of interference were lexical and morphosyntactic interference. The authors also explored the correlation between interference types and specific output- or input-related parameters. They found no significant correlation between interference types and output parameters such as time lag, interpretation length or lexical variety; but found a negative correlation between the input speed and interference frequency, i.e. slower input leads to more interference. Besides this, Lamberger-Felber and Schneider conclude from the same experiment

that, in comparison to the impacts from visual texts on performance, strategies applied by interpreters played a more important role in differentiating the quality of interpretation.

Two helpful points can be drawn from the review above. Firstly, it can be expected that lexical and syntactical interference are common, and that the lower input rate contributes to more such interference. In the present study involving English and Chinese, morphosyntactic interference may prevail over lexical interference, and the morphosyntactic differentiation between the languages in particular should therefore be discussed. Secondly, given the significance of strategies detected in the earlier research, strategies, especially language-specific strategies, should be embedded in exercises to help with interference avoidance in SI.

5.2.3 Monitoring of output

Monitoring of speech is a constant phenomenon in all human verbal communication (Horton & Keysar, 1996) and in SI as well (Gerver, 1976; Isham, 2000; Lonsdale, 1997). Gerver (1971) also argues that the presence of self-monitoring is an integrated process of SI to improve the overall quality of interpretation, not only in accuracy but also in presentation style. This is because monitoring enables the interpreter to produce more legible renditions with reduced verbal self-corrections, and to improve the overall fluency. Darò, Lambert and Fabbro (1996), who studied monitoring as attention focalization on output in their experiment and found out its impact on mistake quantities and types, partially proved the functions of monitoring. According to their findings, in A to B SI, which is called "active SI" (Darò et al., 1996, p. 113), the focus of attention on output only leads to reduction in minor mistakes such as slips of tongue, false starts, hesitations and corrections. Such a function is in line with the repair mechanism that is evident in SI as detected by Petite (2005). All acknowledging the function of monitoring in SI, researchers do have divergence over when to activate monitoring functions. According to the SI information processing model by both Gerver (1969) and Moser (1978), monitoring is performed for accuracy check when the interpreter compares the translation with the input message stored in the memory before the rendition of translation. On the contrary, Paradis (1994) claims that such a comparison occurs only after the rendition.

However, the function of monitoring is not directly presented, but only indirectly manifested by some features of delivery. Gerver (1971) holds that the function of monitoring may be indicated by self-correction, but no verbal correction does not mean that monitoring is not functioning, since what happens if the comparison result is not satisfactory has not been properly discussed (Christoffels & De Groot, 2009; Paradis, 1994). Furthermore, Moser-Mercer (1997b) argues that the execution and impacts of monitoring depend on the processing capacity

available. If capacity is exhausted in other cognitive processes of SI, the use of the monitoring can be impossible, or interpreters are simply unable to rectify problems even though they are detected through monitoring. Therefore, it is sensible to train the consciousness of monitoring among novice interpreters although their capacity in monitoring can be confined at the beginning. In addition, verbal-correction in their interpretation may suggest the function of monitoring.

5.2.4 Use of strategies

Gile (2009, p. 221) defines strategies in interpreting as "deliberate decisions and actions aimed at preventing or solving problems"; and he also coins another term, "coping tactics" (2009, p. 200), to specifically refer to those actions and decisions occurring when on-line. In a sense, coping tactics refers to the practical use of strategy in performing the task. Gile also states that coping tactics are a fundamental practical skill in interpreting. Despite this distinction made by Gile, the present study uses Arumí Ribas's (2012) approach in that tactics and strategies are used interchangeably.

Use of strategies is proven to be a significant skill itself for trainees to obtain which can contribute to the interpreting performance in all aspects (Gile, 1995a/2009; Li, 2015c). Gile (1995a) observes that interpreters make efforts to maintain an overall good performance and that it is common that strategies are employed by interpreters when the task gets challenging. Gile also uses his effort model for SI to theoretically explain the imperative of strategically accomplishing sub-processes of SI when only limited mental resource is available at any point in time during SI. Shlesinger (1995) explains that the activity of SI is characterized by three difficulties, namely time constraints, gradual and linear unfolding of information, and limit in the shared knowledge of discourse, all imposing cognitive constraints on interpreters. These constraints can influence the management of cognitive resources and performance of the concurrent activities of SI, thus requiring the use of specific strategies (Kalina, 1994; Kohn & Kalina, 1996). Furthermore, empirical research provides further corroboration to this position. For instance, Liu (2008) confirms that the skill of strategy use is a prominent feature distinguishing experts from novice interpreters. Liu finds that experts are more likely to apply adequate strategies in all sub-components in SI as well as in the interaction among all processes.

Many strategies in SI are discussed in the literature, and the categorization of strategies varies among researchers with different criteria (Pöchhacker, 2004, p. 132). Pöchhacker (2004, p. 132) briefly divides strategies into general and specific strategies, namely strategies applicable to all languages and strategies specific to certain language pairs for particular interpreting difficulties.

With a different approach, he also divides strategies based on purposes, i.e. process vs. product strategies, and on whether the strategies are applied before or during the task, i.e. off-line strategies vs. online-strategies. Riccardi (2005) takes a different perspective by grouping strategies according to the basis of strategies, that is, skill-based vs. knowledge-based strategies. Other researchers categorize strategies according to the cognitive stages to which they belong. For instance, Kalina (1996, p. 131) makes distinctions among comprehension, production and emergency strategies, and finds that comprehension and production strategies are adopted by SI interpreters more frequently. Among the production strategies, Kalina (1996, p. 131) further identifies sub-strategies concerning the discourse presentation, which include pause distribution, lexical/grammatical means of expression, and adaption to delivery rate. The "emergency strategies" by Kalina are different in that they are contingency measures that are only taken when interpreters' capacity is exhausted, such as word-for-word transcoding. Emergency strategies are to help interpreters regain control of the process in emergency situations; but Kalina also makes it clear that this type of strategy has much a lower degree of automation and is simply too marginal to represent the main strategies in the SI process. Given their special nature and rare use, emergency strategies will not be included as targeted strategies in the present research design. Instead, the focus of the research will be on the development of comprehension and production strategies. Quite similar to the categorization above, Gile (2009) identifies comprehension, reformulation and preventative tactics. Moser-Mercer (1997) also categorises interpreting strategies according to the cognitive processes but names them as comprehension strategies, planning strategies, monitoring strategies and workload management strategies. In Moser-Mercer's (1997, p. 258) typology, the planning strategies are equivalent to Kalina's production strategies, and are used at "lexical, syntactic and semantic level" and for the choice of register and prosody as well. Meanwhile, monitoring strategies are claimed to be at play at all times, since Moser-Mercer holds that an interpreter is making constant input-output comparison throughout the process. Lastly, the workload management strategies can be applied to realize the optimal use of mental resources.

Despite different categorizations of strategies, researchers have managed to identify strategies frequently used in SI. For instance, Chang (2005) makes a detailed review and finds that some common strategies are frequently adopted by interpreters, which include anticipation, regulation of EVS, reformulation, chunking, simplification, generalization, summarization, paraphrasing and omission. Tryuk (2010) makes a recent and comprehensive review of available strategies and manages to provide a shorter list of crucial strategies in SI. According to Tryuk (2010, p. 185), comprehension strategies include anticipation, chunking, information selection and stalling; while production strategies include compression, expansion,

approximation, generalization, syntactic transformation and use of prosody elements. This list provides a valuable source for the choice of targeted strategies in the present research.

The choice of strategy by interpreters attracts much research interest as well; and it is found that some factors can affect the choice of strategy. For instance, Gile (1995a, pp. 201-204) argues that the choice of strategy is subject to five rules: maximising message production, producing maximum effects on audience, economizing efforts, saving face in emergency, and playing on the safe side. Chang (2005) finds that the choice of strategy is shaped by variables including the language pairs, levels of proficiency, text difficulty, and interpreting norms. The specific variables that influence the strategy choice are also discussed. For instance, researchers state that language differences make strategy choice a language-specific decision, where differences in the syntactic structure (SOV vs. SVO) and the information order all dictate this choice (e.g. Gile, 2009; Kurz & Färber, 2003; Wilss, 1978). There are also discussions on strategy choice focusing on B-A direction (e.g. Al-Salman & Al-Khanji, 2002; Chang, 2005; Gile, 1995a/2009; Jones, 1998; Kornakov, 2000; Wu, 2001), which are quite relevant to the present research given that only B-A direction exercises are included in the present research.

Besides this, different expertise levels can also direct the strategy choice (Li, 2015b). Li (2015b, P. 185) reviews previous work on differences in strategy use among novice and professional interpreters, and summarises six aspects of difference, in both general style and specific strategy use. Firstly, experienced interpreters prefer effortful strategies to guarantee minimal interference to incoming information reception, while trainees prefer effortless strategies simply for immediate ease. Secondly, professional interpreters understand when to leave minor errors uncorrected, while trainees are more concerned about them. Thirdly, experienced interpreters can better use strategies such as compression and condensing, while trainees may fail to do so. Fourthly, experienced interpreters are good at moving from known to unknown information, relying on knowledge-based strategies, while trainees tend to concentrate more on unknown information, with more dependence on language-based strategies. Fifthly, experienced interpreters can keep a reasonable EVS by using segmentation successfully, while trainees tend to follow speakers closely at all times. Sixthly, experienced interpreters can better distinguish significant information from omissible information, while trainees are less capable of doing so.

At the same time, it is also noted that one strategy choice can be either the cause leading to or the consequence of using another strategy. For instance, Kalina (1996) quotes the use of anticipation to prove that its use can lead to the choice of particular strategies. Kalina (1996, p. 130) argues that anticipation helps interpreters to predict the upcoming source information

based upon clues drawn "from pragmatic interference to lexical collections, syntactic structures and suprasegmental features", but with each occurrence of anticipation forming a hypothesis that is subject to continuous verification. When immediate adjustment is required, Kalina (1996, p. 130) suggests the use of production strategies that can provide a "leeway" for such a check-and-adjustment action, providing flexibility in the information continuation and correction once contradiction is detected. One such strategy can be manipulating the surface structure of production, by producing relatively independent chunks or open structures.

The didactic implications of the review above are to justify the significance of including strategies in SI teaching and how they should be taught. As Chang (2005, p. 128) identifies, there are two sources for a strategy pool. One is the teaching of interpreting courses, where norms of interpreting strategies are acknowledged and imparted; while the other is the further development and toning of the norm strategies in the professional practice by either drawing from interpreters' own experience or learning from booth partners (Garzone, 2002). This demonstrates that teaching can be the start point for novices to be aware of and to use strategies. In terms of how to teach strategies, it is noted that a helpful way is to discuss one strategy at a time and then combine them to learn how they function together (Lee, 2006). More importantly, Riccardi (1998, p. 178) maintains that the purpose of teaching strategies is to provide options to cope with the message flow, emphasizing the importance of keeping the strategy options open other than setting a definite match between a specific strategy and a particular problem in the teaching.

5.2.5 Lists of selected strategies

Given the limited time available for teaching in SI courses (in the case of the present research, the teaching of experimented exercises is only conducted once a week for one semester), it is imperative to decide upon which ones to be included first to effectively and efficiently prepare trainees for SI task. Based on the review above, along with strategies specific to CST under the skill model developed by Process in the Acquisition of Translation Competence and Evaluation (PACTE) research group (see Jiménez Ivars, 2008 for details) and the observation of novice trainees' difficulties in transition, some strategies are selected for the teaching design of the present research.

The functions in improving SI performance will be reviewed over the selected strategies. In addition, for the teaching purpose, indicators of these skills in performance are to be discussed to assess the development and progress of each skill. In general, two groups of strategies are included, namely comprehension strategies and production strategies. Comprehension

strategies comprise segmentation and anticipation. Production strategies comprise compression (summarization, generalization and omission) and reformulation strategies.

5.2.5.1 Comprehension strategy

5.2.5.1.1 Segmentation

Segmentation is also named as a chunking or salami technique, which involves cutting a sentence into meaning chunks for processing and comprehension (Jones, 1998). As such, segmentation is considered a strategy at the core of interpreting skills (Setton & Dawrant, 2016). In fact, it is a natural tendency for any listeners to impose subjective organization when segmenting input speech for comprehension (Goldman-Eisler, 1972). However, the most ideal result of applying segmentation as a strategy in SI is "to produce something for each short consecutive phrase, to relieve memory and keep up but without trapping themselves, while jointing up the chunks to produce output that is both accurate and idiomatic" (Setton & Dawrant, 2016, p. 212).

In the comprehension and analysis stage, the first question is in what unit the incoming information should be perceived for processing. Barik (1975, p. 290) suggests that the proper form of information perceived and stored for processing in SI is not in individual words but in "meaning units" which enable interpreters to start interpreting unequivocally. This suggestion leads to another common question held by researchers: how long the unit should be? Bloomfield (1933) defines the segmentation units in a linguistic sense as the smallest units of speech that express meaning on their own (in Barik, 1975). For interpreting, Goldman-Eisler (1972) claims that the minimum unit should always be NP-VP structure, which can be further extended by including other constituents. Davidson (1992) raises a more empirically proven proposition, that the length of segments is associated with skill levels of the interpreter. In his experiment, two groups of subjects were required to perform the same SI task. Both groups were constituted of students in SI training, while students in Group B had more training than Group and thus were more skilful in performing SI. The results show that the group with higher skill level tended to manipulate longer units.

Goldman-Eisler (1972, pp. 73-74) has found that there are three ways adopted to segment the input information, namely identity (following the original segmentation of speech), fission (cutting the original segments into smaller units) and fusion (combining two or more segments). Among types identified of segmented units, the third type indicates that to segment is not only about cutting sentences into pieces, it also involves combining some units together. In the third type, when several segments are combined making a compound unit of meaning, this can be

considered a practice of "chunking" (Camayd-Freixas, 2011, p. 21). In the same vein, the strategy of segmentation in this thesis includes both cutting and chunking up the units.

Davidson (1992, p. 5) notes that, among the more competent groups, the interpretation tends to be in chunks which are more likely to be "syntactic entities" rather than lexical in nature, i.e. input information being more likely to be segmented into clauses with verbs. Davidson explains this phenomenon as a function of different skill levels, holding that novice students are too anxious to wait for more information, because they worry that accumulated information will exceed their memory limit. As a result, they are more likely to start interpreting before an adequate segment is perceived, even reducing to word-for-word interpretation. This dilemma is also captured by Camayd-Freixas (2011, pp. 4-5): that to avoid overloading the memory and falling too much behind the speaker, units appear to be the shorter the better; but longer units with more information are more likely to enable interpreters to draw an adequate meaning from the segment. At the same time, Gile (2009) points out that the use of segmentation presents both pros and cons. He mentions that segmentation can relieve short-term memory load, but that to deliver several grammatically complete units may demand higher production effort.

The general finding from this review is that segment length can be fluid (Cutler, 1994), and subject to factors both internal and external to interpreters. Internally, it can be jointly decided by individual capacity and skill levels, since more competent interpreters are capable of handling longer segments to better accommodate sematic meaning. Externally, the changing conditions of tasks can also lead to different segmentation strategies even at different points of time along the interpretation. Camayd-Freixas (2011, p. 6) accurately describes such a flexibility as "like a runner adjusts his stride to negotiate the contour of the terrain, so must the interpreter regulate the length of segments according to the speed, density, and syntax of the incoming message".

The implication for teaching is, therefore, that targeted training should be able to help students to identify the ideal ways of segmentation according to their needs and the task conditions, rather than providing a default formula. As Gile (2009, p. 205) maintains, no universal rule can apply but "recommendations can be given on a case-by-case basis". As a result, the discussion of segmentation in teaching should be conducted with specific examples.

5.2.5.1.2 Anticipation

Anticipation is another key strategy for successful SI (Setton & Dawrant, 2016). In Vandepitte (2001, p. 324), anticipation is defined as "the target language production by the interpreter of a (string of) word(s) before (or simultaneous with) the speaker's production of the corresponding

(string of) words", which is manifested as an oral production in an "advanced" way. By incorporating the relevance theory, Vandepitte (2001, p. 329) rephrases the definition, as interpreter's "mental generation of (parts of) assumptions that correspond to those that have not yet been expressed by the speaker".

Anticipation is considered as a crucial strategy that is commonly used among SI interpreters and considered particularly useful in SI (Bacigalupe, 1999; Chernov, 1992; Gile, 1995a/2009; Lederer, 1981; Moser-Mercer, 1978; Vandepitte, 2001). Lederer (1980), for instance, observes the performance of professional interpreters and finds that the average frequency of anticipation can be as high as every 85 seconds. Anticipation can contribute to good quality of SI performance under general circumstances (Wilss, 1978); and Setton (1999) even describes anticipation as a central operation in SI. When anticipation is successfully executed, an accurate equivalent of the source constituent or an approximation that can be adjusted afterwards can be produced (Van Besien, 1999). In some most frequently quoted interpreting theories, the significance of anticipation is also recognized and acknowledged. For instance, Moser-Mercer (1978) includes anticipation in the flow description of speech perception in her information processing of SI. Then, Gile (1995a/2009) confirms the role of anticipation by stating that it helps interpreters to juggle among the efforts of listening, analysis, production and memory, in his effort model for SI.

Research also proves that anticipation is not only useful but also very necessary in SI to overcome some difficulties (Kurz, 2003; Setton, 1998; Wilss, 1978). The necessity can be found in two aspects. Firstly, Chernov (2004) quotes speeches delivered /read out of written transcripts to prove the benefits of anticipation. According to Chernov (2004, p. 22), advance writing features, such as longer sentences, sub/subordinate clauses and more interrelated predicates, can be addressed by strategies such as anticipation. Secondly, anticipation can be particularly helpful when the source and target languages differ in their surface structure (Choi, 1990; Lederer, 1990; Setton, 1994; Van Besien, 1999). For instance, Setton and Dawrant (2016, p. 309) argue that word-order asymmetries and impossibility of looking ahead partly make anticipation indispensable, nominating anticipation as a "common means of neutralizing awkward structure and asymmetrical word order". This echoes Setton's (1998, p. 174) position that problems caused by structural differences between languages, especially in language pairs with particularly wide structural disparities, can be offset by anticipation because of the improved extent of "synchronicity". Setton (1999, p. 52) claims that anticipation can be "typically used for countering verb-last or head-noun-last structures", i.e. particularly useful when interpreting from SOV into SVO languages. Vandepitte (2001, p. 326) even extends such

usefulness of anticipation to the reversing direction of SVO to SOV as "countering 'opposite branching' in the case of language with non-isomorphic sentence structure".

In English and Chinese SI, the impact of structural disparities is noticeable (Setton & Dawrant, 2016a), which requires anticipation. Setton (1998) notes that, compared with English, Chinese is partly SOV in structure, featuring left-branching VPs and NPs and its special topic-comment structure as described in detail by Li and Thompson (1981). These structural differences between Chinese and English make anticipation one crucial strategy to be mastered for SI.

Depending on various classifications, different types of anticipation are identified. One classification depends on time lag between the delivery directed by anticipation and the actual appearance of segments in the source, i.e. how early the information is anticipated and interpreted before it is rendered by the speaker. Lederer (1980) discovers two kinds of anticipation. One type is represented by production of one constituent before it is delivered in the source language, which is called "proper anticipation"; while the other type is where the production of one constituent is basically concurrent but a bit later than the constituent in the source speech, which is called "freewheeling anticipation" (Lederer,1980, p. 253). For freewheeling anticipation, Lederer considers that the interpreter has summoned the relevant equivalent before the appearance of the corresponding constituent, as proven by the almost concurrent rendition. However, the interpreter chooses not to render the anticipated content until it is confirmed as a control procedure against the actual speech of the speaker. As a result, judging only by the time lag is not an accurate way to identify anticipation.

The other way of classification is based on the clues for anticipation (Van Besien, 1999). Anticipation is divided into linguistic and extra-linguistic types (Gile, 1995a; Lederer, 1978, 1981; Setton, 1999; Wills, 1978). Linguistic clues stem from syntactic/semantic information of the source language, while extra-linguistic clues refer to the situational or general knowledge available to the interpreter (Van Besien, 1999). Wills (1978, pp. 349-350) further divides linguistic anticipation into intralingual and expressional cases. The former is based on the logical links among information, while the latter depends on expressional structures such as idioms and collocation of standard phrases. Similarly, Bacigalupe (1999, pp. 255-256) divides anticipation into four types comprising: advance grammar knowledge; phraseological recognition from the cultural context of source (such as proverbs or sayings with cultural references); encyclopaedic knowledge either of the speakers, of the topic or of the world; and discourse types. In the practice, Van Besien (1999, p. 258) mentions that extra linguistic knowledge provides more clues for anticipation, while linguistic knowledge plays a minor part.

Anticipation, as a common strategy in SI, is considered theoretically to be possible and reliable (Altmann, 2013). Altmann (2013) points out that psycholinguistic studies have demonstrated that understanding a sentence does not necessarily involve hearing all words. Instead, a structural expectation can be built based on encyclopaedic knowledge and an inference process. To explain the possibility of anticipation from a different perspective, Chernov (1992, 1994) argues that semantic redundancy in discourse provides a prerequisite for anticipation. Chernov (2004, p. 33) identifies two types of redundancy, namely, repetition of message element, and their interdependence. For the first type, Chernov mentions that repetition is commonly used in the discourse as cohesive means to keep the unity of discourse in the form of the same expressions, synonyms, paraphrasing, changes of parts of speech, and pronouns/proverbs; while the second type refers to the relations among this repeated information that can be inferred. Based on both redundancy and definitions of sense or meaning in discourse, Chernov (2004) presents a probability model which holds that the possibility of anticipation is in positive relation with degree of redundancy and thus negatively correlated with information density. Chernov (2004, p. 93) also stresses the "cumulative dynamic analysis" for anticipation, that is, that each step in anticipation is based on reference from the previous information and that each generates possibilities of predicted information towards the comprehension of semantic structure of the whole discourse.

One suggested tool to train anticipation is a cloze test. As Lambert (1992b) points out, the cloze procedure is a cognitive task that requires reasoning and construction of meaning based on the clues from the context. The nature of the test matches the purpose of training of anticipation, which is to motivate students to think actively ahead in the process of interpreting and develop the deeper processing required in SI (Lambert, 1992b). Based on this belief, Lambert (1992b, p. 232) makes suggestions on how to design the cloze exercise for teaching and assessment, advising that the contents to be deleted from the text and the position of the contents generate different levels of difficulty. For instance, in quoting Rye (1982), Lambert (1992b) argues that, given the importance of nouns and verbs in conveying meaning, a text with mainly nouns and verbs missing is more difficult than one with only verbs missing. In addition, anticipation of words missing in the later part is easier than that of ones appearing earlier, so that the words at the end of the sentence should be more predictable.

Therefore, one exercise in the present design to practice the strategy of anticipation is a cloze ST where students are required to sight-translate a text with scattered blanks and to fill these blanks semantically based on various clues, to produce an uninterrupted delivery.

5.2.5.2 Production strategies

5.2.5.2.1 Compression

Compression is a common phenomenon in SI delivery and is deemed necessary in meaning-based SI (Alexieva, 1983). Compression refers to acts that simplify production lexically or syntactically to keep up with the source text temporarily (Liu, 2008). Setton and Dawrant (2016, p. 100) provide a more sophisticated definition of compression, as streamlining acts that "include both maximal concision of expression and fuller elimination of redundancy, plus the actual reduction or omission of minor or irrelevant details and even some 'subjective redundancy'".

To stress the necessity of compression for successful communication in SI, Alexieva (1983, p. 234) argues that "the basic means for the realization of the communicative act in SI is to render the information volume of the SL [source language] text with the optimum degree of compression". Alexieva (1983) then outlines three reasons to explain why compression should and could be employed in SI. Firstly, the importance of conveying intention and meaning prevails over maintaining the full volume of source text; secondly, the spoken mediation in SI allows compression in structuring of text; thirdly, communicative elements can serve as complementary codes of expression. Chernov (2004, p. 113) points out that the thematic redundancy in the discourse enables SI interpreters to conduct compression, which is to economize the language but to maintain and convey the message given in the source language. Setton and Dawrant (2016) note that compression can be particularly useful in fast SI, and they claim that skilled compression can reduce the volume of words by 60% for delivery. Wang (2008) argues that the incentive of compression can be found in the economy of language that aims to use least effort for the maximum communication effect, quoting Grice's (1975) cooperative principle and Sperber and Wilson's (1986) relevance theory for support. Specific to Chinese language, Wang (2008) conducts experiments on compression in Chinese (Cantonese) and English and concludes that syntactic differences between languages and high information density in Chinese also make compression imperative.

There are different types of speech compression in SI. Chernov (2004, p. 113) lists five types of speech compression, namely syllabic, lexical, syntactic, semantic or situational compression, providing the definition and description for each. Syllabic compression means the reduction of syllable counts in the target language, which is mainly achieved by finding a shorter equivalent. Lexical compression means that interpreters can utilize fewer words to express the given idea in the target language. Syntactic compression means using easier and shorter constructions in

the target language than those in the source language to achieve language economy, which can be achieved by dismantling sentences with clauses into several simple sentences, downgrading clauses into participial or prepositional phrases, and replacing propositional phrases with participial construction. In terms of semantic compression, Chernov (2004, pp. 116-117) defines this as an act that "reduces the number of iterative semantic components and their configuration in the utterance" to reduce the referred expressions or anaphora, via paraphrasing, generalization (use of hyponyms) and, in more extreme cases, substituting common nouns with deictic pronouns. As for situational compression, which is defined as cases that can be compensated by extra-linguistic elements in the communication, this is considered of limited occurrence and can be inappropriate in official situations. At the same time, Chernov indicates that these different types of compression are interrelated. She also draws attention to the nature of the information to which compression is applicable. That is, only the thematic information can be compressed, while the rhematic information is of a different case.

Alexieva (1983) recognizes that compression can be used to a higher extent in SI due to its unique features and requirements compared with other forms of translation. Alexieva (1983, p. 234) identifies three means for comprehension, namely, omission, substitution and encapsulation. By comparing the terms used by different researchers, it is found that substitution is quite similar to the strategy of approximation by Bartłomiejczyk (2006), hypernyms by Gile (1995a) or generalization by Russo (1989); while encapsulation is similar to summarization by Kohn and Kalina (1996) or abstracting by Viaggio (1992). Therefore, the more commonly terms of omission, generalization and summarization will be used in the following review.

5.2.5.2.1.1 Omission

Omission is not always considered as a strategy, in that omissions are perceived as mistakes due to the deficit in processing capacity, by many researchers (for example, Altman, 1994; Barik, 1994; Cokeley, 1992; Gile, 1995a/2009, 1997; Setton, 1999). Cokeley (1992) determines that all omissions are miscues, and Altman (1994) claims that all instances of omission result in loss or change of meaning.

However, not all omissions are erroneous. Barik (1971) argues that omission of some information that is not disruptive to convey meanings, such as fillers, connectives or articles, can be appropriate. Setton (1999, p. 246) also claims that only omissions resulting from “lapse in self-monitoring due to a distraction from centred attention” are deemed erroneous. Pym (2008) distinguishes valid and invalid omissions, which can be categorized into different types

with varying natures, and claims that their evaluation should be based on both cognitive and contextual considerations.

In the same spirit, researchers have tried to identify various types of omissions, depending on their causes and effects of the omissions. Taxonomies by researchers show that omissions made under different circumstances are not always erroneous (Gile, 1999, 2009; Korpal, 2012; Napier, 2002, 2004; Pio, 2003; Pym, 2008). Barik (1971, p. 201) classifies omissions into four types, of different extent and consequences: skipping omission (omission of single words or phrases functioning as qualifiers, which leads to minimal grammatical structure change and loss of meaning); comprehension omission (omission of larger chunks caused by failure in comprehension, which causes definite loss of meaning and may be manifested in disruption in delivery); delayed omission (deliberate omission when interpreters find themselves too much behind while they could have been able to interpret if the lagging were reasonable); and compounding omission (omission across several clauses where the rest of the information has been combined to be presented). In such a categorization, Barik identifies the possibility that omissions do not always lead to significant loss in information although most omissions are deemed as natural responses when cognitive failure occurs. The same is found in Al-Khanji, El-Shiyab and Hussein (2000), who find that skipping and comprehension omissions are among the most used compensation strategies in English-Arabic SI.

Later, Barik (1994) advances his position on omissions, by emphasizing the active and voluntary omissions made by the interpreters. This is agreed on by Gile (1995a, p. 173), who deems some omissions as being the result of a passive technique adopted by interpreters under extreme circumstances of "high rate of delivery", "high density of information content", "strong accent" or even mistakes by speakers, which cause heavier mental load. Gile (1995a) explains this with his effort model frame for interpreting, concluding that the decision of omission is to deal with the cognitive deficit which is inevitable for interpreters. Such a deficit is either from the complexity of SI as a challenging mental process, described as a "tightrope" to give prominence to the mental saturation close to saturation (Gile, 1995a, p. 159), or difficulties from the text/speech proper due to linguistic or prosodic features.

This position, that omissions can be tactical, is further extended by later researchers such as Korpal (2012), Napier (2002, 2004) and Pym (2008), who all argue that deliberate efforts or choices can be involved in making omissions and that good use of mental resources can lead to proper or successful omission used as a strategy. Napier (2004) analyses omission as a coping strategy in Auslan/English interpretation in a socio-cultural approach. In her study, the assessment of omissions is made through combined product analysis, performance review

interview, and retrospection, with reference to contextual appropriateness; and higher metalinguistic awareness, familiarity with discourse, and relevant knowledge are found to contribute to a better result in the use of omission (Napier, 2004). Napier thus identifies five types of omissions, as conscious strategic omission, conscious intentional omission, conscious unintentional omission, conscious receptive omission and unconscious omission. Among the five types, Napier stresses that interpreters may not be aware of omissions in the interpretation. Otherwise, they can deliberately choose to discard the information due to various reasons, such as failure in receiving the input due to poor reception condition or insufficient understanding, irretrievable equivalents (conscious intentional omission), and realization of information lapse due to long lagging time (conscious unintentional omission). However, there is also conscious strategic omission that is made based on interpreters' linguistic and cultural analysis, which does not lead to loss of meaning. Napier's analysis indicates that not all omission is erroneous, and that interpreters can proactively use omission as a strategy without the dire consequence of significant information disruption or loss. The progress in mastering the skill of making omission can be revealed by analysis of types of omission (Napier, 2005b).

Korpal (2012) sheds more light on interpreters' behaviours of omission through experiment and questionnaire, aiming to find out reasons for omission, factors influencing omission, and group disparities between professionals and trainees in this regard. Korpal (2012, p. 107) analysed areas of interest in the experiment, including repeated words, pure redundancies, cultural allusions, meaningless fillers or discourse markers, and speaker's own assessment. The results show that there is a positive revelation between the delivery rate and frequency of omission for both professionals and trainees. Nevertheless, Korpal (2012) still points out the difference in the quality of omission when the two groups perform SI with a fast delivery rate: that experience and better skills enable professionals to outperform novices in maintaining indispensable information, whereas trainees are more likely to omit informative information than professionals are. This is in line with findings of Gran (1998).

The review above has two pedagogical implications for the assessment of omission in the pedagogical context. The first is that the quality of omission is decided by what is omitted rather than how many omissions occur. The second is that the assessment of omission in the teaching must give account to the skill levels of the students and the specific conditions of relevant tasks.

To help students to make omissions of minimal disruption when omission is necessary, training in some skills and knowledge can be crucial in teaching. Napier (2002, p. 149) defines the awareness of omission displayed by interpreters as being metalinguistic, and quotes Garton and Pratt (1998) to describe such awareness as attention to the "nature, structure and function" of

the language. Napier (2004) further claims that such attention should also include the capacity for processing and selecting information based on its relevance to the context, which all contribute to making proper omissions. In addition, Napier (2005b) finds that conscious omission involves better monitoring and that strategic omission means better awareness of contextual environment and linguistic and topical knowledge, based on which she provides useful suggestions in teaching students how to omit. Pym (2008) also insists that the decision to omit involves both cognitive effort in language processing and use of contextual resources for information selection. In this sense, although omission is categorised as a production strategy, the decision-making process for omission is more associated with the comprehension stage and making omission of minimal disruption depends on efficient information analysis in comprehension.

5.2 5.2.1.2 Generalization and summarization

The other two nominated means of compression are generalization and summarization. Generalization involves replacing a piece of information, normally with less specific information, in the target text, while the core message is retained (Leeson, 2005). Summarization refers to the act where several propositions are merged into a summarized proposition (Tryuk, 2010, p. 190). Although the literature on these two strategies are limited and brief, researchers explicitly recognize the two strategies as a strategic way to communicate complex ideas or dense information more efficiently and effectively (Leeson, 2005; Setton & Dawrant, 2016).

To practice these strategies, didactic suggestions are made in the literature in terms of what to be trained in and how. Setton and Dawrant (2016, p. 337) nominate knowledge and language as two key elements for streamlining the information. In terms of didactic tools, Viaggio (1992) proposes ST-based exercises to develop the relevant skills, including sight-compression and ST-gist. Similarly, Setton and Dawrant (2016) suggest on-line compression and on-line summarizing exercises, which they deem to be particularly useful in practicing the relevant skills and preparing trainees for SI.

Based on the necessity and benefits of compression in interpreting reviewed above, the comprehension strategies can help streamline information to be delivered which can alleviate their cognitive burden. Given that novice students are always at the verge of cognitive saturation, it was hypothesised that these strategies could be an immediate reliever to the novice students, and thus they should be discussed and practiced early in the teaching.

5.2.5.2.2 Reformulation strategies for syntactic linearity

The effect of language combination on interpreting has been studied by many researchers (Barik, 1975; Donato, 2003; Gile, 1997b; Goldman-Eisler, 1972; MacWhinney, 1997). Language divergence between the source and target languages requires language-specific strategies to achieve fluent delivery (see Gile, 1990; Kalina, 1998; Kirchhoff, 1976/2002; Le Ny, 1978). Between English and Chinese, for instance, Wan and Yang (2005) analyse the contrasts in the linguistic structures between the two and their impacts on interpreting, concluding that some remarkable linguistic and structural differences require the use of specific strategies to facilitate production in SI.

After input information is processed and segmented in comprehension, the interrelated processing requirement in production is to link the segments for reformulation (Gile, 1995a/2009). It is argued that to produce the delivery by follow the original sequence of source speech saves processing capacity (Gile, 1995a/2009; Jones, 1998). Such process is called syntactic linearity which is quite similar to the "salami technique" raised by Jones (2014, p. 91), which means that source information is segmented and then linked by generally following the original syntactic order in the source language. It is normally adopted by SI interpreters because syntactic linearity is in line with the rule of minimal effort prescribed in Gile's (1995a/2009) effort model for SI, or the spirit of "minimal program" by Chomsky (1995) which is integrated into SI by Yang (2002). Zhang (2006) also discusses the validity and feasibility of syntactic linearity from the perspectives of linguistics, communication studies and psycholinguistics.

At the same time, syntactic linearity is not applicable to all English sentences when they are interpreted into Chinese. Among the scarce literature on empirical study in this regard, Li (2009) and Wan and Yang (2005) note that certain types of English sentences are suitable for the use of syntactic linearity while some can be challenging, by quoting the concepts of theme and rheme from Halliday's (1967) functional grammar theory. According to them, postpositive adverbial positions, passive voice and subordinative compounds with unmarked theme as the subject in English can make syntactic linearity challenging (Wan & Yang, 2005, p. 76). To achieve the syntactic linearity in English-Chinese SI in these cases while keeping the rendition natural, specific reformulation strategies are required to address the syntactic divergence between English and Chinese as discussed before.

In this regard, Chinese interpreting researchers/instructors provide suggestions on how to realize syntactic linearity in production with smooth transition between English and Chinese

despite structural and morphological differentiations. For instance, Yang (2002, p. 31) advises that the practice of "move, adjunction, copy, merge and delete" in a "minimal program" can be employed to achieve syntactic linearity in SI. Besides this, Lei and Chen (2006, p. 253) suggest that, once chunks are ready after parsing, strategies including addition and transition of parts of speech are useful. Li and Cai (2007) specifically focus on nominalization in English and provide a list of different strategies to realize linearity in Chinese translation, including addition and changing nouns to verbs, adjectives or adverbs. Chen (2011, p. 121) also recommends and explains strategies of addition, transition in parts of speech and structural alternation, as some preferred strategies to achieve syntactic linearity. By drawing on the common elements across these works, the following micro-strategies are selected as effective means of achieving syntactic linearity: addition, transition of part of speech and syntactic restructuring.

5.2.5.2.2.1 Addition

In English to Chinese interpretation, the contrastive features between English and Chinese identified by linguists call for the use of addition to keep the linear interpretation smooth. For instance, one concerned contrastive feature is the use of connectives: that hypotaxis is a norm in English, while parataxis is common in Chinese; and clausal conjunctives are less or not used in Chinese compared with English (Tsao, 1982).

To address this difference associated with connectivity, Chen (2011) suggests that repetition of previous elements, pronouns referring back to previous information, and extra linking devices, can be added in the Chinese rendition.

5.2.5.2.2.2 Transition of parts of speech

Some distinctive features in relation to parts of speech in English and Chinese make transition of part of speech necessary. Although the register influences the lexical composition in English, Chu (1978) hold that English, compared with Chinese that is more dynamic featuring more verbal structures, is more static featuring more nouns structures, in a given text type. Graham (1967) even reports on the omnipresence of verbs in Chinese, by stating that even some words in subject and object positions still maintain the characteristics of verbs. In addition, Tsao (1982) notes that Chinese dose not distinguish propositions, conjunctions and adverbial connectives, as English does. When other different devices appear in English, there must be a way to fit these into the Chinese rendition by changing the part of speech.

As a result, the transition of parts of speech from English to Chinese is required to close the linguistic gaps identified above. In this regard, Chen (2011) and Ma (2013) provide clear

instructions on changing parts of speech, such as nouns to verbs, adjectives to nouns or prepositions, and prepositional phrases to nouns.

5.2.5.2.2.3 Adjustment in syntactic structures

Remarkable features in terms of sentence structure noted by early research necessitate syntactic adjustment in English-Chinese SI. As summarized by Tsao (1982, p. 106), double nominative constructions, relative clauses and passive voice in English are all reasons for concern. In terms of double nominative construction, Tsao (1982) and Wang (1955) observe that it is unique in Chinese, whose corresponding structure cannot be found in English; while English uses propositional phrases, adverbs and relative clauses with possessive relative nouns. Concerning relative clauses, Tsao (1982, P. 107) finds that both English and Chinese have relative clauses, but they appear more frequently in English. In addition, the position of the relative clauses in the two languages is different (Wang, 1955). Wang observes that, in English, relative clauses are normally post-nominal, forming a right branching structure, while the case is the opposite in Chinese, being left-branching with pre-nominal relative clauses. As for passive voice, Xiao, McEnery and Qian (2006) have comprehensively reviewed the phenomenon in the two languages and explain variants of passive construction in English and Chinese based on a corpus analysis. As Xiao, McEnery and Qian note, there is a higher frequency of passive constructions in English than in Chinese, for the former statistically at least ten times that of the latter. They, furthermore, provide possible reasons contributing to this phenomenon.

In view of the differentiations mentioned above, suggested strategies are available to achieve linearity in English-Chinese SI. For instance, Tsao (1982) quotes Yu (1972) and Tsai (1972) to establish that that not all relative clauses in English can be rendered into the form of relative clauses in Chinese. To solve this problem, an English clause is suggested to be transformed into a comment clause in Chinese. Chen (2011, p. 121) also proposes transition techniques in handling formal subjects, in tackling relative clauses by dealing with special linking words for clauses, and in transitions between active and passive voices, etc.

5.3 The research design

Aiming at incorporating the skills reviewed above into CST to extend its role in skill development for SI, a new ST variant, dynamic sight translation (DST), and a cohort of DST-related exercises, were designed within the present research. These exercises were tested, readjusted and redeployed for practice in the teaching from 2014 to 2016 as a part of the

pedagogical AR study for this thesis. Therefore, the research design includes two design components: exercise implementation design and AR design.

5.3.1 The exercise implementation design

The exercise implementation design includes three sub-sections on: 1) the features of DST; 2) the exercise types and deployment; and 3) the measures taken to control the cognitive load. The first sub-section explains the essence of the exercise design in this AR - the dynamic features. It is followed by the second sub-section on how these features are integrated into a cohort of exercises named by the researcher as DST-related exercises. In the third sub-section, two non-skill factors influencing cognitive load, namely interpreting direction and material choices, are discussed in terms of how they are attended to in the design to control the difficulty levels of these exercises.

5.3.1.1 The essential features of dynamic textual display

The DST-related exercises designed for SI skill development and experimented on in this AR distinguish themselves from previous CST–based exercises. The defining difference, among others, is the dynamic textual display achieved by adding new dynamic features. Given the crucial cognitive similarity between CST and SI, that the visual scanning of written texts in ST can be analogous to the thought process in SI (Donovan, 2004, p. 213), new features are added to CST to "share some on-line information processing attributes" (Song, 2010, p. 121) for closer simulation of SI. Among the three features distinguishing CST from SI (Gile, 1997b; Lambert, 2004; Viezzi, 1989a), namely, input modality (visual vs. audial), external time pressure (interpreter-paced vs. speaker paced) and duration of input availability (constant vs. evanescent), the input modality is the only factor that could not be dynamically tweaked by design, whereas manipulation is viable in the other two features in relation to how the input information is presented. With continuous segments of information coming in to be analysed and translated in SI, the input of SI features linear and partial display of information segments and the evanescence of input information, thus requiring simultaneity in comprehension and delivery, and external-paced delivery (Baddeley, 2003; Bajo, Padilla & Padilla, 2000). To simulate these input features, dynamic textual display is adopted in the exercises experimented in this AR, which is enlightened by the innovative method proposed by Song (2010).

In simulating these features of SI, the dynamic textual display changes the static text display innate to CST by employing the appearing and disappearing effects available in the animation setting provided in PowerPoint, to realize the desirable features of ideal ST for SI teaching and discourage backtracking and self-correction, to keep the processing going only forward

(Viaggio, 1995, p. 35). In such design, the two essential new features are the display dynamicity level; and the rate of unfolding and fading texts with time interval between the two actions.

The display dynamicity level refers to the way a text is set to appear and disappear, which simulate SI input to different extents. A text can appear all at once or unfold segment by segment or even word by word; and it can all disappear as a whole at once or fade away gradually. The effects of gradual appearance/unfolding simulate the linear and partial input presentation in SI, and those of disappearance simulate the evanescence of audio input information. In this AR, the display patterns of appearance and disappearance are combined in different ways to generate different levels of textual dynamicity. Set for this AR are three textual dynamicity levels, from 1 to 3, as preliminary, intermediate and advanced, respectively; and the display patterns are sequenced with a view to constituting an increment in the progressiveness of textual dynamic level.

Level 1 is preliminary, where a text appears all at once, and then it starts fading word by word after a certain set time. The purpose is to give students a gentle nudge and urge them to process information linearly with minimal time pressure. Level 2 is intermediate, at which the text unfolds word by word and disappears all at once after the whole text is presented. This is to accustom the students to the add-ons of a progressive presentation of incoming information to the external-paced delivery. The design of this dynamicity level is inspired by an observation that students in CST are inclined to scan ahead the written text for larger meaning chunks, or even further beyond the segment interpreted to collect more information before verbal translation starts (Dragsted & Hansen, 2009). Such an inclination could unnecessarily prolong the EVS in SI, possibly accumulating too much information in the memory for processing while new information keeps coming in. The combination of the progressive display of information and the disappearance of the text shortly after makes excessive waiting before interpreting next to impossible, and thus pushes students to identify eligible meaning units as quickly as possible. Level 3 is advanced, where a text unfolds in a continuum on the screen word by word then gradually fades away a few seconds after (as set by the trainer). The textual unfolding and fading effects simulate the partial availability, continuity and evanescence of the audio input information in SI, pushing students to process forward for delivery with a noticeable presence of time pressure. The three dynamicity levels can be summarized in Table 5.3.

Table 5.3 - Three dynamicity levels with different textual presentation patterns

Dynamicity level	Textual display Action	Display Pattern
Level 1 Preliminary	Appear	All at once
	Disappear	fade gradually
Level 2 Intermediate	Appear	Unfold gradually
	Disappear	All at once
Level 3 Advanced	Appear	Unfold gradually
	Disappear	fade gradually

In addition to the different dynamicity levels, the time intervals between appearance and disappearance and the rates for textual unfolding and fading can all be set at the discretion of the instructor, controlling the external-paced pressure on information processing and interpretation production in line with the extent to which students develop their skills. At externally controlled rates, the students have to adjust their processing methods and speed to the visual reception, with limited flexibility for backtracking reading and correction of interpretation, which are all possible when interpreters are not restrained by interpreting at an imposed speed (Pöchhacker, 2016).

For each dynamicity level, the set rates of and the interval between textual unfolding and fading in the design refer to the suggested input rate in SI teaching. Except for the factor of individual differences in skill and capacity, input rate in the source language is an important factor when simultaneity is involved in interpreting. Both Chernov (1969) and Gerver (1969) found that the fast input rate can largely influence the interpreter's performance, reflected in the fact that the correctly interpreted information is negatively correlated to input rate. Barik (1972, 1973) also confirmed that omission in interpretation is directly associated with input rate. The implication in teaching is that input rate must be well controlled at the initial stage; and Seleskovitch (cited in Gerver, 1976, p. 172) suggested that it be kept between 90 and 120 as a comfortable range for novice interpreters before faster input is introduced in training. Therefore, the rate and interval setting are managed to keep the input rate of a text within this range. As for rates higher than 120 words/minute, they can be used as a tester to find out to what extent students can utilize relevant strategies as the task condition requires, since suggested solution to handle fast input rate is the use of strategies (Chernov, 1969).

5.3.1.2 Exercise types and deployment

The exercises thus designed all incorporate the above dynamic features, under the name of DST-related exercises. They can, however, be divided into two cohorts. One cohort includes non-ST skill-building exercises that incorporate the dynamic feature. This cohort of exercises

is inspired by Baxter (2014), who creatively establishes a simplified teaching tool centred on CST as preparatory training for SI to achieve the introductory/intermediate skill level. In Baxter's (2014, p. 356) design, a type of exercise named "integrated synchronized sight translation" is included, which requires students to fill in blanks in real time in either the source language or target language. With the integration of new elements not traditionally associated with CST, Baxter (2014, p. 357) argues that this type of exercise enables the students to develop simultaneity of input processing and output production in a natural way, while "internalizing a series of key strategies designed to overcome problems arising in the main linear translating process" as required in SI. Meanwhile, Baxter also emphasises that this type of exercise does not exclude the use of other exercises such as shadowing, clozing and memory exercises, so that a larger variety of exercises can be used as supplements to reinforce the skill development. In the same spirit, the dynamic component is integrated into paraphrasing, summarising and clozing in the present design, as dynamic paraphrasing, dynamic summarising and dynamic clozing.

Dynamic summarising and paraphrasing are intended to practice comprehension-related skills. Kalina (2000) argues that receptive competence, i.e. analysis and comprehension of the source text, is the starting point of the SI process, since good comprehension and processing pave the way for the rest of interpreting. Therefore, Kalina suggests that more training focus on the comprehension component at the beginning of the training. Setton (2006, p. 64) maintains that paraphrasing and summarising are good practices for "detachment" techniques in SI, helping students to quickly grasp the meaning and intention from the surface structures of texts. The advantage of summarizing and paraphrasing in developing comprehension lies in that they are "unilingual" or "intra-language" tasks (Anderson, 1994; Malakoff & Hakuta, 1991), meaning that they do not require the detailed transfer of source information into the target language and thus allow students to allocate more mental resources to information analysis, and to consolidate the relevant skills. This point is also well accepted by Baxter (2014) in his design of integrated synchronised ST exercises.

For the present design, the acknowledged value of paraphrasing and summarising in practising comprehension skills is supplemented by the dynamic feature, which brings in a new dimension of time pressure to make the exercises more pro-SI. These integrated exercises are planned for the first two or three weeks of teaching, with texts disappearing gradually, either chunk by chunk or word by word, to help students to get used to the linear and quick comprehension resembling SI in terms of the tempo.

Dynamic cloze exercise is included too for the practice of anticipation strategy at the comprehension stage. By function, conventional cloze exercise is used as both a testing and a pedagogical tool. For testing, Taylor (1953) first designed the cloze test for a readability test and later used as a reliable tool to gauge reading comprehension (Anaya Dávila Garibi & Lopez Islas, 1990). As a didactic tool in general language teaching, cloze has been endorsed with evidence from cognitive psychology that it is conducive to improving skills in detecting and using contextual clues, both syntactically and semantically, for better comprehension (Kennedy & Weener, 1973). In interpreting, Pöchhacker (2016, p. 118) notes that SynCloze in the aptitude test can measure subskills such as "online comprehension, oral expressional fluency constrained by contextual appropriateness, and fast reaction times". The didactic value of cloze is also acknowledged by other researchers (e.g. Chernov, 1994; Baxter, 2014), who confirm that cloze increases students' awareness of inferences from linguistic, cognitive and pragmatic clues from surrounding segments of texts in SI. The necessity of using cloze in SI teaching is stressed due to its value in practicing inference, the foundation for anticipation as a crucial strategy in SI researchers (Andres, Boden & Fuchs, 2014; Baxter, 2014; Lambert, 1988, 1989; Setton, 2008). After all, cloze urges the students to predict the direction of subsequent information based on the event context and wider general knowledge (Baxter, 2014).

To take the use of cloze further in SI pedagogy, the dynamic features are added to make cloze dynamic in the present AR. With the external time pressure added, inference skill for anticipation strategy used in SI can be enhanced. One detail of the design to be clarified, however, is the way the cloze is constructed, i.e. what contents are deleted and replaced by blanks. After reviewing all types of cloze, Chapelle and Abraham (1990) list two main types, with contrasting rationales, of deletion choice: fixed-rate and rational deletion. The former means to turn words into blanks at a regular interval (for instance, every 10th word); while the latter chooses blanks considering the clausal structure, inter-sentential cohesiveness, and textual cohesion. To make the cloze construction reflect the requirement of inferencing on clues at various levels, the second type of cloze is adopted in the design for this AR. As such, dynamic cloze is specifically for the practice of anticipation strategy in class. Besides this, it is also included in the final DST test as an assessment of students' skill development in anticipation.

The second cohort of DST-related exercises is DST exercises, which have various dynamicity levels and input rates added to CST, in that ST featuring time pressure and inadmissible correction is suitable for training of expressional flexibility, monitoring capacity, memory and planning in production (Kalina, 1994, p. 222). Thus, designed to possess these features, the DST exercises are introduced after the non-ST dynamic exercises in the teaching.

5.3.1.3 The management of cognitive load in designed exercises

The overall principle for the exercise design and sequencing in the present study is in line with the cognitive load theory (CLT), to make complex learning easier for novice learners by designing measured tasks. According to Van Merrienboer and Sweller (2005), complex skills are characteristic of simultaneous and interactive cognitive elements, while CLT-based instructions can provide a progressive instructional method for the early stage of learning, with consideration of associated cognitive load. To reduce the interactivity of elements, the instructional approach starts from tasks involving a minimal number of interactive elements at one time, gradually progressing to tasks with increasing numbers of elements at a later stage of learning.

A similar instructional approach, featuring gradual increase of cognitive load, has been endorsed and adopted in instructional design for SI skill development. Gile (1995a) supports this approach by stating that acquisition and implementation of more advanced skills require simpler skills to be acquired as the prerequisite. As a good example of such practice, Patrie (2004) reports the teaching design devised and documented by the Conference of Interpreter Trainers (CIT) as featuring such a progressive arrangement of skill teaching. Patrie (2004) acknowledges that SI is a very complex skill that must be developed through a careful sequence of learning activities, in the way that simpler skills less demanding on cognition should be mastered before more difficult ones. To highlight the importance of sequencing of tasks in the SI teaching, Patrie (2004, not paginated) states on the AIIC webzine[11]:

> Isolating specific skills and learning them one at a time is the best approach to learning complex new skills. Learning new skills one at a time allows mastery of individual skills and a feeling of success. Gaining control over components of the interpretation process can assist in developing simultaneous interpreting skills because appropriate practice helps to routinize these complex skills.

CIT's teaching design has been well assented to by interpreting researchers and instructors. Van Lier (2008) comments that two main features in such teaching design have proven effective. Firstly, the difficulty level of exercises gradually increases. Secondly, sequential exercises involve the continuity directed by the pedagogical scaffolding, namely tasks coming in

[11] Accessed from https://aiic.net/page/1513/sign-and-spoken-language-interpreting-a-componential-a/lang/1.

sequence including repetition of elements, to keep the learning consistent and to provide students with a sense of security.

To emulate the identified successful features of the CLT-directed instructional design in interpreting teaching, the exercise design and sequencing in this AR maintain control of the cognitive load by taking two measures. Firstly, interactivity among the skill components shall be initially kept to a minimum by simplifying the tasks, and new skills shall only be introduced after easier skills have already been practiced in previous tasks. This is implemented through the two cohorts of exercises presented earlier. Secondly, factors that are not in the skill domain but may cause extra cognitive loads shall be managed to control the difficulty level. To this end, specific consideration is given to two factors: the language direction and textual materials. With regard to the language direction, only B-A language is included for the exercises at the early stage of the learning. For the textual materials, the features of topics and text types are controlled to avoid excessive cognitive overload. The following sections expound why and how these two factors are attended to in the design.

5.3.1.3.1 Language direction - B to A exercises only

To decide the interpretation direction for exercises at the initial stage of SI learning, a critical factor to be considered is the characteristics of the novice students, in addition to the reviewed influence of language directionality on the performance (see Section 3.4.2). For students with limited skills and expertise in SI, the direction that bears the lighter cognitive load meets the requirement of the CLT-based instructional principle. In such a spirit, only B to A exercises, i.e. English to Chinese exercises, are included in the exercises for the present research, since substantive evidence from the literature shows that B-A direction is both cognitively and linguistically easier for the beginners of SI (Chang, 2005; Darò, Lambert & Fabbro, 1996; Donovan, 2005).

Cognitively, Nicholson (1992) provides two reasons for the advantages of interpreting into A language for novice interpreters: less attention required to syntactic structures in production and less monitoring required for prosodic features. Subscribing to this proposition, Bialystok (1994) and Ullman (2001) agree that production in A language is more automatic, requiring less monitoring effort and thus being less taxing on the cognitive resource. Donovan (2005) elaborates on the support for B-A direction for novices especially in SI, maintaining that, while difficulties exist in both directions, comprehension difficulty is dominant in interpretation into A language, while production difficulty is dominant in interpretation into B language. Donovan argues that the latter case is more challenging to handle for SI novices, since the deficiency in

B language leads to less flexibility and accuracy in search for equivalents, consuming extra cognitive resources for the production effort. The consequence is the depletion of the share of cognitive resources for other efforts in SI within the finite total cognitive resources available at a given point, which can lead to saturation of the cognitive resource (Gile, 1995a/2009). Acknowledging this view, Kurz (1992) uses physiological data to prove that B-A interpretation is cognitively less demanding. In her experiment, Kurz recorded and measured brain activities of multiple interpreters when they interpreted into both A and B languages. The findings show that all mental activity images for B-A interpreting showed fewer brain areas activated than those in the other direction, indicating that less mental resource is required to interpret into A language. The same finding is affirmed in other experiments by Rinne et al. (2000), who capture the EEG of cerebral activities in interpreting into different directions, proving that more extensive brain areas associated with language functioning are activated in A-B SI. All evidence corroborates that B-A SI is less cognitively consuming, making SI easier to perform for SI novices regardless of other factors.

Linguistically, as the literature shows, the deficiency in B language makes B-A interpreting more challenging at all linguistic levels: lexical, syntactical and semantical. Lexically, Kroll and Steward (1994) raise the concept of asymmetry of translation, which means that better proficiency in A language makes the lexical and conceptual links between the source and target languages stronger in B-A interpreting, leading to a higher speed of lexical retrieval of equivalents in A language and thus a faster interpretation. De Bot (2000) tests this argument in an experiment and finds that participants of various interpreting proficiency levels all show faster word translation in B-A direction. Similarly, Christoffels (2004) identifies more efficient responses in A language in his picture-naming experiment. Although these experiments were all conducted with words as the processing unit, the conclusion can extend to higher levels since the speed of language perception and production is largely decided by the efficiency of lexical access, because both perception and production are mainly lexis-based (De Bot, 2000). Syntactically, less automatic production in B language imposes more syntactic challenges to interpreters (Bialystok, 1994; Ullman, 2001). Regarding this aspect, Seleskovitch (1999) explains that a weaker B language makes interpreters more vulnerable to syntactic interference from A language in the production of B language, leading to a higher chance of syntactically-inappropriate delivery. Semantically, as Darò et al. (1996) find, when interpreters interpret into their B language, regardless of their interpreting proficiency levels, more serious linguistic mistakes are made, which eventually leads to either semantic distortion or mistranslation. Therefore, professional interpreters are advised to accept the fact of lower proficiency in B language and to take more notice of the production if they are required to interpret into their B

languages (Jones, 1998). In the same line of argument, novice students with lower skill levels can be more vulnerable to the impact of B language deficiency, since such linguistic imbalance applies to interpreters in general.

In terms of language-specificity, empirical evidence is available to render support for the English to Chinese direction at the initial stage of SI learning. Chang and Schallert (2007) experimented to study the impact of directionality on SI interpretation between Chinese and English. The subjects of the experiment included professional interpreters and advanced SI trainees, who were asked to interpret in both directions. The researchers analysed all interpretation performances by focusing on two aspects: "a propositional analysis of contents and an error analysis of their linguistic quality" (Chang & Schallert 2007, p. 160). The results show that, for subjects who were Chinese native speakers with English as their second language, their performances were better in the B-A task in all parameters that the researchers examined. The subjects were also interviewed for their preference of direction. The subjects with Chinese as A language generally reported that the comprehension advantages in A language and production disadvantages in B language could not offset each other. Instead, the disadvantages of English as B language in production prevailed over the advantages of Chinese as A language in comprehension, making A-B interpreting more challenging.

Based on the reviews above, it is concluded that B-A SI should be easier than A-B SI, with other task conditions being equal. Donovan (2002) summarises that the ease of self-monitoring, better language ability to interpret culturally based information, and greater facility for reproducing equivalent registers in A language, all contribute to the long-standing preference for B-A interpretation. Therefore, in the exercise design for this AR, only B-A direction, namely English into Chinese, is adopted. What needs clarifying is that the priority given to B-A exercises at the early stage of SI learning in this teaching design does not indicate the exclusion of A-B exercises at a later stage of learning or in other exercise components.

5.3.1.3.2 The sequencing of textual materials

The choice of texts for the exercises in this AR is primarily directed by the distinctive purposes of including ST in SI teaching compared with those in students' previous non-SI interpreting training. In the Australian context, CST is included in the interpreting curriculum because it is a task component in the NAATI professional interpreter accreditation exam[12], which reflects the market demand. As reviewed in Burley (1990), in the community interpreting in Australia,

[12] See https://www.naati.com.au/media/1451/accreditation_by_testing_information_booklet.pdf.

the texts requiring CST are normally written documents such as prescribed instructions, forms, fact sheets, manuals, contracts, or certificates, just to name a few. Accordingly, the CST tasks in NAATI accreditation test are set to embody the similar textual features as in real practice in terms of the topic areas and the language styles. Regarding the topic areas, they are mainly information statements from the common community settings as reviewed by Burley. As for the language style, texts for CST in NAATI tests are adapted from written documents initially compiled for a reading purpose and thus showing distinctive written style. In comparison, ST in this exercise design is not practiced for its own sake. Instead, it is designed to be a didactic tool functioning as a stepping stone to developing SI skills accordingly, choices of topics should reflect the topics in SI settings. Besides, registers and language styles are expected to be different with the change in the social encounter (Halliday, 1964).

Based on such differences in purpose of use, the texts for exercises in this AR are selected and, more importantly, sequenced in the order of difficulty level in line with the CLT principal of progression in teaching. Specific to interpreting pedagogy, what should be stressed is that the exercise materials must be arranged from easier to harder (Andres, 2014), and texts should be arranged in progression to be skill-appropriate (Moser-Mercer, 2005, p. 65). This means, as explained by Kautz (2002) quoted in Andres (2014) that selected texts need to be properly sequenced to enable students to develop skills and abilities step by step. Based on textual features of texts typical of the conference setting (see Kopczynski, 1980), two types of linguistic features are carefully measured in the present design: topics and text types; and levels of preparedness and the associated different language styles. For each, the progression principle is integrated and manifested, as discussed below.

5.3.1.3.2.1 Topics and text types

In the exercise design, the texts were selected and sequenced in reference to topics and text types typical of conferences, being conference speeches on topics of a specialized nature which are professional, scientific, political etc. (Kopczynski, 1980). The topics in the conference, as Alexieva (1997) argues, are more likely to be about objective issues that involve domain-specific knowledge, but normally are not culturally-specific. If speeches are culturally-specific, they increase listening and analysis efforts for interpreters (Andres, 2014). Overall, speeches about specialised topics for conferences constitute an appropriate pool of textual sources for SI teaching, while speeches vary in difficulty for interpreting, depending on the extent of speciality and cultural specification.

Noting that these factors influence difficulty levels of texts for interpreting, Setton (2006) suggests criteria for progression in text choice for SI teaching, although admitting that this is quite difficult in practice. Firstly, the topics should start from current affairs and gradually move to more technical materials after some time. This suggestion is consistent with the recommendation by Patrie (2000) that topics familiar to students can be a good start in SI practice. Secondly, selection of text types should commence from descriptive texts such as stories and gradually transit to argumentative and discursive materials (Setton, 2006).

To achieve both relevance to the conference setting and compliance with progression in selecting and sequencing the texts for SI teaching, three rules are followed in the present research design based on the findings and suggestions reviewed above. Firstly, the texts are adapted from speech transcripts delivered at real conferences and the topics are arranged from general to specific. Familiar and non-specialized topics, such as education and common international concerns (such as peace and climate change), precede more specialised and technical topics (such as economics, finance and technology). Secondly, culturally specific speeches are avoided, to reduce extra difficulties to the students in both comprehension and production. Thirdly, the types of speeches gradually progress from being descriptive to argumentative.

5.3.1.3.2.2 Preparedness and associated textual features

The linguistic features of texts are also associated with the level of preparedness (Andres, 2014) that must be considered when exercise texts are chosen and sequenced. In quoting Barik (1972, 1973, 1975), Kopczynski (1980, p. 16) categorizes conference speeches into three groups based on the level of preparedness: unprepared speeches, semi-prepared speeches with notes, and well-prepared written speeches intended for oral delivery; of which the last one is claimed to be the most common at a conference. Such a categorisation of speeches can find its correspondence in the speech delivery mode categorisation by Lehtonen (1982), who classifies speech types into, impromptu speech as unprepared, extemporaneous as semi-prepared, and delivery with memorisation and manuscript as prepared. According to Andres (2014), different levels of preparedness can lead to variation in both schemata and language styles, further influencing the cognition demanded in interpretation.

Firstly, various levels of preparedness result in different schemata which have impacts on the ease of comprehension for interpreters (Alexieva, 1991). Schemata are defined as different overall structures of texts under which ideas and information are organized (Kintsch & Van Dijk, 1978). The schema of conference speeches, which are normally semi/prepared speeches,

is defined as systemic and organised in structure and contents, with better conciseness, cohesion and precision (Adamowicz, 1989). For the sake of interpreting, Adamowicz (1989, p. 156) claims that prepared speeches are more likely to show a "distinct and highly standardised narrative schema"; and Nida (1964) argues that such a schema of prepared speeches facilitates the comprehension of interpreters. Hönig (2003) even adds that a good and neat structure of texts can be more important than familiarity with topics, for comprehension. The implication for the choice of texts in teaching is that prepared speeches organised with clear structure and logic should be selected for exercises.

Secondly, the level of preparedness relates to different language types, i.e. spoken or/and written (Alexieva, 1991). In a planned speech for a conference, due to the formality involved, written or literate features are naturally expected (Le Féal, 1978). Different language types involve different lexical and syntactical features, and these features impose differing impacts on the interpreting process (Chafe, 1982).

At the lexical level, the differences lie in the lexical composition and density. Lexical composition is defined as the ratio-token: the ratio comparison of words of various parts of speech.by Chafe and Tannen (1987) quoting Mann (1944) and Fairbank (1944). Fraisse and Breyton (1959) found that the verb/adjective ratio is higher in spoken language while nominalisation is more characteristic of written language (in Chafe, 1982). To find the lexical differences between these language types with some definite variables, Drieman (1962) designed an experiment with four conditions: spoken and written data are on the same topics; data are collected from the same subjects; circumstances for data collection are the same for all subjects; and data comparison is made with the entire spoken or written communication rather than segments, so as to avoid there being different amounts of detail in segments. The results showed that more multisyllabic words, more attributive adjectives, and a wider range of vocabulary are typical of written texts, which was proven true in his other studies involving different languages. Besides this, DeVito (1967) outlined some features of written texts, focusing on higher verbal density and higher level of abstraction in verbs (in Chafe & Tannen, 1987). Regarding lexical density, Halliday (1989, p. 67) defined this as the ratio of lexical numbers to the number of clauses, i.e. the number of lexical items per clause; and found that lexical density is higher in written language than in spoken language.

At the syntactical level, difference is found in length and complexity of sentences between written and spoken texts (Redeker, 1984), although there is no consensus for how they differ from each other. In terms of sentence length, longer stretches per unit of time are typical of spoken language (Horowitz & Newman, 1964). In terms of complexity, two modes of language

show complexity in different aspects. At the clausal level, it is held that written language is simpler in that the written language features strutually simpler and fewer clauses (DeVito, 1967; Halliday, 1979) despite higher more often used subordinate clauses (Kroll, 1977). Halliday (1979) quotes different focuses in two language modes to explain such this: spoken language tends to focus on stating processes, so that clauses are more suitable; whereas written language is used to display facts, so that nominal groups are more frequently used, making the syntactic structure shorter and simpler. However, written language can be more complex when different units of analysis is adopted. For instance, instead of having professors as the subjects and clauses as the units for analysis, O'Donnell, Griffin and Norris (1967) studied the sentence complexity among school students at third, fifth an deighth grades based on comparing T-units (which include an independent clause and the syntactically related dependent clause if available) in the two modes of language. They discovered that higher level of literacy in the school students leads to longer and more complex T-units in written language. Also having T-unit as the analysis unit, O'Donnell (1974) conducted another comparative research on oral answers in a television program and column article in the newspaper on the same topic from the same person, obtaining the same result that longer T-units and higher percentage of T-units with dependent clauses were found in written language.

Later researchers argued that the distinction between spoken and written modes is not rigidly exclusive but fluid under different contexts, with an integration of features under some circumstances (Chafe, 1982; Chafe &Tannen, 1987; Tannen, 1980). In a comprehensive review of language features for spoken and written modes, Chafe and Tannen (1987, p. 390) point out that "different conditions of production as well as different intended uses foster the creation of different kinds of language". They further argue that, thanks to literacy, different genres arise other than being rigidly distinctive as purely spoken or written discourse. They coined the terms "colloquial forms of writing" and "literate forms of speaking" (Chafe & Tannen, 1987, p. 391) to show such integration. Biber (1987) also argues that it is impossible to apply a set of differences to generalize what differs written from spoken English. Instead, dimensions of variation and the differences appear to be minimal in some cases, in Biber's extensive corpus study which compares lexical and syntactic features of a wide variety of discourses in English. Gran (1998) reports that prepared speeches to be read aloud are nowadays common for conferences; while scripts for prepared speeches are either "colloquial forms of writing" or "literate forms of speaking" as defined by Chafe and Tannen (1987, p. 391). In the same spirit, Collins and Michaels (1980) have found that, although delivered orally, prepared speeches reflect features typical of written language, such as frequent use of the nominal structure.

Shlesinger (1989), therefore, maintains that texts delivered orally can show different degrees of orality or literacy, which forms the oral-literate continuum.

Linguistic features associated with different positions along the oral-literate continuum have impacts on SI quality due to possible difficulties induced (Gile, 1999; Le Féal, 1978). In quoting psycholinguistic evidence, Macdonald (1997) argues that the syntactic features affect the cognitive load in comprehension. Gile (2008) also maintains that some linguistic features of speeches typical of formal and literate styles can lead to heavier cognitive load at the global level, such as high information density, frequent presence of technical terms, and numbers and names, which largely overlap with difficulty parameters internal to texts listed by Andres (2014). Syntactically, these features typical of formal and literate styles in clauses, sentences or groups of sentences can make the task of interpreting challenging due to the continuous processing of sequential sentences in SI (Gile, 2008). The processing of the previous sentence places pressure on the processing of the following sentence in a way termed "imported cognitive load", especially when sentences involve features such as dense information, lengthy sentences and embedded structures in SI (Gile, 2008, p. 61).

Therefore, syntactic features should be controlled so as not to "reflect all the pitfalls of real-life interpreting but be carefully adapted to students' abilities and needs" at the initial stage of SI teaching (Kalina, 2000, p. 21). Kalina specifies that some texts may need editing and simplifying in some parameters, such as information density, lexis and grammar, so that trainees can develop skills in steps and gradually work towards interpreting speeches within a highly formal register and with more textual difficulties. Therefore, the texts used for exercises must present appropriate syntactical features and complexity with reference to students' skill levels. By so doing, the features likely to be causing extra cognitive load will not be included too early or appear in multiples at the initial stage of the learning.

Based on the reviews above, the register of speeches selected for the present study starts from a less literary and progresses to a more literary style. Accordingly, the associated syntactic features of texts for the exercises in the present research gradually grow more complex in terms of information density, sentence length, and clause types etc. Some chosen speeches are edited to manipulate the linguistic features according to the learning needs. Texts for the class exercises in this AR can be found in Appendix 1.

5.3.2 The AR design

This AR project involved three rounds of action spanning over three academic years from 2014 to 2016. The teaching and learning action took place in the first semester of each academic year and the same timeline was followed in the three rounds.

A one-year cycle included three sequential tests, pre-test, mid-test and final test, and the actions implemented between each test. Supplemented between every two tests were the subsequent questionnaire and/or interview, thus constituting a micro-cycle of action. Therefore, there were two micro-cycles in each yearly cycle of action. The three tests, along with three questionnaires and one interview as opinion collection tools, were used to profile the skill status of the students, with a view to identifying their skill deficiencies and monitoring their skill development at different stages. After each test, remedial actions were taken, during which the researcher used various DST-related exercises as intended solutions to address those skill deficiencies discovered from the test. The efficacy of these exercises were assessed in the following test, which, in turn, continued with another new micro-cycle of identification of skill deficiency, remedy actions and testing of effectiveness.

To frame these activities in one semester, a timeline for weekly arrangement was made. Upon the commencement of each semester, an information session was run to recruit newly enrolled students as potential student participants for the research. All relevant information, including the nature of the research, the obligation and privilege of student participants during the research and, in particular, the principle of voluntary participation, were all imparted to and acknowledged for students' consideration. Consent forms (see Appendix 2) were signed if students agreed to participate.

The first week was an induction session, where the arrangement for the exercise types to be practiced was introduced and the rationale behind these exercises explained. In addition, a pre-test was conducted to record student participants' skill status. The teaching was officially conducted from Week 2 to Week 12, with 11 sessions in total and each taking up one hour out of the four hours allocated to TRAN 865 per week. In this one-hour teaching session, DST-related exercises were practiced and subsequent discussions held in class. Mid-term and final tests were conducted in Week 7 and 13, respectively, immediately followed by a questionnaire and/or an interview.

The overall timeline for each action cycle is presented in Table 5.4. The teaching arrangements, including session allocation, topics of exercises, exercise types and targeted skills, and other in-class activities, are listed.

Each round of action followed this general timeline. Implemented in an AR during the three years, however, the number of sessions allocated to each type of DST-related exercises and the progression of dynamicity levels may vary from year to year, depending on specific circumstances such as the needs and progress of the students in that particular year; or based on reflection from the previous round of action. The adjustments made during the actions are reported in the following chapters, together with the presentation of action findings.

Table 5.4 - Initial teaching arrangement of the semester

Time	Main skill in exercise	topics	Exercises and activities
Week 1		Education	1. Introduction of exercises and class arrangement 2. Pre-test with conventional ST and first questionnaire
Week 2	Comprehension & simultaneity	Social media	1. Comments of pre-test 2. Dynamic Summary at Level 1 dynamicity
Week 3	Comprehension & simultaneity	Education	Dynamic Summary and dynamic paraphrasing at Level 1 dynamicity
Week 4	Simultaneity & strategy-omission/summarization/ generalization	Economy	Dynamic paraphrasing and DST with preparation at Level 1 dynamicity
Week 5	Simultaneity & strategy-anticipation	Economy	DST with preparation at Level 2 dynamicity
Week 6	Omission/summarization/ generalization & anticipation	Trade	1. DST at Level 2 dynamicity 2. Assignment for mid-break
Week 7		Economy	1. Mid-test: DST at Level 3 dynamicity 2. 2nd questionnaire
Week 8	segmenting	Humanity	1. Feedback of mid-test 2. DST at level 3 dynamicity
Week 9	segmentation Syntactic strategies-1	Human pace	DST at Level 3 dynamicity
Week 10	Syntactic strategies-2	Technology	DST at Level 3 dynamicity
Week 11	Synthesis of strategy use	Energy	DST at Level 3 dynamicity
Week 12	Synthesis of strategy use	Culture	1. DST at Level 3 dynamicity 2. 3rd questionnaire
Week 13		Gender equality	1. Final test (DST at Level 3 dynamicity and SI) 2. Interview

5.4 Data overview

5.4.1 Data collection and analysis

This section specifies data-related design for the present study, including data sources, data types, time points of collection, and tools for collection and analysis based on those suggested for pedagogical AR by AR researchers.

Data were collected from both the researcher and the student participants at different stages of each round of action. Data collected from the researcher comprised weekly teaching journals, which recorded the reflection and comments of students' trajectory of skill development, and researcher's reflection on the teaching and interaction with the students; and an analysis of student participants' performance, including that of assigned tasks and three tests as the pre-test, mid-test and final test, respectively. Data from the students comprised their constant feedback through their comments on and experience with the DST-related exercises, either verbal or written, and the students' portfolios including their interpreting recordings and their own retrospection in some tasks. These data from the students were mainly collected via tools of three tests including three questionnaires arranged at the start, middle and end of the semester and an interview at the end of the semester in each round.

All the designs were to manifest characteristics of AR and better server the purpose of pedagogical AR. The data analysis in this AR involves two aspects: methods of analysis and tools employed for analysis. For this pedagogical AR, various analysis methods and tools were used to make both quantitative and qualitative analysis.

Firstly, grounded theory was adopted as one data analysis method as suggested by Norton (2009), because the incorporation of the grounded theory under the framework of AR can reinforce the strength of AR. The grounded theory is defined as a methodology "for developing theory that is grounded in data systemically gathered and analysed…[t]heory evolves during actual research and it does this through the continuous interplay between analysis and data collection" (Strauss & Corbin, 1994, p. 273). As such, the two main features attached to the grounded theory are summarised accordingly as being interactive and fluid. It is interactive in that theories derive from data that are systematically collected from the multiple interactive actors and interpretively analysed; and it is fluid in that processes in provisional contexts with different situations are acknowledged and attended to. Both features lead to openness in the exploration of applicability/inapplicability between evolving theories and different situations. By incorporating the grounded theory into the research design, Lingard, Albert and Levinson (2008) maintain that such research would involve iterative cycles in which multiple cycles of simultaneous data collection and analysis occur. Results of analysis in one cycle immediately inform the data collection in the next round. During such analysis, the constant comparison is essential: a comparison between the detected point of interest from previous data and new data for corroboration or counter-evidence. Strauss and Corbin (1994) expand the function of such comparison by emphasising the interpretive nature embedded in the data analysis and mandating constant questions and reviews of researchers' own interpretation at every step of

the inquiry. Based on the proposition of the grounded theory, Poonamallee (2009) argues that the thrust of grounded theory meets all the requirements of AR.

In this pedagogical AR project featuring constructivist thinking, the interactivity and fluidity of grounded theory are also relevant. Improved learning as a key principal in the constructivist learning process requires different perspectives of thinking – at least from instructors and learners (Takeda, 2010). Bredo (1994) assents that teaching-learning takes place in a participation framework, under which not only individual minds are involved but also the mediation of different perspectives from all participants. As a result, in addition to an understanding of different perspectives in learning, Bednar, Cunningham, Duffy and Perry (1992) argue that convergence and divergence among different perspectives must be detected through comparison to evaluate the evidence better. The grounded theory-based analysis aligns with the spirit of constructivist education orientation and dynamics of AR method , in that constant data comparison and reference to changed context are required by grounded theory.

As for tools available for the data analysis in the pedagogical AR, Norton (2009) provides a useful toolbox of analysis methods. Since the multi-methodological approach matches the immediate goal of pedagogical AR - to modify the teacher-researcher's own practice - the variety of data types collected require different analysis tools (Norton, 2009, p. 115). Accordingly, Norton provides vigorous accounts of data analysis tools for qualitative and quantitative data analysis and reminds that they are not necessarily dichotomous but have some crossover.

In qualitative data analysis, Norton (2009) lists four types of qualitative analysis for different analysis purposes. The four types comprise grounded theory to form theories or hypotheses from data in practice; discourse analysis to uncover underlying meanings of speeches or texts; semiotics to discover meanings from signs such as images, sounds or gestures; and interpretative phenomenological inquiry to understand individuals' experiences and perspectives.

Among the four recommended tools, thematic analysis and content analysis are deemed to be particularly applicable to the qualitative data analysis in the present research. Norton (2009) also highlights these two as the most used for and closely associated with pedagogical AR. For thematic analysis, the focus is to search for patterns from data by identifying and categorising repeated themes emerging, for instance, among interview data. Regarding the content analysis, this penetrates into produced contents during research, such as submitted assignments. One merit of content analysis is that "it combines both the search for rich meanings and deeper

understanding of the topic with the ability to carry out some very basic quantitative procedures" (Norton, 2009, p. 123). Both methods are adopted in the analysis in the present research. For instance, theme analysis was used to analyse the data from questionnaires and interview, while the content analysis was used to analyse the student participants' task performance in the form of the recording and transcripts.

Meanwhile, Norton (2009) also suggests some simple tools for quantitative analysis. By using different statistical calculations, two types of statistics can be produced, i.e. descriptive statistics and inferential statistics. For descriptive statistics, calculation results can be produced to show an overall tendency, variability or frequency. For inferential statistics, these are mathematical testing results to prove correlation or difference among prescribed variables. Between these two types of statistics, Hanson and Mellinger (2016) maintain that descriptive statistics can be considered as the first mathematical step to provide a picture of basic properties of data. They also list five prescriptive tools, namely, frequency, the central tendency, the variability, the skewness, and the kurtosis; and acknowledge their respective values in translating and interpreting studies (Hanson & Mellinger, 2016, p. 40). In the present research, only descriptive statistics are employed given that the data collected and analysed in this research are not intended to statistically test the correlation of variables but to show some brief characteristics of the data. Therefore, only simple calculations of frequency and percentage are involved in the qualitative analysis in this research.

The data collection and analysis design as reported above was carried out across the period of three years from 2014 to 2016, and are summarized in Table 5.5.

Table 5.5 - Data collection tool and analysis methods for two data sources

Data source	Data collection tool	Analysis method	Analysis type
Students participants	Three questionnaires	Content analysis Thematic analysis Grounded theory	Qualitative
	One interview	Content analysis	Qualitative
	Portfolio of exercise performance and reflection	Content analysis	Qualitative
Teacher-researcher	Weekly teaching notes	Content analysis	Qualitative
	Test performance analysis	Content analysis Thematic analysis Grounded theory Descriptive statistics	Qualitative & Quantitative

5.4.2 Data synopsis

As planned, in each of the three action cycles from 2014 to 2016, the data were collected and analysed. Before the detailed report on the data, this section shows in general the data scale of this AR and how the data-related actions manifest the characteristics of AR.

5.4.2.1 Data scale

A summary of the student participants over the three years is presented in Table 5.6, including numbers of student participants and gender distributions. The number of the student participants varied each year; while the female student participants were consistently dominant in number.

Table 5.6 - Participant numbers and gender distribution for 2014-2016

Year	Student Participant number	Gender distribution	
		Male	Female
2014	7	1	6
2015	11	3	8
2016	6	2	4

5.4.2.2 Data manifestation of AR characteristics

Data collection and analysis in this AR were designed to manifest the characteristics of AR. Collected in a cyclical manner from collaborative and multiple sources, and analysed and reflected upon to inform new rounds of action to make refinements and changes, all data serve the purpose of AR, to enquire in action for changes.

Firstly, the disruptiveness of AR is reflected in the purposes of data collection and use: for intended changes in previous teaching practice of using ST in SI teaching. The status quo is that CST has long been used in SI teaching but normally on an ad-hoc basis. Based on literature and the researcher's observation, the unsystematic use of CST has restrained ST's due pedagogical value in SI regarding skill development and transfer. The present research aimed to experiment with new ways of using ST to develop at least some uncovered skills of CST in transition to SI. Serving this purpose, the data were collected to evaluate the effect of DST-related exercises as the new tool tested in the action. Besides this, the use of the collected data sustained the momentum of change during the whole AR: findings from the data in one round of action were used to inform changes in the following round of action. From 2014 to 2016, it was a constant case that changes were made to the teaching arrangement or data collection details, in 2015 and 2016, to accommodate teaching needs better or focus the exploration on specific areas, largely informed by the findings in the previous round(s) of action.

Secondly, the data in this AR are locally-situated and democratic in that the data were collected from the natural classroom teaching and the analysis is subject to the researcher's interpretation with reference to all the factors constituting the specific context for each year. To be more specific, all participants' (both students' and the teacher-researcher's) subjective experiences and views were collected as the valued elements constituting the context every year. To interpret the data collected, the researcher acknowledged specific contextual factors that both constituted and impacted on the data, such as pedagogical adjustments, emotional factors and individual features of students. The researcher is also aware of possible personal bias or limitation in observation and interpretation, since AR researchers must consider and acknowledge personal interpretation and bias as an important part of the research (O'Brian, 1998).

Thirdly, the collection and use of data in the three years were well suited to contribute to the realization of the upward cyclicality in AR, in that pedagogical AR is filled with unpredictability and variations from plans, requiring multiple cycles of exploration, and these iterative cycles should feature adaptive changes and refinements instead of simply copying the previous cycle (Kember, 2000; Norton, 2009). This proposition is proven true in this AR: the students with different characteristics reacted differently to the planned exercise design, and unexpected issues and problems were gradually revealed during the execution of the original plan and from the findings of data analysis. As responses to the unpredictability, adjustments to teaching and assessment plan were made in 2015 and 2016, based on the findings from the previous year and the students' instant feedback, including changes in exercise sequencing, exercises progression and test formats in that particular year. Additional data generated after the adjustments complemented the understanding of the effects of experimented tools. In addition, guided by grounded theory, hypotheses about the functions of DST-related exercises in SI were formed from the interpretative analysis of the first round of data in 2014. Then, the iterative cycles of AR provided abundant opportunity to verify and modify those hypotheses in different contexts. With new data generated from the teaching and learning interaction in different contexts, the hypotheses formed were adjusted and supplemented in 2015 and 2016, directing to a more comprehensive understanding of the value as well as limitations of DST-related exercises in SI teaching.

Finally, the data collection, analysis and application in this research incorporated collaboration underpinned by the active engagement of two groups of participants, i.e. the teacher-researcher and the student participants. A holistic view of teaching-learning interaction as promoted by Norton (2009) and Strauss and Corbin (1990) was intended for every step of this AR. For a

start, the design of DST-related exercises was based on the students' unsatisfactory feedback about CST and the researcher's knowledge towards and observation of the use of CST in SI teaching. When the designed exercises were implemented, the students were engaged to provide constant feedback about their experiences with the exercises, while the researcher's findings from the data were acknowledged to the students to keep the learning interactive and open. Finally, two sides of data were valued as equally important in evaluating the effects of the designed exercises and jointly led to the decisions on whether improvements or changes were necessary and appropriate. Accordingly, the observation and interpretation of the data by the researcher were always compared with the inputs from other stakeholders, i.e. the students in this case, for corroboration.

The collection, analysis and use of data all served to match with the characteristics of AR: to be disruptive, to engage interconnected participants in the specific context, to adjust and improve with constant reflection through iterative cycles, and to interpret with subjective understanding and perspective. Therefore, it could be argued that the data collection and analysis in this design aligned with and facilitated the implementation of the present pedagogical AR.

5.5 Conclusion

After stating the research background and its targeted skills, this chapter has reported how the research is designed under the framework of AR. The design includes the planning for two elements: the exercises for teaching, and action plan for AR. In the exercise design, important issues including the dynamic features, exercise types and sequencing, and material choice and sequencing, were all explained. The intention of the design is to develop the targeted skills with reference to the CLT-related instructional principles. In the AR design, however, it is shown how the teaching and other activities that combine to constitute the action were planned to experiment and rectify the exercises through action cycles in AR. The provision of the data overview specified the plan of data collection and analysis in relation to the data-related design. To give a bird's eye view, a synopsis of the three-year data was presented with the data scale in terms of the participant numbers and how they manifest the AR characteristics, which paves way to detailed reports of data to be provided in the following chapters.

6 QUALITATIVE ANALYSIS OF DST-RELATED EXERCISE EFFECTIVENESS IN SI SKILL DEVELOPMENT AND TRANSFER: REPORT OF ACTION IN 2014

This chapter presents a detailed report on the methods, procedures and use of DST-related exercises, three tests and reflections on the teaching and learning interaction in 2014, all constituting the action of the first round in the present AR. Its sole purpose is to present a general picture of the full cyclic procedure, which was also followed procedurally in 2015 and 2016 despite some necessary adjustments and readjustments. As such, this report is more descriptive than analytical.

The first round of teaching action started from February and finished in June, covering 13 academic weeks. As designed, one-hour DST-based training was conducted as a teaching component of TRAN 865 - *Introduction to Simultaneous Interpreting: theory and practice* of MCI on every Wednesday morning, except for Weeks 1, 7 and 13 scheduled for the three designated tests of this research. Seven students, six females and one male, agreed to participate as voluntary and informed participants. During the implementation of the AR, the researcher constantly reflected upon the teaching-learning interaction by taking notes about the teaching effects, referring to students' feedback, and observing the students' reactions to and results from the use of the DST-related exercises for the first time.

It was found that comprehension, translation and production subskills were all improved, to a different extent, as the results of training with the DST-related exercises. These skill improvements were found in input segmentation, quick retrieval of translation equivalents, syntactic planning in production, and the management of attention in tasks involving concurrent sub-processes. Nevertheless, skill deficiencies were still detected, as some developed skills needed to be further consolidated or were not fully transferred to SI at the end of the semester. The failures in skill development and transfer led to reflection on teaching adjustment as preparations for the next round of action.

6.1 The start of first micro-cycle: novices' skill profiles at the beginning

6.1.1 The pre-test

The pre-test was run in the 1st week of the semester with a view to determining initial skill levels of the student participants. To perform a CST without preparation time during the test, for which no specific time was set for delivery, the seven students were instructed to interpret

as fluently as practical. After the CST, the students were asked to fill in a questionnaire (see Appendix 3.1) to comment on the test, their performances, and difficulties they encountered. The questionnaire contained five multiple-choice questions. For each, the students were allowed to choose more than one answer and add extra comments. Subsequently, the inputs from the students were compared with the results of the researcher's analysis to make the findings informed by different perspectives.

The text chosen was a 653-word transcript of a speech (see Appendix 4.1) which was linguistically easy. Its Flesch Kincaid Grade from the readability test is 7.8, meaning that it is suitable for Year 7-8 school students. In addition, its non-technical topic, descriptive feature and absence of specialized terms are all consistent with the main parameters making texts easy in interpreting teaching (Dam, 2001). Nevertheless, the students still encountered difficulties in performing the CST, and these problems revealed deficiencies in the subskills needed for simultaneity.

6.1.2 Skill deficiencies identified

Based on inputs from the researcher and the students, it is found that the lack of simultaneity derives from the fact that the students could not identify units of meaning, retrieve translation equivalents and plan the translation for delivery concurrently and under the time pressure.

6.1.2.1 Deficiencies identified in the researcher's performance analysis

In analysis of the students' pre-test performances, several issues came to the fore. Although they were all anticipated, a thorough analysis confirmed the anticipated problems. Without preview of the text, on-line information processing and reading ahead of what is enunciated are necessary to maintain the interpretation flow (Weber, 1990). Therefore, four issues preventing the students from producing fluent delivery, as outlined below, could be related to the inadequacy of the skills underpinning the concurrent online information processing, translation and production.

The most noticeable problem was a large number of unnecessary pauses. Although pausing is naturally required in interpretation for communication purposes or marking grammatical boundaries, the pause that occurs for other reasons is considered an unnecessary pause, which is also called a hesitation pause (Cecot, 2001). The hesitation pause can be problematic in that long and unnatural pauses can lead to long time lags between the input and output, which prevents the temporal flow of concurrent processes (Setton, 1998, 1999).

To associate the hesitation pause with difficulties that interpreters face, Ahrens (2007) attributes these pauses to longer waiting for more information to enable meaning unit identification or ambiguity to be clarified for translation, or additional cognitive capacity required for reformulation due to hardship in lexical retrieval or syntactical planning. Holding the same position, Cecot (2001, p. 65) also agrees that hesitation pauses normally occur due to "difficulties in the syntactic or lexical planning of the discourse". Therefore, the hesitation pauses in the pre-test could reflect a lack of skills in quick meaning unit identification, lexical retrieval or syntactic planning, or their combination.

The second issue was a large number of corrections. Corrections are deemed as repair mechanisms, for they normally occur for rectification or improvement of the delivery as a consequence of monitoring (Petite, 2005). Earlier researchers identified various types of repair by the interpreters (e.g. Levelt, 1983), arguing that the occurrence of correction/repair indexes either identification of errors or attempts to make the production more appropriate (Defrancq, 2015). Gile (1995a) considers that repair becomes more likely and necessary when short EVS is adopted, which is more likely to lead to comprehension error so that the production simply heads in the wrong direction before it is corrected. As a result, the frequent corrections could index frequent miscomprehension or failure in delivery planning.

The third issue is frequent verbatim interpretation. Also called transcoding or word-for-word translation, verbatim interpretation could be associated with superficial processing (Dam, 2001) or limited processing of input (Barik, 1975). As Lederer (1981) argues, word-for-word translation tends to be adopted when interpreters fail to extract the meaning from the input information. One possible cause for the failure in meaning extraction in SI among trainees is that SI trainees tend to overly segment the input information during the online processing for comprehension, making the segments too short to contain adequate information when their translation is enunciated (Riccardi, 2005). Riccardi (2005, p. 760) describes such over-segmentation as being "to split information units uttering them separately while waiting for the verb".

Finally, the delivery pace was much slower as compared with that of SI. In this 653-word text, the students took between 7'23'' and 8'37'' to finish their ST delivery. However, a speaker-paced interpretation should only take 7'15" or so if the speaker delivers at 90 words/minute. Since the delivery time of ST "alludes to the continuation of the target language production and smooth translation" (Akbari, 2017, p. 27), the longer delivery time suggests failure in continuation and fluency. To achieve a fluent flow in ST production, concurrent reading comprehension and oral production is required, which entails split attention to understanding

new segments on one hand, and to conceptualizing and producing earlier segments on the other hand (Christoffels & De Groot, 2004; MacWhinney, 1997). In addition, Akbari (2017, p. 40) associates longer delivery time with the tendency of literal translation caused by the lack of skill in making lexical and syntactic compressions. By this token, the students might be not efficient either in identifying and conceptualizing new segments or in planning the production for current segments, or in both.

From the four issues above, the researcher extrapolated that, under the pressure of on-line information processing, the interpreting skills previously possessed by the students could not fully function. In comprehension, they could not quickly identify units of meaning and decide on segments. In translation, they could not quickly conceptualize the ideas and retrieve the equivalents of translation. In production, they could not plan the rendition of the conceptualized ideas adequately to keep the delivery natural and appropriate in the target language.

6.1.2.2 Deficiencies shown in the students' feedback

The students' opinions collected from the first questionnaire (see Appendix 3.1) agree with the researcher's diagnosis of causes for their difficulties. Six out of the seven students confirmed that, among the other factors, the textual features played a limited role in causing difficulties, by rating the text as moderately difficult in Q1. However, in Q2: *How do you assess your own performance*, four students expressed dissatisfaction towards their performance. To specify the difficulties, the students were asked in Questions 3, 4 and 5, respectively, to explain why unnecessary pauses, self-correction, and reverse reading, as common phenomena observed among the novice SI students, occurred. The results are summarized in Table 6.1. The findings generally supported the researcher's assumption of the skill deficiencies discussed above.

Table 6. 1 - Responses to Q3-Q5 in the first questionnaire in 2014

Question in Questionnaire	Choice for the question	Number of choice (n=7)
Q3 - **For <u>unnecessary pauses</u> in your delivery, what was/were the cause(s)?**	a. Inadequate comprehension after reading through so have to go back to read again	2
	b. Find it difficult to read ahead while delivering the previous segment at the same time	2
	c. Find it difficult to locate the equivalents for certain words or phrases immediately	1
	d. Had difficulties in planning the verbal interpretation in the delivery	4
Q4 - **Why did you make self-corrections?**	a. Realize that there is misinterpretation or omission	0
	b. Find it difficult to continue with the sentence structure that you start with	5
	c. Find the previous rendition unacceptable although all key information has been included	2
	d. Lose track of the delivery in the middle and have to start all over again	0
Q5 - **Did you do <u>reverse reading</u> in sight translation? If so, why?**	a. Just a habit from previous CST training	0
	b. To double check the information due to inadequate comprehension	3
	c. Find it difficult to hold information segments in memory before rendering	2
	d. Did not do reverse reading	2

In terms of pauses, the students mainly attributed these to difficulties in comprehension and production. Their choices indicate that they either could not quickly understand the continuous input information during the on-line processing or could not complete syntactic planning of production when other processes were executed concurrently.

To explain the occurrence of correction, five students claimed that they failed to deliver the conceptualized information with the syntactic structures they initially chose, showing deficiencies in the syntactical planning in the production.

To explain the reverse reading, the students' choices reflect deficiencies in two skills for comprehension, parsing and working memory (WM). During comprehension, reverse reading in ST is always associated with the need for further reanalysis due to difficulties in text processing, especially in parsing (Kemper, Crow & Kemtes, 2004; Shreve, Lacruz & Angelone, 2011; Viezzi, 1989b). Therefore, the students who had inadequate comprehension might fail to parse the texts properly, i.e. fail to identify units of meaning and segment them under the time pressure. This assumed possibility was corroborated by some students' comments that they tended to find equivalents for each word of the input texts, suggesting that their information processing was largely lexicon-based rather than meaning unit-based. As for the memory issue

reported, this revealed deficiencies in WM, which is a crucial cognitive component in comprehension (Gernsbacher, Varner & Faust, 1990; Macnamara, Moore, Kegl & Conway, 2011). WM is responsible for temporary storage of the earlier processed information, which will be accessed and linked to successive information for a coherent representation of the original speech, while the new information is concurrently processed (Baddeley, 1997; Bajo, Padilla & Padilla, 2000). Therefore, WM is not only for information storage but also positively correlates with discourse processing and comprehension (Agrifoglio, 2004; Daneman & Merikle, 1996; Just & Carpenter, 1992; Kintsch & van Dijk, 1978).

All these subskill deficiencies which prevented these novice students from achieving simultaneity should be addressed head-on. Although the skill deficiencies were reflected in comprehension, translation and production, the researcher decided to focus on some skills for on-line comprehension in the first micro-cycle leading to the mid-test, given that at least 80% of the cognitive resource is allocated to comprehension and analysis, while only 20% is on production (Padilla, Bajo, Cañas & Padilla, 1995), and that successful comprehension lays a solid foundation for other sub-processes (Kalina, 1994). The pre-test results also show that students needed more practice in input processing and getting the meaning accurately and quickly. At the same time, assistance should be provided to help the students adapt to the new mode of interpretation involving the simultaneity of reception and production, and the external time pressure.

6.1.3 Action for skill development in the first micro-cycle

To address the students' comprehension deficiencies and adaptation to the new mode as the top priorities, DST-related exercises implemented in the first micro-cycle comprised dynamic summarization, dynamic paraphrasing, and DST (see Section 5.3.1.2). On top of practicing meaning unit identification under measured time pressure, discussions of strategies alleviating cognitive load in comprehension were incorporated as supplements. These strategies are summarization, generalization, omission and anticipation. In class, the researcher explained the definitions of these strategies and demonstrated their use with examples from the exercises; then, the students practiced these strategies in class with the researcher's assistance. Although the strategies were also explained and practiced in other units of the semester, the learning objectives of which all include knowledge of strategy use in SI, the practice of strategies in this teaching element was a complement to and reinforcement of the strategy teaching in other units.

The first group of exercises introduced in Weeks 1 and 2 were dynamic summarizing/paraphrasing at Level 1 dynamicity (see Section 5.3.1.1 for dynamicity level

description) and at input rate of 90 words/minute. The textual display, starting from low dynamicity level and low input rate, created a task condition of minimal time pressure so that the students were gently pushed to adapt to externally paced delivery. In these exercises, the texts stayed on the screen for 5 seconds before gradually fading away word-by-word at the rate of 90 words/minute, the recommended starting input rate for trainees in SI teaching (Gerver, 1976; Moser-Mercer, 1978). Under such minimal time pressure, the students practiced meaning unit identification and segmentation for meaning extraction with time constraint. They made a summary based on comprehension when all of a text had faded; and then performed concurrent paraphrasing of the text. In these exercises, the strategy emphasis was placed on summarization and generalization, which were discussed and practiced in class.

Then the exercises morphed into DST of Level 1 dynamicity with preparation in Week 4. This was when the students indicated that they were used to the minimal external time pressure and were ready to take on more challenging tasks. Therefore, the translation component was added. The dynamicity level escalated to Level 2 in Week 5 and the input rate was increased to 100 words/minute in Week 6. In these exercises, the strategies of omission and anticipation were added to the practice and discussion in class.

6.2 The testing of action in first micro-cycle and initiation of second micro-cycle action

6.2.1 The mid-test

To test the action effects in the first micro-cycle and to inform the action in the second micro-cycle, the mid-test was conducted to evaluate whether and to what extent the exercises implemented addressed the skill deficiencies identified at the pre-test. The mid-test results and the students' feedback together profiled the students' skill status after the DST-related exercised practiced.

The mid-test involved one DST task (hereafter, referred to as mid-DST). The mid-DST was at Level 3 dynamicity. This was to keep the mid-test and the final test at the same dynamic level so that the test results could be comparable. The text for the mid-DST was adapted from a speech delivered by the former British PM, David Cameron, entitled "Trade, Tax and Transparency" at the 2013 Davos forum (see Appendix 4.2). The Flesch Kincaid Grade Level of the text is 9.8, indicating that the text is suitable for Year 9 to 10 school students. Given the students' literacy level and language proficiency, the text should not be too challenging for interpretation.

After performing CST with the first 1/3 of the passage for a preparation, the students were asked to perform DST of Level 3 dynamicity with the rest of text. The input rate was set at 100 words/minute (see Appendix 4.1). In keeping this rate at Level 3 dynamicity, the features of the text display are summarized in Table 6.2 and the setting for unfolding and fading effects in the animation pane of PowerPoint for a slide of 39 words is captured in Figure 6.1 as an example.

Table 6.2 - Profile of mid-DST text display

Total number of words	Number of slide	Maximal word number on slide	Minimal word number on slide	Font	Input rate
410	9	45	39	Calibri 36	100 words/min

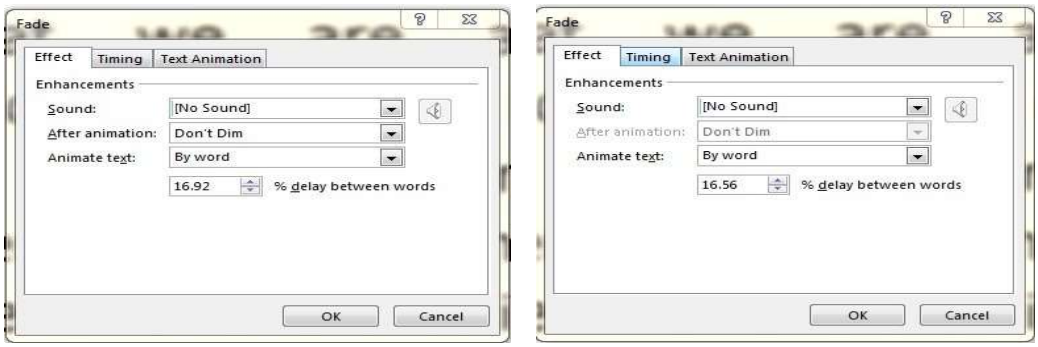

Figure 6.1 - Animation setting for mid-DST

Following the mid-DST was the second questionnaire comprising six multiple-choice questions and two open questions (see Appendix 3.2). This was used to collect the students' self-assessment of performances and comments on the effects of the DST-exercises practiced in the first micro-cycle. The students were allowed to choose all options that apply and provide extra comments.

6.2.2 Effects of DST-related exercises in the first micro-cycle

The findings show that the DST-related exercises implemented in the first micro-cycle had dual effects. They resulted in skill progress in comprehension accuracy and agility under time pressure, and in adaptation to the new simultaneous mode. Nevertheless, the skills practiced and improved in the first micro-cycle still required enhancement to meet the skill demands of DST at Level 3 dynamicity.

6.2.2.1 The success in skill development

The success in skill development was confirmed with the inputs from both the researcher and the students. Progress in both comprehension and adaptation to the simultaneous mode was found to varying degrees.

The assessment conducted by the researcher could only focus on some indicative parameters rather than being a full-scale one. Moser-Mercer (1996) argues that the special needs of assessments for pedagogical purpose make it more reasonable to focus on single parameters with reference to the expertise levels of the students and specific learning goals at various stages. Since the aim of the DST-related exercises in the first micro-cycle was to improve comprehension accuracy and agility, the researcher decided to focus on the comprehension accuracy achieved by the students under the given time pressure. Comprehension accuracy should be eventually reflected in production accuracy (Lee, 2012); thus, a production assessment was made to examine the information correctness and completeness of the interpretation.

To this end, the criterion was only set to see whether one information segment in the source text was fully/accurately interpreted (AI), misinterpreted (MI) or completely omitted (OI) in the production. The text for the mid-DST was divided into 43 segments; and interpretation for each segment was assessed for completeness and correctness by this criterion. The group average and individual results are shown in Table 6.3. The results show evidence for improvement in comprehension concerning accuracy and agility.

The comprehension accuracy achieved by the group as a whole was quite satisfactory even though it was the first time that the students performed DST of level 3 dynamicity. The average AI reaching 69.77%, four students performed equal to or above this average. The average omission rate (OI=4.65%) was also low and six students performed at or below this rate.

Table 6.3 - Accuracy assessment in the 2014 Mid-DST

Rate of segment type in production / Students	AI %	MI %	OI %
14A	76.74%	20.93%	2.33%
14B	65.12%	30.23%	4.65%
14C	53.49%	32.56%	13.95%
14D	86.04%	11.63%	2.33%
14E	60.46%	37.21%	2.33%
14F	76.74%	18.61%	4.65%
14G	69.77%	27.9%	2.33%
Average	**69.77%**	**25.58%**	**4.65%**

From the students' perspective, they also reported skill progress in the first micro-cycle as shown in their responses to the questionnaire. For instance, the students' choices of developed skills in Q3 suggest that most students considered the DST-related exercises in the first micro-cycle to have contributed to their overall development of simultaneity and their confidence in transition to SI, as listed in Table 6.4.

Table 6.4 - Reported skills that have progressed via DST-related exercises in 2014 mid-semester questionnaire

Choice for progress	Number of choice (n=7)
Simultaneity	6
Confidence in transition to SI	4
Agility in retrieving translation equivalents	3
Accuracy and agility of comprehension	1
Fluency	1
Delivery appropriateness	0

The results show that some objectives of DST-related exercises in the first micro-cycle have been achieved. The reported development in simultaneity indicates that exercises facilitated the adaptation to the simultaneous mode. The better confidence in transition to SI suggests that the resemblance to SI achieved by the DST-related exercises constituted a path leading to SI. Furthermore, the identified progress in agility in translation suggests that the increase in input rate and the ensuing time pressure might have contributed to the enhanced agility of translation.

Another skill development acknowledged by the students was the use of strategy. In the second questionnaire, the students were asked to first choose strategies that they used in the mid-test and explain their intentions in using those strategies in Q5, and then to choose the most useful strategies in Q6. Kader and Seubert (2015) advise that the goal of strategy teaching among beginners is to identify possible strategies for solving problems. Therefore, progress in the use of strategies should mainly be reflected in the ability to identify and explain the use of strategies. By this criterion, the results of the two questions presented in Table 6.5 evidence progress in this regard.

Table 6.5 - Used and most useful strategies with explanations in the 2014 mid-test

Strategy	Number of choice		Quoted responses to explain the strategy use
	Q5 - Strategies used	Q6 - Most useful strategies	
Anticipation	6	5	1) Save processing time (14A) 2) It can help me overcome some unfamiliar or unsure situations, while keeping fluent and correct delivery （14G）
Generalization	4	3	1) Since it helps me to complete delivery while keeping up with the speaker (14G) 2) It can help me overcome some unfamiliar or unsure situations, while keeping fluent and correct delivery (14G)
Omission	7	3	1) Save processing time (14A) 2) The speed is fast, so omission is the best way to keep up (14E) 3) Insufficient time to comprehend (14C)
Guessing	4	2	Insufficient time to comprehend (14C)
Summarization	2	1	When sentence structure in complex, I had to wait for longer and then summarization is necessary (14D)

As shown in the table, the teaching of strategies in the first micro-cycle was successful in that the students demonstrated their understanding of the strategies and the ability to identify the application of those strategies. Moreover, the students showed awareness of distinguishing between useful and used strategies. Five out of seven students chose anticipation as the most useful strategy, although six students reported omission as the most used strategy. This shows that the students acknowledged the usefulness of anticipation in enhancing comprehension efficiency even though they made more omissions.

In general, the findings prove the efficacy of DST-exercises in developing comprehension skills and adaptation to the simultaneous mode. In the mid-test featuring higher time pressure in comparison with the pre-test, the satisfactory accuracy and omission rate indicate improved processing agility and accuracy, which could be a result of improved on-line information

processing skills and progress in the use of strategies practiced. Such suggested progress in comprehension skills from the performance analysis was corroborated by the students' report of skill development.

6.2.2.2 The unaddressed skill deficiencies at the end of the first micro-cycle

Despite the above skill development in comprehension skills, the researcher found that comprehension skills required further improvement, and that deficiencies in production skills became relatively prominent at the mid-test. It was found that, in comprehension, the students still had problems with accurately identifying units of meaning and segmenting in a DST of Level 3 dynamicity that cognitively resembles SI the most. On the production side, deficiencies were found in syntactic planning and reformulation strategies necessary for producing fluent and natural interpretation.

6.2.2.2.1 Evidence from researcher's performance analysis

In the mid-test performance, misinterpretation was a common phenomenon; thus, the researcher attempted to find out why these misinterpretations happened, by making close analysis of the interpretation. The focus was on the information completeness and correctness for the same purpose as discussed in Section 6.2.2.1. From the researcher's analysis, the skill deficiencies revealed included insufficient discourse analysis for identification of meaning units and logic, slow translation retrieval, and lack of production planning and reformulation strategies.

Some interpretation from the test is quoted here to show the deficiencies mentioned above. To explicitly show the level of correctness and completeness of the interpretation by comparing with the English source text, the back translation of these interpretations by Google Translate was used as an intermediary version for comparison. The neutral translation by Google Translate is considered appropriate to well serve the purpose of the analysis here. Despite the absence of consensus in ranking existing machine translation tools, Google Translate is assessed to prevail in accuracy especially in terms of idiom, biblical language with formal register, lexical ambiguity, phrasal verbs, and grammar, among the existing main stream online translation tools (Hampshire & Salvia, 2010).

First of all, it was found that the students sometimes failed to identify the complete units of meaning for translation. Instead, they delivered when only a part of a unit was perceived, which led to miscomprehension and thus misinterpretation. An example was the interpretation for the following texts involving three segments divided by double slash. The back translation of the interpretation and the source texts were compared segment by segment, as shown in Example

6.1. The segments marked with asterisks were either misinterpreted or incomplete, while blanks indicated complete omissions of the relevant segments.

Among these seven interpretations, 14D's interpretation was considered the most accurate with all the source information correctly and fully interpreted. For other students, except for 14A who completely omitted one segment, inaccurate interpretation mostly entailed partial information within the segments, while the rest of the segments were either omitted or misinterpreted. In some cases, some students appeared to realize that they had missed information in the segments, so they inserted subjective information to fill up the gap, leading to significant deviations from the source texts, as found in 14F's and 14G's interpretation.

Example 6.1

Segment / Student	Segment 1	Segment 2	Segment 3
	I don't believe that one person's wealth //	fairly gained through free exchange in an open market //	is somehow the cause of another person's poverty.//
14A	*I think, I think, this system **		*should give… should make another person poor. * This should be a win-win and should not be a zero-sum situation.*
14B	*I do not believe, there is no one, **	*through the free trade, can,*	*a person who benefits will make other people suffer loss.*
14C	*I believe that **	*through free exchange **	*people can benefit, benefit from this. **
14D	*I believe that I think a person's income*	*in the open market*	*is not necessarily the loss of another person as a price.*
14E	*So I think people's wealth **	*needs to be obtained through free trade, **	*not at the expense of other people's interests.*
14F	*I do not believe that there is a person's wealth*	*can also get in this open market.*	*through not communicating with outsiders. **
14G	*I do not think that a person's wealth*	*is available only in an open market **	*that he also needs other people to interact with each other. **

Except for comprehension deficiencies, translation and production deficiencies also became more prominent, especially for special information in the source text. Translation could consume too much of the cognitive resource and influence the perception of the following segments; and some reformulation was not natural in target language. Such problems were manifested in the interpretation presented in Example 6.2, where misinterpretation or omission are marked by asterisks and blanks indicate complete omission.

Example 6.2

Segment / Student	Segment 1	Segment 2	Segment 3	Segment 4
	I'm also proud//	that we are leading the fight on global hunger,//	funding nutrition programmes for twenty million children and pregnant women//	over the next few years. //
14A	I am also proud of it.	we are uh…leading the fight against global hunger,	and to give some nutrition institutes the money. We helped 20 million children. *	
14B	I am also proud to claim	that we are fighting with global hunger,	and then provided for 20 million hungry children, as well as women with uh… nutrition, *	in the next few years.
14C	At the same time I am proud, I am proud	that we are about to participate in the fight against global hunger, *	to provide nutrition materials to many children, especially ... at the same time, we also…uh…to provide funding. *	
14D	I am also very happy	that we are fighting to fight against the global famine.	And for the establishment…for 20 million people, the establishment of a nutrition plan. *	These will be in the past, will be available for some years to come.
14E	I am also very proud	that we have been fighting global hunger.	and, uh…in these projects play a leading role. *	Uh…we were so in the last few years. *
14F	I am also very proud	that we are leading, leading the way in dealing with global hunger.	And then we support those nutrition projects for twenty billion… uh…twenty billion of the children, *	and then in the next few years.
14G	I am also very proud	that we are continuing to respond to the global hunger,	as well as continuing to provide these children, and women in need of help with the nutrients they need, *	

It is noted that the misinterpretation and omission mainly occurred in the 3rd and 4th segments. In the 3rd segment, the number *twenty million* was a source of issue, where most students paused, indicating lack of speed in translation retrieval. Four students (14C, 14E, 14F and 14G) failed to interpret this number correctly. Others who interpreted the number correctly tended to mistranslate or even omit the information closely following the number within the segment. To explain such a phenomenon, special contents tax effort in speedy decoding and quick search for equivalents for delivery (Gile, 2008); while slow decoding of numerical information can consume too much mental effort at a given time, leaving insufficient mental resource for other concurrent efforts, leading to omission or misinterpretation of segments after numbers (Gile, 1995a/2009).

In the 4th segment, the problem in the interpretation of "in the following years" indicates production deficiencies, especially in language-specific reformulation strategies. This segment under discussion is a typical postpositive adverbial segment, which requires language-specific reformulation strategies to concert the structure in Chinese (see Sections 3.4.2 and 5.2.5.2.2). However, three students completely omitted it, while the other four students either misinterpreted it (14E) or produced verbatim interpretation (14B, 14D and 14E) that sounded unnatural in the target language by completely following the surface structure of the input text. Such a style of interpretation is categorised as an "emergency strategy" by Kohn and Kalina (1996, p. 131), which is adopted by interpreters when "the capacity is exhausted or their competence is not in accordance with the demands made on them". Those surface-structure bound interpretations, which were not uncommon in the students' performance, could be caused by too little mental resources left for production or insufficient skills in making the delivery linguistically appropriate.

6.2.2.2.2 Evidence from the students' report

In the second questionnaire, the deficiencies revealed from the students' evaluation of their performance and skill development were consistent with the researcher's findings presented above.

In rating the difficulty level and identifying sources of difficulties of the mid-test in Q1, four students found it challenging, and two rated it moderate, with one thinking it easy. Among the options provided, six students chose "speed", two chose sentence structure, and one chose lexical difficulties.

To associate those difficulties with underlying skill deficiencies, the students were asked to choose the aspects for which they had deficiencies in Q4; and the results are displayed in Table 6.6.

Table 6.6 - Choices of skill deficiencies in the mid-test in 2014

Skill deficiency	Number of choice (n=7)
a. Accuracy in comprehension under time pressure	5
b. Simultaneity	3
c. Agility in equivalent retrieval	2
d. Fluency	0
e. Syntactic adjustment	3
f. Expressional appropriateness	5
g Confidence	0
h. Others	N/A

Comprehension accuracy and delivery under time pressure were the leading chosen deficiencies by the students. This was consistent with the researcher's finding that the skills required for comprehension accuracy and agility required further enhancement. Besides this, the deficiencies in production were more noted by the students, which was consistent with their performance, indicating that reformulation skills required more attention in the practice.

In Q7, some students commented on difficult texts in the test and flagged their difficulties, revealing skill deficiencies that echo the findings above:

"I think the main problem facing me is that I think too slowly. I always only focus on the single slide instead of comprehending it in a bigger context. When I move to the next slide, I totally forgot the previous slide." (14C)
"Too much information so I had to omit" (14 D)
"This part occurred almost at the end of passage, and a number was obtained. I got stuck and lost the rest of it." (14 F)
"Syntactic handling and speed" (14 G)

As underlined parts in these comments indicate, the students reported their deficiencies in quick discourse analysis under time pressure, agility in translation retrieval, speech planning, and WM. Except for the WM issue, which could not be directly observed from the interpreting performance, all the others were detected in the test performance analysis by the researcher.

These findings on skill deficiencies were confirmed again in the responses to Q8, skills that the students wanted to improve. Four students explicitly indicated skills that they wanted to improve, which pointed to skills that were deemed inadequate. 14D hoped to develop skills for quicker responses to the information and more natural delivery, pointing to a lack of agility in discourse analysis, retrieval of translation, and inadequate speech planning. 14E intended to improve skills to handle unfamiliar expressions and comprehend complex sentences, indicating perceived shortcomings in discourse analysis and segmentation of the source texts. 14F wanted to practice more interpretation for numbers and improve concentration, showing deficiencies in translation retrieval speed and management of attention for cognitive processes. 14G wanted to improve comprehension skills, agility in translation retrieval, and natural delivery.

At the conclusion of the first micro-cycle, the findings led to two reflections that could direct the teaching focus in the second micro-cycle. The first was that the development of subskills for comprehension must continue after the mid-test and should be practiced in more demanding tasks for consolidation. The second was that, in addition to developing further comprehension-enhancing skills, production skills, including language-specific reformulation strategies, should gain due attention in the second micro-cycle's exercises. All these reflections were implemented in the exercises after the mid-test.

6.3 Action in the second micro-cycle to address skill deficiencies

The exercises implemented in the second micro-cycle were DST of Level 3 dynamicity, including cloze DST, at incremental unfolding and fading rates. The purpose was to enhance comprehension skills and to give more attention to production skills under a more demanding task circumstances based on the findings at the end of the first micro-cycle.

For comprehension, the combination of maximal textual evanescence achieved at Level 3 dynamicity and the controlled input rates was intended to facilitate less word-bound but more meaning-based processing despite the visual stimulus. Gile (2009, p. 71) states that that "the possibility of focusing on a particular word for a longer time or rereading a text segment after going through it a first time" can make the perception of the input message more word-bound, while constrained delivery time and limitations in WM make the processing of evanescent input less "word-bound" in interpreting. Therefore, the DST exercises used at this stage aimed at keeping the possibility for rereading or lingering over particular words, which barely exists in SI, to a minimum; and imposing incremental time constraints on delivery. At Level 3 dynamicity, the textual display maximally simulates the SI condition in terms of information evanescence. Meanwhile, the unfolding/input rates gradually increased from 100 to 120 words per minute, creating a task condition that steered the information processing in reading toward being more similar to that in SI. Given that the students were still beginners, the rate was confined to a range between 100 and 120 words per minute, which is recommended as the optimal speed for interpreting (Seleskovitch, 1978).

In addition, comprehension and production strategies were discussed and practiced in the second micro-cycle. For comprehension strategies, segmentation (see Section 5.2.5.1.1) were added and practiced with focus. The production strategies (see Section 5.2.5.2) comprised three reformulation techniques: change in part of speech, addition and transformation of syntactic structures.

In Weeks 11 and 12, the exercises were used to practice all skills in an integrated way, so that the students had the opportunity to experience how different subskills could contribute to simultaneity as a whole.

6.4 The testing of action in second micro-cycle: effects in skill development and skill transfer

At the end of the second micro-cycle, the efficacies of the DST were tested through the third questionnaire, a final test (comprising DST and SI), and an interview. The purpose was to

explore whether the implemented DST in the second micro-cycle addressed the skill deficiencies identified at the end of the first micro-cycle and transferred these skills to SI.

6.4.1 Three tools for testing

The third questionnaire (see Appendix 3.3) was completed at the end of Week 12. It contained eight multiple-choice questions, serving the purpose of soliciting the students' comments on the progression of the exercises in terms of: the scaffolding effects; whether DST-related exercises improved and transferred some skills to SI; and what those skills were.

The final test was conducted in Week 13, consisting of both DST at Level 3 dynamicity and SI. The purpose was to examine whether and what skills were transferred, by comparing the performances of the two tasks. As reviewed in Section 2.2.1, the number of shared skills and common knowledge between two tasks positively correlates with the extent to which some common skills could be transferred (Bovair, Kieras & Polson, 1990). Therefore, the researcher hypothesized that, since DST and SI share significant cognitive processes and subskills as theories indicate, those commonalities would contribute to the skill transfer from DST to SI. If the transfer is achieved, the performances of the two tasks with close difficulty levels should show some similarity in quality as a result of the transferred skills.

To keep the test materials for the two tasks in the final test roughly at a similar difficulty level, two measures were taken. First of all, the texts for the two tasks were extracted from the same speech (see Appendix 4.3). The Flesch Kincaid Grades for the DST and the SI texts are 10.8 and 9 respectively, being relatively close. Secondly, the two tasks had the same input rate of 130 words/minute. The test rate was intended to be slightly higher than the maximal input rate for DST leading to the final test, because Moser-Mercer (2000b, p. 90) holds that successful novice interpreters in an intensive post-graduate course should be "able to hone all sub-skills equally well, to integrate them and to carry out cognitive processes at high speed". Nevertheless, this rate is deemed reasonable since it is still within the range of common presentation rates in conferences (Shlesinger, 2003).

To set the display for the final DST test, the fading effect began 1.5 seconds after the unfolding effect started on one slide, and the two actions finished almost simultaneously at the end of the slide (see Appendix 4.3). The display setting specifications in the animation pane of PowerPoint for a slide of 49 words are captured in the screenshots as shown in Figure 6.2.

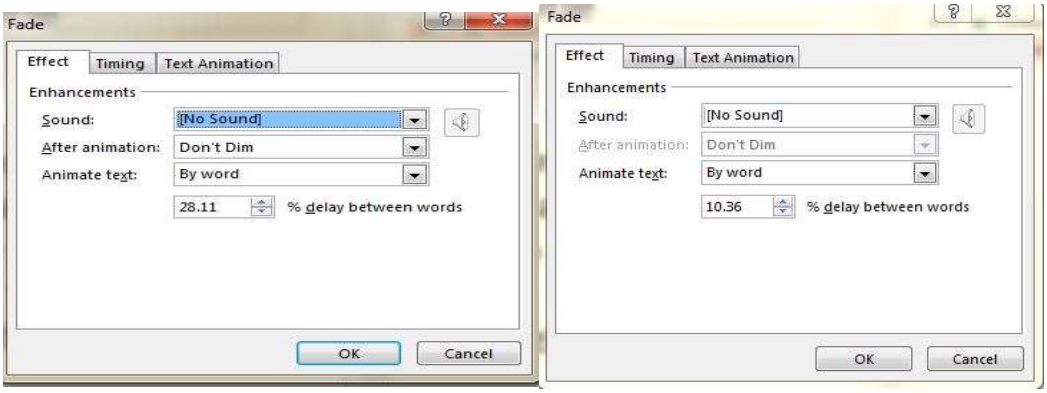

Figure 6.2 - Textual display setting for the final DST text display

After the test, the researcher had a one-on-one interview comprising five open-ended questions with each student. The purpose was to qualitatively solicit students' opinions on the efficacies of DST in the second micro-cycle, and to verify evaluation of the DST-related exercises made by the students earlier in the action cycle.

6.4.2 The mixed effects of DST in the second micro-cycle for skill development and transfer

The findings show mixed results on the efficacies of DST in the second micro-cycle. The DST exercises were found to have contributed to the development of subskills in input information analysis, translation retrieval speed, production planning, and strategy use. However, some skills remained inadequate to perform DST of Level 3 dynamicity at an input rate over 120 words/minute. In terms of transfer, the statistical results of the DST-SI performance comparison did not indicate clear-cut transfer, but the transfer was acknowledged by the students, though the skills and the extent of transfer varied among individuals. In the following sections, these findings are presented and discussed in detail.

6.4.2.1 The success of DST in skill development

The researcher first evaluated the students' performance in the final DST by evaluating information completeness and correctness against the same criteria as in the mid-test analysis. The final DST text was divided into 54 segments; and the percentages of segments that were accurately interpreted (AI), misinterpreted (MI) and completely omitted (OI) are listed in Table 6.7.

Table 6.7 - Performance analysis in 2014 final DST

Rate of segment type in production / Student	AI	MI	OI
14A	64.81%	31.49 %	3.70%
14B	53.70%	40.74 %	5.56%
14C	48.15%	44.45%	7.40%
14D	70.37%	18.52%	11.11%
14E	31.48%	46.30%	22.2 %
14F	42.60%	44.45%	12.95%
14G	57.41%	35.19%	7.4%
Average	**52.65%**	**37.30 %**	**10.05%**

Statistically, it is difficult to observe directly whether the test performance was better or worse than that of the mid-test. Since the input rate of final DST was higher than that in the mid-DST, a lower accuracy rate and higher omission rate are expected based on the proven correlation between higher rate and lower accuracy (Chernov, 1969; Gerver, 1969).

However, by analysing the students' responses in the third questionnaire and interview, the researcher found that skill progress was acknowledged by the students, in comprehension efficiency, translation retrieval agility and production efficiency.

6.4.2.1.1 Reported skill development by the students

In the third questionnaire, the students were asked to make choices of skills that were improved at the end the cycle in Q3. The summarized results are presented in Table 6.8.

Table 6.8 - Improved skills reported by the students at the end of the cycle

Skill improved the most due to DST-related exercises	Number of choice (n=7)
Use of strategies	5
Speed in equivalent retrieval	6
Simultaneity	4
Accuracy and swiftness in comprehension	4
Confidence to transit from CI to SI	1

The most students reported progress in the speed of translation retrieval, indicating their perceived improvement in translation agility. This suggests that a purpose of the DST implemented in the second micro-cycle has been achieved: to enhance mental agility via DST with higher dynamicity level and increased input rate.

The next most acknowledged progress was in strategy use, which also suggests that the students responded to the teaching focus. In the second micro-cycle, both comprehension and production strategies were discussed and practiced, and exercises were arranged for synthesized and integrated use of those strategies. The recognized progress in strategy use could mean that such an arrangement worked in helping the students to better access the strategies when necessary.

To further explore whether the different skill focus entailed in the teaching for the first and second micro-cycles led to different skill development results, the choices of improved skills in the questionnaires at the end of two micro-cycles were compared, as displayed in parallel in Table 6.9. The three choices showing evident mid-final contrast, marked by asterisks, indicates that the implemented exercises focusing on addressing skill deficiencies identified at the end of the first micro-cycle showed effects.

Table 6.9 - Comparison of reported skill development at middle and end of semester in 2014

Skill improved the most due to DST-related exercises	**Number of choice (n=7)**	
	Mid-term	**End of semester**
Use of strategies *	1	5
Speed in equivalent retrieval	4	6
simultaneity	6	4
Accuracy and agility in comprehension *	1	4
Confidence to transit from CI to SI *	4	1

First of all, there was a noticeable increase in the number of students reporting progress in comprehension skills in the second micro-cycle. Since one practice focus in the second micro-cycle was to continue enhancing comprehension accuracy and agility, more reporting of improvement in this regard could be a manifestation of its effectiveness.

Secondly, four more students reported progress in strategy use at the end of the second micro-cycle. With the numbers of strategies discussed in the first and second micro-cycles being roughly the same, more acknowledgement of progress in strategy use could show that the continuous focus on strategies and the practice of the strategy integration in the second micro-cycle resulted in more recognition of skill development in this regard.

Showing contrast, the third aspect proved the exercises' efficacy in a different way. Unlike the previous two aspects with an ascending trend, the number of students opting for confidence in transition to SI was noticeably reduced, with only one student reporting more confidence in transition at the end of the second cycle. To some extent, this frustration among the students could indicate that the DST exercises in the second micro-cycle were challenging as a result of higher cognitive load intended for closer simulation of SI; although it was open to discussion, if the exercises became too challenging for some students to perform at some point.

6.4.2.1.2 Strategy use as a prominent example of skill development

Among the improvements reported by the students, progress in strategy use was found to be particularly prominent. In addition to achieving "strategy recognition and analysis" (Chesterman, 2000, p. 83), which was demonstrated by identifying and explaining their own strategy use as the teaching goal of strategies for beginners (Kader & Seubert, 2015), the better execution of some strategies also indicates progress in some skills underpinning the execution.

The students' better understanding of strategies is demonstrated by their overall strategy preference and explanation of use demonstrate at this stage. For instance, in Q7 of the third questionnaire, the students were asked to choose their most useful strategies which were acquired via the cohort of DST-related exercises, and to explain their purposes in using these strategies, as presented in Table 6.10.

Table 6.10 - Useful strategies and reasons at the end of the cycle

Nominated useful Strategy	Number of choice (n=7)	Purpose of use (quoted from students' answers)
Anticipation	6	1) "anticipation makes it easier to organize sentences and shorten the time for waiting" (14A) 2) "I am able to produce complex sentences with it, especially when the structure needs to be adjusted" (14D)
Omission	5	1) "Omission saves me a lot of efforts which I can put into comprehension of coming segments (14A) 2) "It helps me deal with redundancy in the text and improve my simultaneity" (14D)
Segmentation	4	1) "It helps me get a rather accurate idea under the time pressure". (14E) 2) It helps me get the unit of meaning" (14F)
Summarization	3	N/A
Generalization	2	N/A
Guessing	1	N/A

As the results show, the students could identify the strategies that were most useful to them and had a clear purpose of relieving the cognitive load by applying different strategies. The leading strategies chosen were mostly comprehension strategies, among which anticipation and segmentation are the strategies the researcher stressed in the second micro-cycle.

To examine whether the students' choices of strategies changed as a result of the training, their choices of most useful strategies at the end of first and second micro-cycles were compared, as shown in Table 6.11.

Table 6.11 - Choices of useful strategies at the middle and end of the semester in 2014

Nominated useful strategy	Number of choice (n=7)	
	End of first micro-cycle	End of second micro-cycle
Anticipation	5	6
Omission	3	5
Segmentation	0	4
Summarization	1	3
Generalization	2	2
Guessing	3	1

The table shows that the students' choices were consistent with the strategies prioritized in the teaching. At the end of the second micro-cycle, while anticipation and omission remained among the leading useful strategies, segmentation, as the new strategy for the second micro-cycle, was also chosen by more students as a useful strategy. The researcher then delved into the quality of execution of these leading strategies, and the findings also proved the progress.

6.4.2.1.2.1 Anticipation

The execution of anticipation requires the skills to quickly identify significant information and then to make inferences out of the information. Vandepitte (2001) argues that an interpreter can only make adequate anticipation when he picks up the most relevant information as the stimulus or has enough knowledge to process the stimulus. Then, inferences based on the contextual or linguistic clues must be actively made to execute anticipation, as reviewed in Section 5.2.5.1.2. Therefore, successful execution of anticipation could be a proof of these skills.

To assess how well an anticipation is made, there are three types depending on the anticipated accuracy: exact anticipation (e.g. Kurz & Färber, 2003); more general (Jörg, 1995) or generic anticipation (Bevilacqua, 2009); and incorrect (e.g. Jörg, 1995; Kurz & Färber, 2003) or false (Bevilacqua, 2009) anticipation. While exact and erroneous anticipation types are quite self-explanatory, more general or generic anticipation means approximation to or a hypernym for the source text, which represents "a meaning similar to that of the source text, but does not

cover every nuance of the late-appearing constituent" and where the meanings of the output are either "weaker" or "stronger" than the meanings of the source texts anticipated for (Liontou, 2012, p. 161). In the assessment of anticipation in this AR, the same criteria are adopted.

The students demonstrated their agility to anticipate in interpreting six cloze blanks, in the final DST intended to examine how well the students could make inferences. All the blanks appeared at the end of slides, enabling the students to collect enough clues. The interpretations for the cloze blanks were assessed to be extract, generic, and erroneous types of anticipation (see Appendix 5.1 for assessment details). If the interpretation for the blank was missing, it would be marked N/A. In this AR, the researcher considered both exact and generic anticipation as successful execution for the novice interpreters. The percentages of the three types of anticipation, i.e. extract, generic, and erroneous + no anticipation, are calculated and shown in Table 6.12.

Table 6.12 - Percentages of different anticipation types for the final DST cloze blanks

Type of anticipation	Number of anticipation	Rate of anticipation type (n=42)
Extract anticipation	14	33.33%
Generic anticipation	4	9.53 %
Erroneous and no anticipation	24	57.14%

The results show that the rate of successful anticipation, extract and generic anticipation, combined, was lower than that of erroneous or missed anticipation. The results indicate that the students were capable of picking out important information as clues at the prescribed input rate and using this important information as a prerequisite for inferencing, although the accuracy needed to be improved.

6.4.2.1.2.2 Omission

For the strategy of omission, the progress was reflected in the purposes of omission at the end of the semester. Not all omission is a mistake resulting from miscomprehension (Viaggio, 2002; Visson, 2005; Pym, 2008). It is a strategic act when interpreters can identify more significant information with better accuracy and leave out secondary information, when omission becomes necessary (Liu, Schallert & Carroll, 2004). Therefore, the assessment of omission should be more about the quality of omission, namely valid or invalid omission (Pym, 2008).

In this spirit, a positive change in the purposes of omission was found in comparing the students' reporting on omissions at the end of the two micro-cycles. It is true that the omission rate in the final DST was higher than that of the mid-DST, but this was expected by the researcher since

the higher input rate of the final DST would lead to higher omission rate (Pio, 2003). A more valuable finding was that the omission reported at the end of the second micro-cycle started involving effort in information analysis, thus being a more deliberate act (Korpal, 2012). In the mid-DST, omission was reported by the students as a primitive means of temporarily shortening long lagging between the input text and their delivery, with no mentioning of the distinction of significance of the information and decision-making on what could/could not be omitted. By contrast, the reasons for omission reported at the end of the second micro-cycle included getting rid of redundancy, which hinted at some discretion based on effort in differentiating primary and secondary information. This is evidenced in the students' comments on their general use of omission, such as "*…omission helps me deal with redundancy in the text*" (14D) and "*omission is inevitable for me in SI but I need to be selective about the primary and secondary message*" (14E).

6.4.2.1.2.3 Segmentation and summarising

The increased numbers in the choice of segmentation and summarizing were a sign of progress, in that they could indicate that the students tended to identify information meaning-units rather than only paying attention to lexical items in information processing. Unlike generalization, which refers to finding hypernyms for single lexical items, chunking and summarizing are meaning- or segment-based strategies. Such changes in the processing units are an indication of progress in comprehension (Riccardi, 2005).

To sum up, the use of the strategies discussed were all underpinned by relevant subskills, including quicker information processing and analysis of meaning units and identification of primary information. As a result, the DST-related exercises contributed to both improved identification of the match between problems and strategies as possible solutions, and to the development in relevant comprehension skills underpinning the use of these strategies.

6.4.2.2 The failure of DST in skill development - skill deficiencies that remained

In spite of the skill development as a result of the DST-related exercises, it is also found that skill deficiencies remained when the task condition featured higher dynamicity levels and higher input rates. These deficiencies were lack of speed in meaning unit identification and segmentation, translation retrieval, and syntactic planning of the delivery.

These skill deficiencies could be generally reflected in the performance comparison between the mid-DST and final DST. The accuracy, misinterpretation and omission rates for the two tasks were compared, as displayed in Figure 6.3. In the statistical sense, performance of the

group as a whole in the mid-DST was better, with much higher accuracy rate and lower omission rate. It is a fact that the final DST was more challenging than the mid-DST, indicated by higher Flesch Kincaid Grade and higher input rate, which could both influence the interpretation quality in terms of interpretation accuracy among the interpreting trainees (Korpal, 2012; Tommola & Heleva, 1999). However, the average accuracy rate of the final DST, which was slightly over 50%, still indicates that some skills developed so far were not adequate to guarantee satisfactory performance in the similar task condition as the final DST.

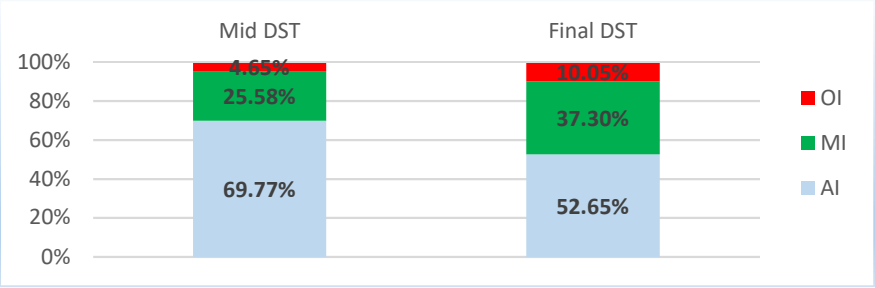

Figure 6.3 - Mid DST Vs Final DST test results in 2014

To explore whether and in what way the exercises implemented failed to contribute to the skill development from the students' perspective, the researcher analysed the students' comments in the third questionnaire. The findings show that the current DST-related exercises might require adjustments to reinforce the practice of the targeted skills.

The students' feedback revealed more details of their unaddressed deficiencies. In evaluating the difficulty levels and nominating the sources of difficulties of the DST exercises in the second micro-cycle in the third questionnaire (see Appendix 3.3), all students believed that the exercises were generally moderate but that difficulties still existed. The nominated difficulties are underlined in Table 6.13.

The main sources of challenges mentioned by these students in Table 6.13 could be associated with insufficient skills to meet some linguistic or cognitive request of the tasks. The mentioned challenges include syntactic complexity, input rate, and specialized topics with jargon. For the syntactic complexity, this could reflect deficient segmentation skill in comprehension and lack of syntactic planning in the production. For the complaint about the high input rate, the reported implication was in comprehension, which could reflect a lack of agility in segmentation of input messages. As for the difficulties in the topics and jargon, these indicate insufficient topic/thematic knowledge.

Table 6.13 - Students' evaluation of DST exercises in the second micro-cycle in 2014

Question	Choice provided	Number of choice (n=7)	Comment on source of challenge (Quoted from students' comments)
Q1. How do you describe DST exercises practiced in the second half of the semester? Why?	Easy	0	Syntactic complexity; insufficient lexical resource (14A) Challenging at the beginning and then progress has been made through practice (14B) Sometimes [I] can't keep with the speaker or totally don't know what they are talking about (14C) Familiar with the topic; no difficult terms (14D) General topics with sometimes complex syntactic structures (14E) Technical terms are difficult (14F) I'm familiar with the topics and can apply strategies we've learnt when doing ST, although some of the input rate is relatively fast (14G)
	Moderate	7	
	Challenging	0	
	Difficult	0	

These deficiencies were found aligned with those identified in Q8 of the third questionnaire, as a double-check question for existing skill deficiencies, which asked about the skills that the students still wanted to improve on. Although the responses did not entail many details, since most students only requested more exercises without specifying skills to be strengthened, the small number of specified skill requests are examined as underlined in Table 6.14.

Table 6.14 - Skills desired to be improved by the students at the end of the semester

Request for improvement	Number of choice (n=7)	Comment
More exercises	5	One hour practice is not sufficient since ST indeed helped me consolidate simultaneity in SI (14B)
More challenging exercises	2	Exercises in more specialized/technical topics and with faster unfolding and fading rates (14A) More challenging in syntactic complexity and technical terms (14D)
Nothing changed	1	Can't think of any since I really enjoyed ST exercises this semester and they helped a lot (14G)

For the students who did not specify skill requests, either they could think they had no prominent skills deficiencies to be fixed, or they were lacking confidence in all skill aspects. Judging from their test performance, the latter is more likely. For 14A and 14D who wanted to enhance skills to perform tasks with higher input rate and syntactic complexity, their focus seemed to be on analytical skills in comprehension and skills for enhanced agility.

The conjectured skill deficiencies are corroborated by the students' final DST performances and their comments on their own performance in the interview. The combined rate of segments involving partial or full omission for each student was high. Although it was acknowledged that not all omissions were mistakes, the evaluation of these omissions shows that most occurrences were invalid omissions (see Section 5.2.5). For such results, 14A, 14E and 14F explicitly reported that the fast rate led to incomprehension, so that they had to either omit the uncomprehended information, or adopt very short EVS and produce verbatim interpretation. 14E's rates of omission were particularly high, thus this student's comments were closely examined. According to the student, *"…the text simply flashes by, especially in some complex structure. It can be hard to even get the word right"*. This shows that the student had difficulties in quickly processing the input information by identifying the meaning units, let alone segmenting, which could be the main cause for omission.

To sum up, skill deficiencies still existed at the end of the second micro-cycle, although improvement was made in some skill deficiencies identified at the beginning of the semester to varying extents. The lack of agility in executing the cognitive processes remained, especially in the DST exercises that feature advanced dynamicity level and high input rates. It appears that the students required more time and more practice to enhance these skills in such task condition. Given that the teaching time allocated to DST component was definite in each cycle, expedited progression of exercises was thus considered for improved results of skill development in the following round of action.

6.4.2.3 The success and failure of DST-related exercises for skill transfer

Employed as a didactic tool for the teaching of SI, DST-related exercises have their ultimate value in transferring the subskills developed via these exercises to SI. The evaluation of their transfer effects mainly depends on the feedback from the students. This is because the DST-related exercises are only one teaching element among other elements and units in the MCI curriculum, and it is difficult, if not impossible, to directly and quantitatively assess the effect of transfer between tasks by calculating the proportions (Burke, Jones & Doherty, 2005; Roscoe & Williges, 1980). Therefore, the present AR was not intended to establish the quantitative contribution of the DST-exercises to skill transfer in SI, but to make a qualitative analysis on how effectively they could help skill development and transfer. Since the theoretical review supports the cognitive prerequisites for transfer between DST and SI (see Section 3.5), the hypothesis was that a synclastic performance between DST and SI could be found to be a function of the transfer. The findings indicate that some reported skills developed through the

implemented exercises could be transferred to SI to some extent; while which skills and to what degree they were transferred could vary among individuals.

6.4.2.3.1 Inexplicit transfer reflected in the final test

No explicit trend or pattern of transfer could be found in the researcher's performance analysis of the final DST and SI. The researcher compared the group average of accuracy (AI), misinterpretation (MI) and omission (OI) rates between the two tasks, as shown in Figure 6.4; and then compared AI and OI rates for individuals between the two tasks separately, as shown in Figures 6.5 and 6.6. None of these comparisons shows a distinctively synclastic trend between the performances for final DST and SI.

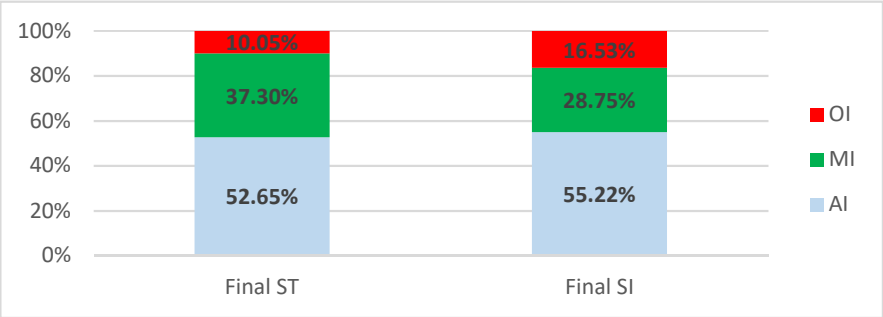

Figure 6.4 - Final ST vs. Final SI average performance comparison

On average, the comparison results do not show definite transfer patterns. The average accuracy rate was higher in SI, indicating that the performance was better in the final SI; while the average omission rate was also higher in final SI, indicating otherwise.

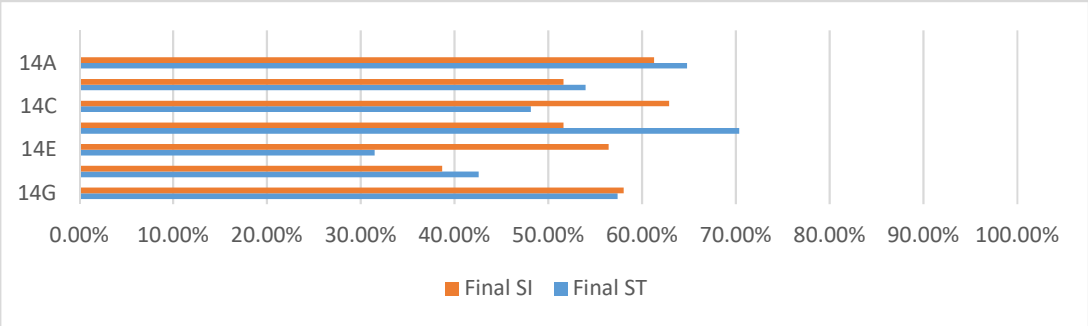

Figure 6.5 - Final ST vs. SI accuracy rate comparison for individuals in 2014

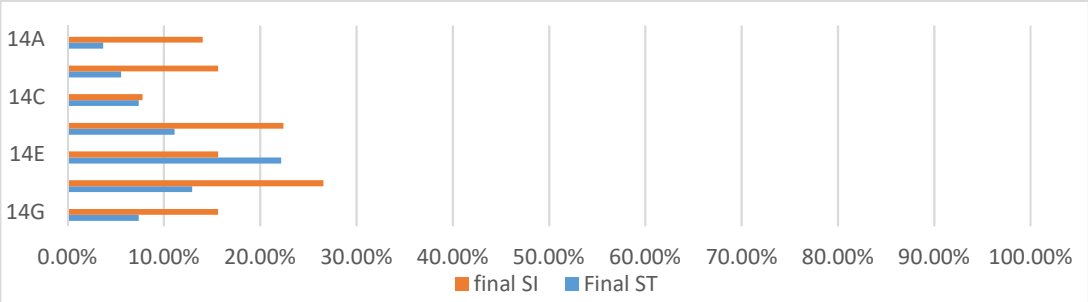

Figure 6.6 - Final ST vs. SI omission rate comparison for individuals in 2014

Individually, the accuracy rate comparison in Figure 6.5 does not show any obvious patterns. The inter-task difference in AI rate was relatively small in 14A, 14B, 14F and 14G, but is noticeable in others.

In terms of omission rate comparison in Figure 6.6, six out of the seven students (14E as the only exception) had higher OI in SI, and six students show noticeable inter-task difference (14C as the only exception).

As a whole, the ambiguous patterns revealed from the statistics make it difficult to draw a definite conclusion of skill transfer.

6.4.2.3.2 Supporting evidence of skill transfer from the students

From the students' perspective, the existence of skill transfer was explicitly acknowledged in the third questionnaire and interview, where responses to different questions corroborated one another. In Q3 of the third questionnaire, when the students were asked whether some skills practiced and acquired in the DST-related exercises could be useful in SI, all the seven students answered yes. In Q4, as a multiple-choice question, they made choices of skills that they thought were transferred to SI, as shown in Table 6.15.

Table 6.15 - Reported skills transferred to SI in 2014

Choice of skills that were transferred	Number of choice (n=7)
Agility in translation retrieval	6
Availability of techniques and strategies	5
Accuracy and swiftness in comprehension	4
Simultaneity	4
Confidence in transition from consecutive to SI mode	1

As a verification question for the reporting on transferred skills in the third questionnaire, the same question was raised in Q5 of the final interview as an open question. The students confirmed the effect of skill transfer by the following comments, with the key terms indicating the transferred skills underlined as follows:

"*Yes. DST definitely helps with my equivalent retrieval. Also anticipation is quite helpful. I can predict better what to come next." (14A)*

"*DST sort of pushes me to SI".* (14C)

"Yes, it is quite helpful, especially the ways to deal with sentence structures." (14D)

"Yes, definitely. For example, anticipation. Clozing DST exercises help me to develop the awareness and how. (14G)

The transferred skills mentioned by the students are consistent with the choices they made in Q4 of the third questionnaire (see Table 6.15). As the underlined terms show, retrieval of

translation corresponds with agility in translation retrieval, anticipation could find its counterpart in the choice of availability of techniques and strategies, and ways to deal with sentence structures could be associated with segmentation skill that contributes to comprehension efficiency.

In identifying the function of dynamicity levels in the skill transfer, the students were required to name the most useful dynamicity level(s) for their skill transfer in Q5 of the third questionnaire. Five students chose Level 3 dynamicity, two chosen Level 2 dynamicity, and one chose Level 1 dynamicity. The choices suggest that higher dynamicity levels were perceived by the students to be more conducive to skill transfer for SI. The fact that the most students chose Level 3 dynamicity could indicate that the advanced dynamicity level designed to maximally simulate SI provides the most assistance of skill transfer to the novice students.

In particular, the transfer of anticipation was mentioned by the students in the comments. Given that the cloze DST was used in particular for the practice of anticipation, the researcher could make a hypothetical link between this exercise type and the transfer of anticipation to SI.

6.4.2.3.3 Failure in skill transfer

Although the students acknowledged the existence of transfer, failure of transfer also existed in terms of the unsatisfactory extent of transfer. The findings show that some skills developed via DST-related exercises could not be successfully transferred to SI. That is, the students claimed that some skills were well applied in DST, but not similarly well in SI.

These skills were identified by the students in Q6 of the third questionnaire, when the students were asked to choose skills that were better applied in DST than in SI. The results are shown in Table 6.16.

Table 6.16 - Reported skills not fully transferred in 2014

Skill not fully transferred to SI	Number of choice
Simultaneity	5
Accuracy and agility in comprehension	3
Fluency	3
Quick retrieval of translation	3
Expressional appropriateness	2
Syntactic handling	1
Use of strategies	1

The results show that simultaneity was chosen by the most students, which could mean that some subskills enabling simultaneity, or the coordination of attention among multiple tasks,

were not well transferred. The following three most chosen choices directed to skills for comprehension, translation and production respectively.

To explore the students' feelings about the transfer in detail, they were invited to comment on the skill transfer in Q4 of the interview (see appendix 3.4), "*What do you think of the usefulness of the DST-related exercises for SI?*" Unfortunately, the students did not explain or comment much on unsuccessful transfer from which finding could be barely made. Only 14F commented on unsuccessful transfer of strategy use that "*…at this stage, I didn't pay much attention to strategies in SI. Though I know about the strategies, I can only rely on automatic response in SI".* Since the student acknowledged the understanding of strategies but also mentioned in the interview that it was a tendency to adopt very short EVS and even produce verbatim interpretation, it appears that the issue of transfer might lie in inadequate segmentation rather than in use of strategy per se. However, with limited information, it is difficult to draw any conclusion concerning how and why the transfer was not successful at this stage.

6.5 Conclusion

In the 2014 cycle, the DST-related exercises implemented have both successful and unsuccessful effects in the skill development and transfer. For skill development, the early DST-related exercises featuring lower dynamicity levels and input rates focused on skill practice for comprehension in the first micro-cycle. Those exercises with controlled cognitive load and time pressure helped the students to gradually adjust to the multitasking condition and external-paced mode of interpretation. However, skill deficiencies remained reflected by the results of the mid-test and the students' feedback. In the second micro-cycle, the DST at higher dynamicity levels and input rates helped the students to improve their processing agility and use of strategies. Nevertheless, skill deficiencies remained when the input rate was raised to 120-130 words/minute, as mainly seen in slow segmentation, translation retrieval, and failure in delivery planning.

In terms of skill transfer, the students generally acknowledged that DST-related exercises could transfer some essential skills to SI. However, for some skills, failure of transfer was reported in that some developed skills could not be similarly applied in SI. It was unable to make any conclusion about the cause of transfer failure from the limited data collected in this regard during this cycle.

The remaining skill deficiencies and the failure in transfer made the researcher reflect on the DST-related exercises implemented in this cycle. In the following rounds, some adjustments to

the DST-related exercises would be made to explore whether better results in skill development and transfer could be achieved; and more targeted information would be sought to identify possible causes for failure. The changes are reported in Chapter 7.

7 CONSTANT ADJUSTMENT IN ACTON: SEARCHING FOR SUCCCESSFUL SKILL DEVELOPMENT AND TRANSFER VIA DST-RELATED EXERCISES

One prominent feature of AR, that constant reflection and changes are made in line with the data collection and analysis (Kember, 2000), was manifested in the reflection and adjustments made during the present AR, which aimed at: 1) improving the efficacy in skill development and transfer; and 2) searching for more student-tailored didactic solutions. To fulfil these two tasks, some of the adjustments were made in response to failures of skill transfer identified in the earlier round and some to skill deficiencies yet to be addressed. Other adjustments were merely ad-hoc adjustments, mainly responding to the students' negative feedback and reaction towards the teaching. Due to the limited number of participants in each of the three action rounds, some adjustments were tested repeatedly for their effects and efficacy, unless and until some special circumstances in the round that followed rendered them inappropriate.

This chapter presents and reviews these adjustments made in the rounds of 2015 and 2016 supported by the data and analysis of 2014 results. Since the adjustments were made in an attempt for better skill development and transfer in 1) comprehension, and 2) translation and production, the report of adjustments comprises two sections accordingly, in each of which the reasons for the adjustments, their implementation as solutions, and the analytical presentation and interpretation of the results, are presented and discussed. The findings show that some of the adjustments could indeed improve skill development and transfer as intended, whereas others were not as effective as expected due to varying reasons.

7.1 To improve skills for comprehension

In 2014, deficiencies in skills for comprehension were discovered as a prominent issue from the teaching of DST-related exercises. The students showed a lack of agility in information processing primarily induced by inadequate input text analysis under the temporal pressure, which foregrounds two main comprehension deficiencies to be consolidated: 1) identification of meaning units; and 2) computation of the relations among meaning units. Given that parsing and meaning integration are important elements of the comprehension process in interpreting (Moser-Mercer, 1995), a two-pronged adjustment was made to the use of DST-related exercises in both 2015 and 2016. While Level 3 dynamicity was introduced earlier to increase the simulation of SI in terms of temporal pressure and push for processing agility, more emphasis was given to the application of strategies that can help with identifying and integrating meaning

units in the input processing, i.e. anticipation and segmentation, by moving them forward in the teaching plan. Further details of the two adjustments are presented in the following sections.

The findings show that the adjustments led to different results. The earlier introduction of Level 3 dynamicity did not prove instrumental to the enhancement of agility in text analysis as expected. The adjustment to the teaching sequence of strategies, however, proved effective and useful in improving the consciousness and mindfulness of strategy choices, which could be helpful for improving comprehension efficiency in a long run, though no immediate success could be measured in the performance.

7.1.1 Adjustment 1 - earlier introduction of Level 3 dynamicity

7.1.1.1 Reason for adjustment

The issue of comprehension efficiency compromising accuracy and agility was unaddressed by implementing the design exercises in the first micro-cycle in 2014, and was later continuously found to be a prominent challenge facing the novices in the pre-test results of both 2015 and 2016, which all necessitated adjustments in teaching to improve the agility of input text analysis.

The lack of agility in text analysis was identified in 2014 as an unaddressed issue after the implementation of the DST-related exercises at Levels 1 and 2 dynamicity. Despite the focus on the skills for comprehension of these exercises in the first micro-cycle, the students' mid-test performance and their feedback still showed that they could not quickly identify units of meaning or segments in on-line processing of the input texts displayed at Level 3 dynamicity.

Besides this, the students' pre-test results in 2015 and 2016 again cried out for the necessity to enhance the agility in input analysis under the task condition involving simultaneity. A change to the pre-test type was made after the 2014 round: that the original CST was replaced by DST of Level 1 dynamicity. The rationale for the replacement was based on the following considerations: 1) the limitations of CST; and 2) the matching between the test and the students' skill levels. The CST could not truly reveal the students' skill deficiencies under explicit temporal pressure. However, a task that highly simulates SI could be too cognitively demanding for the novice students. To attend to both issues, DST of Level 1 dynamicity and at the input rate of 90 words/minute was adopted, a task that could moderately simulate SI in terms of temporal pressure but is not too cognitively challenging for the novice students. The test results show that the common deficiencies at the beginning of the semester were quite similar to those found in 2014. Moreover, the deficiencies in comprehension became more evident when

temporal pressure increased. For instance, omissions of important information and incidences of misinterpretations were more frequently detected as recurrent cases.

In addition, the students' self-reflection after the test also supported the observation in 2014: that the difficulties in performing the task are commonly derived from the deficiencies in agility of input processing. The students' feedback reflecting on the comprehension difficulties in the two years were analysed, and these comments were categorized as indications of cognitive and linguistic deficiencies, either explicit or implicit, as presented in Table 7.1.

Table 7.1 - Comments on comprehension difficulties in the pre-test in 2015 and 2016

Indicated comprehension deficiency	Explicit indication	Implicit indication
Cognitive	*(Poor) Analysis ability in English (15B)* *Low reading speed (15D)* *Little time to fully go through a complete sentence (15G)* *Too slow in reading and couldn't grasp the main idea quickly (15J)*	*I failed to read before the text disappeared. (16A)* *Lack of speed in information processing. (16C)* *Problems in understanding sentences comprehensively & slow reading speed. (16D)* *Sentence structure (16E)*
Linguistic	*Some key words were not understood (15C)* *Poor grammar (15 D)* *Key words which I do not know (15E)*	

As Table 7.1 shows, cognitively, lack of agility in input analysis has been a main issue reported. The underlined comments such as "too slow", "too little time", "lack of speed" and "not in time" all indicate that the students were not agile enough to adequately process the input texts under the temporal pressure.

The rate of processing is deemed to be largely decided by an interpreter's cognitive abilities or linguistic sub-skills (Just & Carpenter, 1992), thus deficiencies in these two aspects could be major contributing factors for the reported slow processing. Since the students all had CI and CST training before undertaking the MCI course, it is reasonable to assume that they were capable of processing the input information in CI and CST. However, the abilities and skills developed in the students' previous training were not able to function normally in the pre-test as expected, due to the increase in temporal pressure and simultaneity demand.

These findings unequivocally suggested the need to balance the processing agility for simultaneity in the practice of the first micro-cycle. To this end, simulating tasks featuring higher time pressure and simultaneity demand were to be implemented in the first micro-cycle.

Level 3 dynamicity, designed to maximally simulate SI (see Section 5.3.1.1), was thus considered as a tool for skill scaffolding. Hypothetically, if more SI-simulated tasks were practiced, students would be more assisted in managing their comprehension to satisfy the temporal and simultaneity demand in SI practice.

7.1.1.2 Implementation of adjustment and results

With the causes identified above, the designed features of Level 3 dynamicity theoretically met the requirement and were thus introduced earlier to expose the students to more exercises that simulate SI maximally in terms of temporal and simultaneity condition. Following the same dynamicity progression from Level 1 to Level 3 (see Section 5.3.1.1), they were increased to Level 3 in Week 5 in 2015 and 2016, instead of Week 7 in 2014.

The earlier application of Level 3 dynamicity was to testify whether more exercises that maximally simulate SI in terms of temporality and simultaneity could be conducive to improving input analysis agility, and thus the comprehension efficiency. The efficacy was evaluated at the end of the first and second micro-cycles. The results show that, in terms of skills development and transfer, the core objectives of the present AR, little that was satisfactory in either aspect appeared to have taken place.

7.1.1.2.1 Effects on development of input processing agility

To find out the effects of the adjustment on input analysis agility, the students' mid-test performance was analysed. The researcher expected that improved processing agility could lead to higher comprehension accuracy under the time pressure, and the analysis was thus on the accuracy of the production which reflects the comprehension accuracy. The rates of accurate interpretation (AI), misinterpretation (MI) and omission (OI) in the interpretation in the mid-test of 2015 and 2016 were measured and then compared with those in 2014, as presented in Figure 7.1, to see whether the adjustment led to higher accuracy rate in interpretation, which could be a manifestation of an improved processing speed.

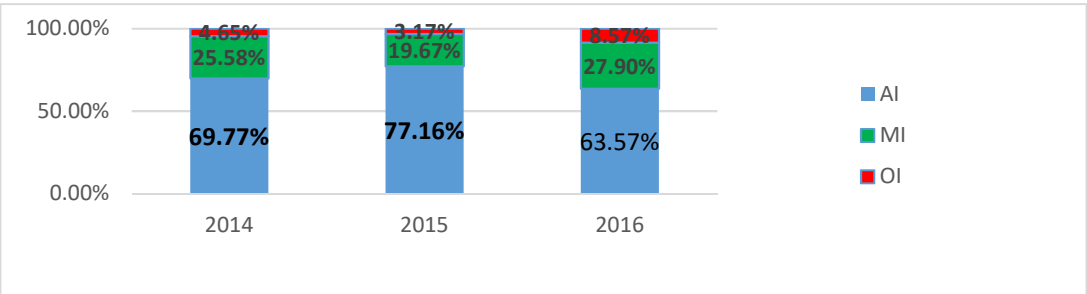

Figure 7.1 - Average performance comparison of Mid-DST among three years

As Figure 7.1 shows, the adjustment led to different results in 2015 and 2016 compared to 2014. The higher accuracy rate (AI=77.16%) and lower omission rate (OI=3.17%) in 2015 suggest the effectiveness of the adjustment. However, the performance in 2016 after the implementation of the same adjustment was weaker (AI=63.57%, OI=8.57%), even inferior to that of 2014 (AI=69.77%, OI=4.56%). The comparative statistics show that, though effective in 2015, the adjustment was otherwise in 2016.

Similarly, a mixed result was found in the students' feedback collected from the questionnaire subsequent to the mid-test (see Appendix 3.2). To explore whether comprehension remained as the students' main concern after the adjustment, the students were surveyed to reflect and then report on their prominent difficulties in the mid-test. The choices of difficulties in Q5 were categorized by interpreting efforts defined by Gile (1995a/2009); and the counts of choices in each effort are shown in Table 7.2.

Table 7.2 - Prominent difficulties of the mid-DST reported in 2015 and 2016

Associated Effort	Difficulty in the mid-test	Number of choice		
		2015 (n=11)	2016 (n=6)	Total (n=17)
Comprehension	agility and accuracy in comprehension	2	1	3
Translation	agility in equivalent retrieval	4	3	7
Production	syntactic reformulation	4	1	17
	Expressional appropriateness	6	3	
	fluency	3	0	
Coordination	Simultaneity	2	2	4

Table 7.2 shows that comprehension agility and accuracy seemed not a major concern in the two years, since only three out of seventeen students chose this option as the prominent difficulty. Comparatively, more students expressed concerns about insufficient skills for translation (n=7) and production (n=17). In comparison to the reversed case in the pre-test comments (see Table 7.1), this appears to affirm that the implemented adjustment might be instrumental in improving the input analysis agility and thus in better accuracy in comprehension.

However, the students' feedback on the developed skills subsequent to the implemented adjustment indicates otherwise. When they were required to nominate the skills developed in the first micro-cycle (Q3), the option of comprehension skill development was only chosen by

a small number of students. Table 7.3 shows the counts for the choice of skill development categorised by associated efforts.

Table 7.3 - Choice of skills developed at the mid-semester in 2015 and 2016

Associated effort	Skill developed through DST–related exercises	Number of choice		
		2015 (n=11)	2016 (n=6)	Total (n=17)
Comprehension	agility and accuracy in comprehension	3	2	5
Translation	agility in equivalent retrieval	3	0	4
Production	fluency	5	3	11
	delivery appropriateness	2	1	
Coordination	simultaneity	7	2	9

Table 7.3 shows that comprehension skill development (n=5) was chosen less than production skill development (n=11). Even for the students in 2015 who presented a better mid-test performance, only three out of eleven acknowledged the development in comprehension skills with the adjustment. This suggests that the better average performance achieved in 2015 might not be directly the result of improved agility and accuracy in input processing. Given the intended purpose of improving agility in input analysis as a comprehension skill and the mixed findings of the results, it is impossible to make a convincing conclusion about the efficacy of the adjustment on the skill development in this regard.

7.1.1.2.2 Effects on transfer of input analysis agility

With skill transfer, the findings at the end of the second-micro cycle show that the adjustment in the dynamicity progression did not make a prominent difference to transferring quick input analysis skills to SI. Due to the difficulties in measuring transfer directly and quantitatively (see Section 2.2.1), the evidence was mainly harvested from the students' reflection and analysed qualitatively, which shows that the transfer effect is inconspicuous after the adjustment.

The first evidence was found from the students' report on the transfer in the third questionnaire (see Appendix 3.3). Only six out of seventeen students in the two years reported their success in transferring comprehension skills. Comparatively, more students acknowledged the skill transfer in other two efforts: translation and production.

The inconspicuous impact on the transfer of input analysis agility was found again from the students' report of skills that were not well transferred to SI (Q6). To make out the meaning of their choices, the counts of choices were categorised by associated efforts and shown in Table 7.4.

Table 7.4 - Student choices of skills NOT well transferred to SI in 2015 and 2016

Skill NOT well transferred to SI		Number of choice		
		2015 (n=11)	2016 (n=6)	Total (n=17)
Comprehension	Accuracy and agility in comprehension	7	1	15
	Use of comprehension strategies	4	3	
Translation	Agility in equivalent retrieval	3	1	4
Production	Fluency	4	0	18
	Syntactic transformation	6	1	
	Expressional appropriateness	4	3	
Coordination	Simultaneity	1	3	4

Table 7.4 shows that comprehension skills were chosen 15 times, of which 8 were for speed and accuracy in comprehension. This indicates an unsatisfactory transfer effect of quick input analysis perceived by these students. In comparison, however, 2016 witnessed a lower proportion of report on the transfer failure in this regard, showing an inter-cycle variation, which is investigated in Chapter 8.

7.1.1.3 Discussion of the results

The results jointly suggest that the earlier introduction of Level 3 dynamicity could be premature for developing and transferring skills for agile input analysis. As shown in the findings presented above, there were only a small cohort of students reporting on skill development and transfer in comprehension skills but a large number reporting on the failure of transfer in this regard. Such results indicate that the students did not perceive the implemented adjustment to be effective in improving skills constituting input analysis agility. As a result, the less reported concerns for comprehension at the mid-semester in 2015 and 2016, and the better performance of mid-test in 2015, could not be directly attributed to the improvement in comprehension skills. Instead, an alternative explanation appears to be more likely.

That there were fewer concerns reported on comprehension is possibly because the students' focus was diverted in the changing condition triggered by the Level 3 dynamicity. According to the intention of the design, Levels 1 and 2 dynamicity impose time pressure mainly on one cognitive process: either on the comprehension or the production process. However, Level 3 dynamicity, which features a higher degree of information evanescence, presents salient time pressure to both input processing and speech production. With time pressure higher and unaddressed deficiencies in comprehension, the students would immediately find their production to be much worse when they had to allocate their definite attention to both comprehension and production. The salience of the declined output quality could have alarmed

the students, so that their concerns on their production efforts outweighed their concerns over comprehension. This explains the finding that students feedback showed more reporting on the production-related difficulties, improvement of relevant skills, and failure in skill transfer (see Tables 7.2, 7.3 and 7.4). This also in part explains why more students in 2015 and 2016 reported their progress in simultaneity at the mid-semester. Because of their shifted focus, the students might need to examine and adjust their attentional allocation to different sub-processes, thus becoming more conscious of attention management. As for the better test performance in 2015, it might be due to the group superiority in cognitive capacities and interpreting skills originally, compared with students in the other two years.

The pedagogical implication of the findings was that the earlier introduction of Level 3 dynamicity was premature, especially when skill development was still focused on comprehension. The high evanescence effect of the textual display at Level 3 dynamicity requires a considerable share of novice students' cognitive resources to manage the production effort, possibly adversely diverting the students' attention away from the intended training focus of skill development. Comparatively, the dynamicity at lower levels could constrain the imposed cognitive load and thus be more helpful in developing and consolidating comprehension skills.

7.1.2 Adjustment 2 - shifted emphasis on strategies

The findings in 2014 show that the prescribed sequence of strategies was not aligned with the practical need of the students' skill development. As a result, an adjustment was made to shift the original emphasis on omission to anticipation and segmentation, with a view to providing more assistance to improve novice students' active input processing and enhance agility and accuracy in comprehension. The results show both positive and negative effects of the adjustment implemented.

7.1.2.1 Reason for adjustment

2014 findings prove that the use of omission as strategy cannot generate its due effects when students are still weak in comprehension-related skills. As reviewed in Section 5.2.5.2 1.1, omission is commonly adopted by SI interpreters to temporarily alleviate cognitive burdens and not all omissions are erroneous and cause significant information loss (Livingston, Singer & Abramson, 1994; Napier, 2004). Researchers have different criteria for justified omissions. According to Gile (2009), omissions are justified when the omitted segments are redundant or known to the audience. Pym (2008) gauges the omissions by arguing that justified omissions should not undermine the communication aims. With this contextual prerequisite, Pym (2008,

p. 91) makes a distinction between high-risk and low-risk omissions, only considering the low-risk omissions to be valid because high-risk omissions "jeopardize the fundamental aims of the communication act", while low-risk ones do not. For Napier (2004, p. 125), the omission category of "conscious strategic omissions", coined by her, are valid omissions which result from deliberation based on linguistic and cultural knowledge.

In reference to the functions of omission and the criteria for justified omission, it was hypothesized that, if the novice students can improve their skills in omitting insignificant information upon their deliberation, the practice of making justified omissions could help the students to alleviate cognitive load when they were always at the verge of global cognitive saturation or deficit in individual efforts (Gile, 1997b) without causing significant information loss or disruption to the communication. As a result, omission was discussed and practiced early in the teaching of 2014, with an expectation that the subsequent better selection of information could help to improve the comprehension efficiency and spare more cognitive resources. However, the results were unsatisfactory in terms of the quality of omission and its intended benefits for comprehension.

After the mid-test in 2014, the students generally reported that their omissions in the test were unintentional but occurred when there were insufficient processing capacities to comprehend or deliver the omitted segments on line. Strategic omissions committed after the identification of primary and periphery information were not reported at all. This was also the case at the end of the second micro-cycle. When the students were surveyed about the omissions they made in the final DST test, all seven students recalled that most of their omissions were still triggered by incomprehension of information segments or failure to translate and deliver production for the segments. Only two students reported, each once, that the omitted information was considered redundant and repetitive. The types of omissions reported by the students were consistent with the findings from the performance analysis by the researcher that most omissions in the mid-test and final DST test were "high-risk" omission according to Pym's (2008) criteria. As such, these "high-risk" omissions only led to more loss of information and disruption of communication.

An explanation for this is that it could be too demanding for the novice students to make valid omissions at the early stage of their training. Interpreters can only reduce high-risk omissions when they have the capacity to select information on two conditions: to have spare cognitive resources rather than in cognitive saturation (Pym, 2008); and to mobilize the linguistic and cultural knowledge (Napier, 2004). These prerequisites for making valid omissions can be difficult to achieve by novice students due to their insufficient processing capacity to assess

each omission to be committed. Consequently, they are more likely to miss a segment in listening and analysis or find a segment disappear from the short-term memory (Gile, 1995a/2009). Even when novice students try to make valid omissions by engaging their processing capacities and relevant knowledge for information evaluation, they will find their cognitive resources too limited, leading to further local or overall saturation (Gile, 1995a/2009, 1997b). An omission strategy that hypothetically could alleviate the cognitive burden was, in reality, more than what the students were capable of at the early stage of learning. Therefore, omission should not be practiced as a prioritized strategy for efficient comprehension.

Instead, anticipation can be a more adequate substitute. Disfavouring omission, Andres (2014, p. 109) recommends anticipation as a prioritized strategy for comprehension, because anticipation contributes to the proactive processing and mastery of input information.

The other ill-sequenced strategy was segmentation. In 2014, segmentation was discussed in the second micro-cycle, on the ground that parsing is a natural process of discourse analysis in comprehension due to the restraint in the human information processing system, and that people employ parsing unconsciously (see Van Dijk & Kintsch, 1983). Parsing involves dividing and regrouping the units of the source text in a different way compared with the original structure (Seeber & Kerzel, 2012), which is closely associated with segmentation as a strategy. The researcher thus hypothesized that, after the students had done parsing and theorized their own problems under the simultaneous task conditions, the discussion of segmentation might make more sense and become easier to master. Following this assumption, a tentative plan for the 2014 round was made to discuss segmentation in the second micro-cycle.

The findings after the implementation of this tentative plan in 2014 show that the original hypothesis appeared to be false. The discussion of segmentation as strategy after the students' own parsing in the text analysis did not help to quickly inform the practice as envisioned, in that many students continued reporting that the deficiency in segmentation compromised their comprehension agility and accuracy in the final test. This suggested that the self-directed parsing did not provide much assistance to the subsequent practice of the segmentation strategy and did not make it easier to be mastered. Instead, more helpful in developing a targeted skill is making clear directions, followed by constant retrieval and use of the knowledge with purposeful analysis and internalization (Anderson, 1982).

All the findings above indicate that the priority given to omission as a strategy in 2014 was inappropriate. Rather than alleviating the cognitive burden, it was found to be cognitively too challenging for the students to apply at the early stage of learning. Therefore, more emphasis

should be placed on those strategies that feature efforts in active text analysis to serve the purpose of improving the accuracy and speed of input analysis in comprehension (Andres, 2014).

7.1.2.2 Implementation of adjustment and results

To act on the shifted emphasis on strategies in teaching, anticipation and segmentation were brought forward before omission in 2015 and 2016.

For anticipation, its role in active processing for comprehension was discussed and practiced early in the first micro-cycle of two years. Cloze exercises were introduced to the class earlier for practicing inference making. For segmentation, its discussion and practice were also moved forward to the first micro-cycle, when different types of segmentation were explained, and discussions about how to segment were made with specific examples from the in-class exercises.

The effects of the adjustment were tested through the mid-test and final test. Combined with the findings from the subsequent questionnaires and interview, the results show that the rearranged sequence of the strategy teaching led to different results in terms of skill development and transfer in the strategy use. The adjustment mainly exerted an influence on the students' consciousness of strategy choices that could be transferred to SI. However, the adjustment did not necessarily contribute to significant and immediate quality improvement in the strategy execution or in comprehension accuracy. The effects on the three strategies involved in the adjustment, anticipation, segmentation and omission, are reported separately in terms of development and transfer.

7.1.2.2.1 Effects on anticipation

With the adjustment, the students were more conscious about the value and use of anticipation, though no better performance in anticipation was observed.

The students' increased awareness of using anticipation was shown in the questionnaire after the mid-test (see Appendix 3.2). When surveyed about the strategies used in the test (Q6), seven out of thirteen students in 2015 and three out of six students in 2016 reported anticipation, higher in proportion than in 2014.

Besides this, the value of anticipation in enhancing the input processing was more acknowledged as a skill to be transferred at the end of the semester. The students in 2015 and 2016 made more comments in the interview about the usefulness of anticipation in comprehension when they performed SI, such as: "[it is] *really* <u>*helpful in understanding*</u> *the*

source text (16A)", and "[it] helps me to catch up the speed and produce complete and understandable sentences" (16D). These underlined comments show that anticipation was perceived to improve the input processing with higher agility and accuracy in comprehension for SI by the students.

Nevertheless, what needs to be pointed out is that the improved consciousness of using anticipation did not equate to better implementation of the strategy, as shown in the results of the cloze blanks in the final DST (see Appendix 5) which were designed to assess the students' skill in making inferences. Compared with the 2014 results, the percentage of accurate anticipation, including both extract and generic anticipation (see Section 5.4.2.1.2.1), did not show significant increase. The comparison is presented in Table 7.5.

Table 7.5 - Comparison of cloze blank results in final DST in 2014, 2015 and 2016

Years / Percentages of different types of anticipation	2014	2015	2016
Extract anticipation	33.33%	28.13%	33.33%
Generic anticipation	9.53%	6.675	5.66%
Erroneous and missed anticipation	57.14 %	65%	61.1%

Table 7.5 shows that, compared with 2014, erroneous and missed anticipation still accounted for the majority, and the percentage of extract anticipation did not increase in 2015 and 2016, indicating that the earlier introduction of anticipation in the strategy teaching sequence did not result in improvement in the quality of anticipation.

7.1.2.2.2 Effects on segmentation

Earlier discussion and practice of segmentation led to remarkable changes to the development and transfer of this strategy. Practicing this strategy with clear directions earlier made the students more aware of its value and use, thus making it more ready to be transferred to SI. Evidence is found in the students' comments on whether and how segmentation was useful in their practice in comparison to those in 2014.

With the adjusted sequence, segmentation became one of the most useful and most used strategies in the two years. In the second questionnaire, ten out of seventeen students in two years chose segmentation as the most used strategy in the test (Q6), indicating their consciousness of strategic parsing during the input processing.

Additionally, the adjustment led to more comments on the benefits of segmentation for comprehension in the mid-term questionnaire. These comments reflect, explicitly and implicitly,

how segmentation helped with the students' comprehension; and the benefits are drawn from these comments, as presented in Table 7.6.

As shown by the underlined comments in Table 7.6, the students reported the benefits of segmentation in dealing with the temporal pressure, manifested in identifying and integrating the meaning units. The benefits for comprehension is further supported by the reported benefits from the reduced burden of WM. Since WM plays a significant role in comprehension by temporarily storing processed information and computing the relation between earlier and subsequent information for information integration (Baddeley & Hitch, 1974; Carpenter & Just, 2013; Newell & Simon, 1972), the reduced burden on WM must result from more effective storage and/or computational function. Given that the storage capacity was unlikely to expand within a short period of six weeks, a more reasonable explanation could be that segmentation helps with identifying the boundaries of information segments and/or informational computation, thus contributing to the comprehension efficiency.

Table 7.6 - Reported benefits of segmentation for comprehension in 2015 and 2016

	Comment on benefits of segmentation	**Indicated benefit for comprehension**
Explicit Indication	*Segmentation helps to reduce the burden of working memory. (15B)*	Free space for working memory
Implicit Indication	*Segmentation can enable me to cope with complex syntactic structures. (15G)*	Syntactic processing
	It was unfolding and vanishing at the same time at a very high speed, I didn't have the chance to see the whole sentence at once, so I had to chunk. (16C)	Information computation and integration
	And also, due to time limitation, I can't afford to wait until the end of the sentence to start interpreting but use segmentation. (16B)	Meaning unit identification and computation

In terms of skill transfer, evidence shows that discussing segmentation earlier in the teaching made it more readily transferrable to SI. For instance, in the final interview, 15B, 15E and 15I all emphasized that the discussion of and clear directions on how to segment in the DST-related exercises led to their purposeful implementation of and subsequent reflection on the use of this strategy in multitasking conditions, further actuating them to apply segmentation in SI practice. The students also reported the same benefits of segmentation in SI as reported in DST, which indexes a successful transfer.

7.1 2 2.3 Effects on omission

The findings show that the changed sequence of strategy discussion in the teaching did not influence the students' choice and use of omission as a preferred strategy. This can be seen from the students' choices of useful strategies at the end of the first and second micro-cycles, as shown in Table 7.7.

Table 7.7 - Useful strategies reported at the end of first and second micro-cycles in 2015 and 2016

Choice of useful strategy	Number of choice at the end of first micro-cycle			Number of choice at the end of second micro-cycle		
	2015 (n=11)	2016 (n=6)	Total (n=17)	2015 (n=11)	2016 (n=6)	Total (n=17)
Summarization	4	*3*	*7*	*5*	*4*	*9*
Segmentation	3	*3*	*6*	*4*	*4*	*8*
Omission	3	*3*	*6*	*4*	*3*	*7*
Anticipation	2	*1*	*3*	*3*	*4*	*7*
Generalization	2	*0*	*2*	*4*	*0*	*4*

Table 7.7 shows that omission was always among the most chosen options of useful strategies. Compared with the two strategies, anticipation and segmentation, which were given more emphasis for adjustment, omission was chosen by almost the same number of students over the two years. This nuance shows that the students tended to resort to omission regardless of when it was discussed in the teaching.

Furthermore, the emphasis placed on information selection, important as it is, could not immediately help the students to take full control of when and what to omit, as found from the students' comments on their use of omission. In the final interview, the students suggested that, despite understanding the difference between primary and secondary information, most omissions were still unintentional rather than after a deliberate distinction between primary and secondary information. Examples can be found in the following comments on omissions made by the students:

I omit because the text was vanishing fast and I also wanted to maintain a smooth delivery with the same pace. (15H)

Omitting makes life easier. (15I)

Omission saves time and efficiency to achieve fluency (16A)

Because of the fast speed, it is necessary for me to omit something to follow the text. (16D)

As the underlined comments indicate, omission was mainly triggered to reduce the contents in order to shorten the time for comprehension effort regardless of the significance hierarchy of the omitted contents. This was consistent with the analysis results of the omission validity for

the final DST in 2015 and 2016. In reviewing the students' test performance, high-risk omissions still accounted for the majority, indicating that the students were not able to effectively distinguish between primary and secondary information. This is also consistent with the findings in 2014 in this regard.

7.1.2.3 Discussion of the results

Based on the results presented above, it is concluded that the shifted emphasis of strategy teaching was necessary due to the pedagogical implications in two aspects.

Firstly, more emphasis placed on anticipation and segmentation indeed resulted in the students' improved consciousness of the use of these strategies. With such strengthened mindfulness of these strategies, the novice students would be more likely to deliberately use them when necessary and reflect on their effects in use.

The greater use of these strategies was proven to be contributing to active processing in comprehension, based on the differences before and after the training. Before the training, the students reported a passive tendency in input processing. In the survey about strategies after the pre-test (see Appendix 3.1), the students generally reported that they tended to speak fast, omitted or just gave up delivery, when lagging behind the input texts was occurring or impending. Comparatively, a more proactive approach in processing, featuring preference for and conscious use of anticipation and segmentation, was reported at the end of the training. This proactiveness lies in that anticipation can reduce uncertainty and relieve cognitive load before difficulties appear (Gile, 2009, p. 175) and segmentation is considered as a preventive tactic to avoid potential memory overload (Gile, 2009, p. 205).

Secondly, it was proven correct that less emphasis should be placed on omission as a strategy in the teaching, since the findings show that omissions mostly occurred due to cognitive failure. Whether discussed and practiced as a strategy early or later in the cycle, omissions made in the three years of the research all featured a high proportion of high-risk omissions. To the novice students, omission was always a resort to deal with cognitive failure in two ways, to save energy, and to quickly pace themselves in line with the input texts temporarily; whereas the two purposes, making least effort and self-protection, fall within the unwelcome category of Gile's (2009, p. 218) law of strategy selection in interpreting.

Therefore, the practice of omission does not deserve too much time at the early stage of teaching. The knowledge of primary and secondary information is paramount and thus should be

established early. Except for that, practice of omission would be of little help when the students are weak in capacities underpinning the act of information selection and making valid omissions.

7.2 To improve translation and production skills

To explore exercise features that could improve translation and production skills, an ad-hoc adjustment to the unfolding/fading rate progression at Level 3 dynamicity was made in 2016. The findings show that such adjustment could be helpful in enhancing the translation retrieval and use of reformulation strategies in production.

7.2.1 Reason for adjustment

In 2016, maladaptation to the input rate progression of the exercises was detected in the performance of the mid-test. The rate progression prescribed in the teaching plan appeared to have overwhelmed the students. With the positive mid-test results obtained after the first micro-cycle in 2015, the same cohort of exercises was implemented in 2016 to further test their efficacy. Findings from both the mid-test and subsequent questionnaire pointed to a higher sensitivity to the unfolding rate increase and the necessity to adjust the rate progression in 2016.

Firstly, the performance in the 2016 mid-test was not satisfactory. The interpretation was analysed in terms of correctness and completeness, and the accuracy (AI), misinterpretation (MI) and omission (OI) rates of the performance for each individual and the group as a whole were calculated, as presented in Table 7.8.

Table 7.8 - Mid-DST performance analysis in 2016

Student / Rate (%)	16A	16B	16C	16D	16E	16F	Average
AI	60.47	93.02	39.53	44.19	86.05	58.14	63.57
MI	20.93	6.98	48.84	46.51	13.95	30.23	27.9
OI	18.6	0	11.63	9.3	0	11.63	8.53

Table 7.8 shows that the average performance of the group as a whole appeared acceptable, but four out of six students performed below the group average in terms of AI and OI rate, as highlighted in the table. Such an intra-group difference has never occurred before.

In addition, the comparison of mid-test results shows a considerable discrepancy between 2015 and 2016, as shown in Figure 7.2.

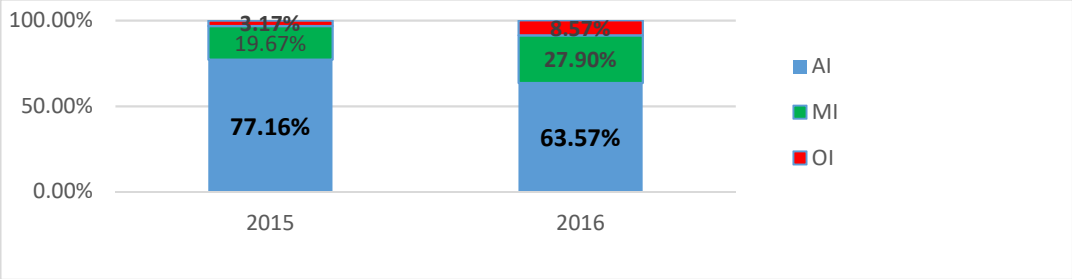

Figure 7.2 - Mid-DST performance comparison between 2015 and 2016

As Figure 7.2 shows, the mid-test performance in 2016 was much weaker as a group. Compared with 2015, the average accuracy rate was much lower (AI=77.16% vs. 63.57%) and the average omission rate almost doubled (OI=3.17 % vs. 8.57%) in 2016.

The students' comments indicate that the combination of advanced dynamicity level and high input rate was debilitating their skill development. The heavy impact of the input rate was prominent in the surveyed self-evaluation of the mid-test performance, with four out of six students rating the mid-DST as challenging, who all reported high rate as a main source of difficulties encountered. It was no accident that these four students all performed below the group average in AI and OI.

The high rate was found to be specifically linked to the incurred difficulties in translation and production from the students' responses to the questionnaire after the mid-test (see Appendix 3.2). The students were surveyed to choose specific problems in the test (Q5), and their choices were counted and categorized by associated interpreting efforts, as seen in Table 7.9.

Table 7.9 - Choices of difficulties in the mid-test in 2016

Associated effort	Choice of difficulty	Number of choice	Total (n=6)
Comprehension	Accuracy and agility in comprehension	1	1
Translation	Agility in translation retrieval	3	3
Production	Syntactic transformation	1	4
	Expressional appropriateness	3	
	Fluency	0	
Coordination	Simultaneity	2	2

As shown in Table 7.9, the highest counts were for translation (n=3) and production (n=4), indicating the student's main concerns on these two operations under the temporal pressure of the mid-DST. In other words, the students had difficulties in finding adequate equivalents and producing well-planned interpretation in the target language.

The same finding was drawn from the students' comments on skills that they wanted to enhance, at the end of the first micro-cycle. The comments on the deficiencies, explicit or implicit, as presented in Table 7.10, still concentrated on translation and production efforts under temporal pressure.

In Table 7.10, the underlined parts show that the unaddressed deficiencies were dominantly relevant to managing the rate-induced difficulties in translation and production. Comments such as "ability to switch", "equivalent retrieval" and "speak fast" could be regarded as supporting evidence.

Table 7.10 - Skills the students wanted to improve at the end of the first micro-cycle in 2016

Student	Comment on expectation of skill development	Explicit and implicit deficiencies
16 A	To help me deal with long and complex sentences.	Segmentation (comprehension)
16B	I hope to <u>improve my ability</u> to switch the part of speech while interpreting from one language to another to serve my interpreting.	Reformulation **(production)**
16C	I'd like to <u>respond and speak</u> as fast as you do. I am <u>too slow</u> at the moment.	Processing speed (comprehension) Translation retrieval **(Translation)** Delivery rate **(Production)**
16D	I would like to have exercises of different topics.	Topic knowledge
16E	Generalization; more <u>agility in</u> comprehension and <u>equivalent retrieval</u>	Segmentation (Comprehension) Equivalent retrieval **(Translation)**
16F	<u>high input rate</u>	Mental agility (Comprehension, **translation, production)**

The dominant concerns on translation and production by the students in 2016, which is similar to the case in 2015, could have different causes. In addition to the cause of diverted attention to production due to premature introduction of Level 3 dynamicity (See Section 7.1.1.3), a new factor in 2016 was that the students showed higher sensitivity to the incremental input rates when it reached 100 words/minute than the students did in 2015. Action was thus required to keep the progression of input rate moderate for students in 2016 in the second micro-cycle, to

test the influence of input rate of exercises on the skill development and transfer for translation and production processes.

7.2.2 Implementation of Adjustment and results

Based on the findings above, adjustment to the input rate progression was made in the second micro-cycle of 2016. Instead of following the same rate progression as in the previous two years, the time for DST of Level 3 dynamicity at 100 words/minute was extended by two weeks, lasting until Week 11. Then the input rate increased to 120 words/minute in the last two weeks before the final test.

The effects of the implemented adjustment were evaluated at the end of the 2016 through the third questionnaire, final test and interview. The data collected at the end of the semester show that more exercises at relatively moderate rates, i.e. 100 words/minute in the present AR, could be more helpful for the novice students to develop better subskills steadily, not only in translation retrieval and production skills as intended but also in comprehension skill.

The overall positive effects of the adjustment were reflected in the final test results. The accuracy (AI), misinterpretation (MI) and omission (OI) rates were calculated for individual students and the group as a whole, and the results are presented in Table 7.11.

Table 7.11 - Final DST performance analysis in 2016

Student / **Interpretation type (%)**	16A	16B	16C	16D	16E	16F	Average
AI	31.48	75.93	24.08	38.9	59.26	40.74	**45.06**
MI	40.74	12.96	64.81	44.44	31.48	24.07	**36.42**
OI	27.78	11.11	11.11	16.66	9.26	35.19	**18.52**

The positive finding was that more students performed above the average level. Although the intra-group variation in performance still existed, four students scored lower MI and OI rates than the average, compared with three in the mid-test.

Another evidence was found in the inter-group comparison, that better performance was found in 2016 compared with that of 2015, as shown in Figure 7.3.

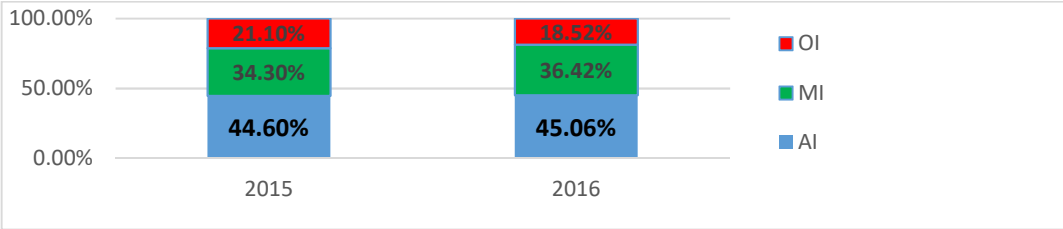

Figure 7.3 - Final DST performance comparison between 2015 and 2016

As shown, the inter-group comparison results at the end of the action cycle were reversed in those at the mid-semester. Statistically, the average performance for the mid-test in 2015 was noticeably stronger than in 2016 (see figure 7.2); while the final DST average performance in 2016 surpassed that of 2015. Given that such contrast occurred after the adjustment was made, an attempted link could be made between the adjustment and the better performance in 2016.

The students' comments in the following interview supported the findings from the performance analysis, that the better performance in 2016 benefited from the adjusted rate progression, in particular in translation and production. In the interview, all six students nominated DST of Level 3 dynamicity as the most useful exercises and listed the associated skill development. These reported skills were categorized according to the efforts they are associated with, to identify which sub-processes had prominent skill improvement after the implemented adjustment, as shown in Table 7.12.

Table 7.12 -Breakdown of skills developed through DST of Level 3 dynamicity in 2016

Comprehension	Translation	Production	Coordination
agility and swiftness in responses (16B) agility (16E) segmentation (16F)	agility and swiftness in responses (16B) agility (16E)	agility and swiftness in responses (16B) delivery efficiency (16C) flexibility in production (16C) changing words to get proper sentences, e.g. Changing nouns to verbs (16D) agility (16E)	simultaneity (16B, 16C, 16D)

Table 7.12 shows that the skills for translation and production accounted for the majority of the reported success in skill development in DST of Level 3 dynamicity, indicating the students' prominent acknowledgement of skill development in these two efforts with the adjustment. However, such result could not rule out the possibility that the acknowledgement of progress in production was simply because the tasks attacked more attention of the students as discussed in Section 7.1.1.3.

Findings from responses to other two questions in the third questionnaire proved that more reporting of development in translation and production in 2015 and 2016 were for different reasons. And the responses to the two questions corroborated each other.

One evidence was from the responses to Q4 in the third questionnaire (see Appendix 3.3). In reporting success in skill transfer, transfer in the translation and production skills was reported by the largest number of students after the adjustment, as shown in Table 7.13.

Table 7.13 - Transferred skills reported at the end of second micro-cycle in 2016

Choice of transferred skill	Number of choice (n=6)	Associated Effort
Accuracy and swiftness in comprehension	2	Comprehension
Agility in translation retrieval	4	Translation
Availability of techniques and strategies	3	Comprehension Production
simultaneity	3	Coordination
Confidence in transition from consecutive to SI mode	1	N/A

As shown in Table 7.13, the translation and production options were chosen for the most times, indicating that the students might have built better skills in these two aspects and that these skills were thus more ready for SI.

The second proof was from the students' choices of skills that were not well transferred (Q6). The numbers of choices categorized by the associated efforts were compared to those in 2015, as shown in Table 7.14, to show the different result of transfer after the adjustment.

Table 7.14 - Comparison of skills NOT fully transferred to SI between 2015 and 2016

Skill not well transferred to SI	Number of choice		Associated effort
	2015 (n=11)	2016 (n=6)	
Accuracy and agility in comprehension	7	1	Comprehension
Agility in translation retrieval	3	1	Translation
Syntactic reformulation	6	1	Production
Expressional appropriateness	4	2	
Fluency	4	0	
Simultaneity	1	3	Coordination
Use of strategies	4	3	Comprehension and production

Table 7.14 reveals that, compared with 2015, the counts of reported failure of skill transfer in agility in translation retrieval and production skills were far less in 2016. Since the rate progression was the only change implemented in the teaching, this enforces the link between the adjustment in input rate progression and better skills in translation retrieval and production.

On top of the students' reporting, evidence could be also found for the reported transfer of production skills in the final SI performance. Although it is hard to measure directly translation retrieval in interpreting, the production skills could however be evaluated in the products. The production skills intended to be developed through the exercises in the second micro-cycle included reformulation strategies as a main component, so efficacy in the use of these strategies could be a valid indicator of the efficacy of those exercises in production skills.

The performance analysis detects greater use of reformulation strategies in 2016. The interpretation of the following sentence from the final SI task is a typical example. The sentence includes a postpositive adverbial segment, as a typical linguistic difference between English and Chinese, which requires the reformulation strategy to produce natural interpretation in Chinese if the information is processed linearly. The students' interpretation (with back translation followed) was divided into segments in accordance with the segmentation of the input text, as shown in Example 7.1.

Example 7.1-Use of reformulation strategy by the students in 2016

Segment / **students**	And we want to do more	to partner with all of you here in this room and online.
16A	*我们想要做的更多,* *We want to do more*	
16B	*我们想要做更多，* *We want to do more*	*让在座的所有人， 以及网上的人都能参与进来。* *to make all present and online participate in it.*
16C	*我们想要做的更多，* *We want to do more*	*我们希望跟在场的各位， 和网络上其他人合作* *We hope to work with all present and on line.*
16D	*我们想要做更多，* *We want to do more*	*我希望在这个房间里和在线上听的人都可以做一些事情。* *I hope to do something with people in this room and those listening online.*
16E	*我们想要做的更多，* *We want to do more*	*和我们这些在座的各位一起合作。* *to work together with all present.*
16F	*我希望…* *I hope…*	*与在座的各位…* *with all present…*

In Example 7.1, except for 16A and 16F who committed omission in the interpretation for the second segment, all other students produced adequate interpretation in terms of both information accuracy and rendition naturalness. The underlined parts in the translation show

that some students used the reformulation strategy of addition to make their interpretations more natural in Chinese. In previous years, by comparison, most interpretation for this sentence was less natural.

7.2.3 Discussion of the results

The findings support the claim that the adjustment in the rate progression at Level 3 dynamicity was effective in enhancing translation and production skills. It was found to be more helpful for practicing and consolidate translation retrieval and reformulation skills, which were thus more likely to be transferred to SI.

Given that most of the DST of Level 3 dynamicity practiced in 2016 was at the unfolding rate of 100 words/minute, a tentative causal relation could be established between these exercises and the better development of translation and production skills. This is evidenced by less reporting of translation and production related difficulties and more reporting of skill development and transfer in this regard from the students' feedback, and the better test performance from the researcher's performance analysis. It is argued that training components that automatize and speed up the retrieval processes and production may be beneficial in reducing the saturation and individual deficit problems, thus contributing to the improvement of the overall performance (Groot & Christoffels, 2006); thus the better performance of final test in 2016 could be explained as benefiting from the improvement in translation and production skills as a result of the change.

In addition, an unintended benefit from this change was the reported improvement in comprehension skill development and transfer in 2016. This was mentioned by half of the students in the interview (see Table 7.12). Besides this, only one out of six students reported failure in transfer of comprehension agility and accuracy in 2016 (see Table 7.14), a much lower rate than that in 2015 (seven out of eleven). This suggests that the exercise condition that features Level 3 dynamicity and moderate input rates is more suitable for novice students. The possible explanation could be that such exercise condition simulates SI in terms of the information evanescence and simultaneity requirement; meanwhile, it keeps the temporal pressure at an acceptable level to most students without imposing overwhelming cognitive pressure. Consequently, the students have the opportunity to practice skills of all sub-processes in a focused but also balanced way, thus being more conducive to skill integration at a later stage of learning.

7.3 Conclusion

In the present AR, adjustments were made to the two features that constitute the dynamic texts, dynamicity levels and input rates; and to the teaching sequence of strategies. The findings from the adjustments all have significant pedagogical implications.

The dynamicity level and input rates must be considered as two separate yet integrated factors in deciding the simulation levels for SI. To advance the practice of skills for novices, a demanding task condition that features both advanced dynamicity levels and high input rates may not be the optimal choice. Instead, the two variables should be considered in a concerted way in manipulating the exercise features to jointly keep the task condition stimulating yet not too demanding. In terms of the dynamicity progression, the premature introduction of Level 3 dynamicity did not enhance the skills for comprehension. Instead, it could be a distraction to the training focus of comprehension agility and accuracy. In terms of the input rate, the increment must be measuredly controlled to prevent it from imposing too much cognitive burden on the students, especially at Level 3 dynamicity as the maximum. From the present findings, the combination of unfolding rate of 100 words/minute and Level 3 dynamicity made an optimal task condition, which was more conducive to the skill development and transfer. The DST exercises featuring such variable combination were nominated as the most useful exercises for skill development and transfer by the most number of students in the course for three years. As 16A commented in the interview, those DST-related exercises were particularly helpful in that they simulated SI well while the rate allowed interpreting with purposeful use of skills discussed in the class.

In terms of teaching strategies, it was found to be beneficial to place more emphasis on anticipation and segmentation and less on omission. For anticipation and segmentation, the emphasis might not improve the execution of these strategies immediately, but it helped improve consciousness of the use of these strategies and proactiveness in input processing for comprehension. This might contribute to comprehension efficiency in the long run and make these strategies more actively available for transfer to SI.

As for omission strategy, it is imperative that students understand and are able to make distinctions between primary and secondary information, but it is not necessary to invest too much time in practicing omission. The ability to avoid high-risk omissions largely depends on the capacity for information selection underpinned by cognitive capacities and the mobilization of linguistic and contextual knowledge in comprehension, so that the strategic use of omission should be naturally enhanced with the development of comprehension capabilities and skills.

The findings from the adjustments made in 2015 and 2016 show that the DST-related exercises require fine-tuning to better accommodate the students' skill development needs. By doing this, it is possible to achieve the skill teaching that serves "to isolate a student's cognitive strengths and weaknesses and, subsequently, developing interpreting strategies that will maximize the former and compensate for the latter" in SI (Moser-Mercer, 2000b, p. 85).

The actions in all three years have been reported in detail. This leads to a comprehensive reflection on and analysis of the manipulation of the exercise features to identify the merits and demerits of DST-related exercises, and the role of AR in the present exploration of skill development in the following chapters.

8 THE MERITS AND DEMERITS OF DST-RELATED EXERCISES AS DIDACTIC TOOLS IN SI

The analysis of the three-year AR reveals both merits and demerits of the DST-related exercises for SI skill development and transfer. The merits were reflected largely in their simulation of SI, featuring the flexibility of exercise forms and types, and the adjustability of simulation to accommodate different skill levels and needs for skill practice; while the demerits were also found in their failure of or limitation to developing and transferring certain skills.

This chapter, consisting of five sections, discusses the merits and demerits of the DST-related exercises applied as didactic tools in SI teaching, but with more of its weight on the discussion of the demerits. Section 8.1 presents a brief review of the merits that are argued strongly for at length in Chapters 6 and 7. Section 8.2 draws on the demerits, setting out the manifestation of the demerits, based on the students' feedback. Section 8.3 focuses on discussing the source of the demerits, analysing from various angles why and how these demerits occur. Section 8.4 explores the possible remedies to the demerits discovered in this chapter. Section 8.5 summarizes the didactic implication that the DST-related exercises should be viewed dialectically positive that they can facilitate scaffolding skill development and transfer once appropriately designed; and that otherwise, they could have negative effects. Therefore, the design must be prudent and consistent with individual students' changing needs, and must take into account possible cognitive implications and characteristics of the visual stimuli for the students. Meanwhile, the DST-related exercises should be complemented by other teaching components commonly used in SI to offset the limitations of the exercises.

8.1 Merits of DST-related exercises

The manifestation of the merits of DST-related exercises is twofold. One is reflected in skill scaffolding, because the various DST-related exercises sequenced for incremental cognitive demands could assist the students in developing skills progressively. The other is in their enabling effects of skill transfer. With their resemblance to SI, the exercises meet the cognitive prerequisites to transfer some developed skills to SI (see Section 2.2.1).

8.1.1 Flexibility for skill scaffolding

DST-related exercises were found to be conducive to providing assistance in scaffolding skill acquisition. Scaffolding serves the purpose of providing measured help and assistance to the students before they could accomplish a task independently (see Section 2.1.2); and the cohort

of DST-related exercises shows their flexibility in serving this purpose at different levels and for individual students.

In general, it was proved that the sequencing of the various DST-exercises shapes a progressive learning. In 2015 and 2016, after all the adjustments were implemented, Q2 in the third questionnaire was replaced by a new question (see Appendix 3.3) to assess the difficulty progression trajectory of the exercises implemented, as shown in Table 8.1.

Table 8.1 - Students' evaluation of exercise sequence

Trajectory type / Year	Progressive	Constant	Getting difficult abruptly	Have no idea
2015 (n=11)	10	1	1	0
2016 (n=6)	4	2	0	0
Total	14	3	1	0

Table 8.1 shows that the majority of the students concurred that these exercises were progressive in difficulty levels and helped to advance their skill practice stepwise, regardless of the implemented adjustments in each cycle. Such progression in practice satisfies the mission of skill scaffolding: to provide gradual and incremental assistance to prepare the learners to perform a complete task independently.

On top of this, the cohort of exercises can attend to various needs at different levels and of different individuals thanks to the flexibility of the exercises.

Firstly, the exercises are change-friendly in accommodating the scaffolding needs at various skill levels. As reported in Chapter 7, the adjustments to different variables of the DST-related exercises, some of which were ad-hoc, were made to accommodate the skill status and development needs for the students at different stages. Although not all the adjustments achieved the intended purposes, they did show the likelihood and flexibility of manipulating the exercises for the purpose of meeting students' needs. The results of the adjustments provided new knowledge about how to measuredly control difficulty levels by making adjustments to some variables individually or combined.

Besides this, the variety of the exercises meant availability of more choices to meet various demands of the students. As shown in the responses in the third questionnaire and interview, the students in all three years found some specific types of exercises useful in meeting their

own skill deficiencies. With relevant questions improved for soliciting more concrete and ample data in 2015 and 2016 (see Q5 in Appendixes 3.3), the students nominated their favourite exercise types of various dynamicity levels and linked these exercises to acquired skills for SI. These nominated skills were categorized into skills for comprehension, translation, production and coordination, as presented in Table 8.2.

Table 8.2 shows that different students could find different types of exercises among the cohort that they thought particularly useful for their skill development and transfer. In the three years, DST of Level 3 dynamicity was the most chosen choice and was associated with the largest number of transferred skills in 2015 and 2016, though some students found DST of lower dynamicity levels most useful. In addition, the students could benefit from the same exercises in different ways. For instance, among the acquired comprehension strategies through DST of Level 3 dynamicity, some students highlighted segmentation while others reported on anticipation. With the diversified exercises types available, the students could choose the specific types to enhance their targeted skills and become more autonomous in learning.

Table 8.2 - Useful DST-related exercises in skill transfer to SI in 2015 and 2016

Useful DST exercise	**Number of choice**			**Acquired SI skill through the nominated exercise**			
	2014 (n=7)	2015 (n=11)	2016 (n=6)	Comprehension	Translation	Production	Coordination
DST of Level 1 dynamicity	0	4	3	Summarization (15D) Memory storage (16B) Accuracy (16B)	Agility in translation retrieval (15D, 15F, 16B)	Enhanced pace of delivery (15I)	
DST of Level 2 dynamicity	1	1	3			Delivery efficiency (16C)	Simultaneity (15D,16B)
DST of Level 3 dynamicity	6	8	5	Segmentation and meaning assembly (15B, 15D, 15E, 15G, 16F) Fast comprehension (15H, 15L, 16B, 16E) Summarization (15D) anticipation (15G)	Quick retrieval of translation equivalent (15C, 16B, 16E)	Idiomatic expression (15H) Reformulation strategies 15D,16D) flexibility(16C,16D)	Simultaneity (15A,15B, 15D, 15H, 16C, 16D)

8.1.2 Enabling of skill transfer

Designed to be SI-simulated, the DST-related exercises were acknowledged to be conducive to skill transfer by the students. When asked whether DST-related exercises developed skills that contributed to the SI performance, in the third questionnaire, all 18 students in 2015 and 2016 chose "Yes" as the answer, expressing an overall recognition of the efficacy for the exercises in skill transfer. The students' willingness to have more practice with the exercises further echoes the usefulness of the exercises. In making suggestions for the teaching of DST-related exercises implemented, eight out of twelve students in 2015 and all six students in 2016 demanded extended teaching hours or larger number of DST-related exercises for practice, stressing that they found the skills and strategies practiced in those exercises useful for SI.

The efficacy for skill transfer was specified and substantiated in the final interview. The students made comments on how the DST-related exercises contributed to their SI learning in Q4 (see Appendix 3.4). The comments and the transferred skills suggested in these comments are presented in Table 8.3.

In Table 8.3, the students' elaboration accentuated the specific skills practiced and transferred. These skills include comprehension strategies such as segmentation; production strategies including summarization and language-specific reformulation strategies; and skill for better management of cognitive resources. A more important finding is that these statements unambiguously indicate that the students were guided to practice skills with a clear purpose of skill transfer due to the well-defined simulation, and thus consciously used these skills in practicing SI with these exercises.

The findings across three years prove the benefits and usefulness of DST-related exercises in skill development and transfer for SI. Sub-skills and strategies that could alleviate cognitive burden in different efforts could be developed gradually through various DST-related exercises. The flexibility characteristic of these exercises makes it possible to sequence various exercise types and manipulate exercise variables to meet different and changing skill practice demands. Besides this, guided by the simulation achieved by these exercises, the developed skills were more consciously and voluntarily used by the students in SI, and thus were ready to transfer to SI.

Table 8.3 - Comments on skill transfer at the end of the cycle in 2015 and 2016

Quoted comment on skill transfer	Transferred skill suggested	Benefited sub-process
When dealing with similar problems, I did not realize that was the case, but certainly, there was a great impact. DST allows you little space to manipulate. So it forces you to have to deal with it linearly, or to summarize or do segment etc. But I always feel that this and SI are very similar in terms of skills. So I can always borrow skills. (15B)	Summarize Segmentation	Comprehension
Does segmentation count? I think the most beneficial part is that you are pushed to this. This is what I will always use in SI consciously. (15E)	Segmentation	Comprehension
I used order-drive strategies for linearity often, as well as the transition between nouns and verbs that you talked about. These are, I think, the two that I use more frequently. (15F)	Segmentation Reformulation strategy	Comprehension Production
When there is a long sentence, that is, the sentence is particularly long, in the DST, it would be chunked for interpretation, this is the same with the SI, which you will not completely follow if you don't. Otherwise, you cannot keep up, no way. (15I)	Segmentation	Comprehension
Borrowing happens often. I think there can be a better way to interpret, I then think of skills acquired from DST in class and then try to use it in SI, such as connecting segments in the sentence. (15L)	Reformulation strategy	Production
It is like interpreting while reading, it is helpful in making reading and processing at the same time. This is practiced first. (16A)	Simultaneity	Coordination

8.2 Demerits of DST-related exercises

Despite all the merits, some limitations of the DST-related exercises were also found. In the present three-year AR, almost all the students reported failures of skill transfer at some stage, complaining either that the transfer was hindered or that the transfer could not meet the skill requirement in SI. These failures were mainly reported in the second micro-cycle with the complaints largely about DST of Level 3 dynamicity. Therefore, the following discussion of demits concentrates on DST of level 3 dynamicity which is hereafter briefly referred to as DST within this section, unless it is clarified otherwise.

The Level 3 dynamicity was designed to cognitively maximize resemblance and minimize disparity with SI. That being said, it was found that some features make the simulation conditions either excessively or insufficiently difficult to match with SI cognitively. They were mainly reflected by the task comparison between DST and SI; and by reported failure in transfer of simultaneity. Two sources of such demerits are identified in analysis: the exercise design defect reflected in inadequate display setting; and the intrinsic characteristic of DST arising from its visual stimuli.

In the following sections, the manifestation of these demerits is presented, and the reasons why they caused the reported failures of the skill development and transfer are explored.

8.2.1 Demerits reflected by comments on task comparison

In terms of task comparison, the students did not always think the DST were easier simulated tasks to SI as the original design intended, which was first detected in 2014. In the final interview, when asked to nominate the easier task between DST and SI (see Q5 in Appendix 3.4), some students found the designed tasks harder than SI at any rate or at certain rates, as seen from Table 8.4.

Table 8.4 - Nomination of easier task between DST and SI in 2014

Student	Nominated easier task
14A	SI (at higher rates)
14B	DST
14C	The same
14D	DST
14E	SI
14F	DST (at higher rates)
14G	DST

As shown in Table 8.4, only 14B, 14D and 14G thought DST easier under all circumstances as highlighted, which required the focused investigation of the causes of this unexpected result in the following consecutive rounds of AR. Therefore, a new question was added in the interviews of 2015 and 2016 to collect comments on a comparison between SI and DST set at two different rate ranges, 90-120 words/minute for exercises and 130 words/minute for the final test. The collected comments were then cross-referenced with the final test results, showing that the various input rates play a role in the comparison results between the DST and SI.

8.2.1.1 At the input rate of 90-120 words/minute

At the input range of 90-120 words/minute, three streams of opinions on the task comparison could be found in 2015 and 2016; and the numbers of students holding different opinions are summarised in Table 8.5.

Table 8.5 - Students' task evaluation between DST and SI at 90-120 words/minute input range

Year / Nominated easier task	Number of choice		
	2015 (n=11)	**2016 (n=6)**	**Total (n=17)**
DST of Level 3 dynamicity	6	3	9
SI	3	2	5
Depending on some variables	2	1	3

As shown in Table 8.5, the majority of the students believed that the DST is easier than SI at this input rate range. To identify the factors influencing the students' judgements, their comments on the comparison in the interview were analysed, which reveal two noteworthy factors for consideration: stimulus preference in perception; and display issues associated with high rates.

In terms of stimulus preference of information perception, the preference for visual or audio stimuli leads to different judgements. The students with visual preference tended to think DST easier than SI. To these students, the visual access to the input information could provide an advantage to comprehension, even in the case of dynamic display. Some students attributed such advantage to the psychological security arising from reading. For example, 16B reported less mental pressure in performing DST, and 16E admitted that *"...seeing is a comfort to me, it feels more secure".* Others believed that the visual stimuli made comprehension cognitively easier. For instance, 15L commented that, "*when I see a word, I react faster than when I hear the word".* In other cases, reading was associated with longer memory. As 16D commented, "*once I read something, it stays in my head for longer time, in comparison to listening".* For whatever reason, these students reported that they could deliver a substantial amount of information despite occasional textual difficulties and could monitor their own performance most of the time.

On the contrary, students with preference for audio stimuli tended to think SI easier due to the cognitive advantage of listening comprehension. To these students, they mainly reported longer WM in listening. For instance, 15B stated that, "*working memory is longer in SI. If I listen, I will remember it very clearly"*; and 15E also mentioned, *"when it comes to storage of the information, it is longer in listening"*. It appears that, to the students with audio preference, the information decay is faster when the input is in texts.

The findings above indicate that, at 90-120 input range, the stimulus preference can be reflected in variations in physiological comfort and cognitive functions with different input modalities, which can largely influence individuals' comprehension results.

However, when the input rate reaches 120 words/minute, the display issue induced by the input rate begins to prominently hinder comprehension indiscriminately, regardless of the stimulus preference in comprehension. The students with preference for audio stimulus reported more stress due to the visual interference (such as 15B) and little time to finish reading (such as 15E). Even the students with preference for visual stimulus reported that the advantage in comprehension started to disappear at this rate. Analysis of the students' comments identifies that the problem lay in the short length of texts available for reading, which encumbers the cognitive processing in comprehension. For instance, 16D mentioned that the texts available for reading could be very short at a given time so that word-for-word interpreting was a temptation under the visual influence. 16A also observed that the input texts were sometimes decomposed into individual lexicons that appeared and disappeared fast in display, so that it was challenging to finish reading and to comprehend before the texts faded, let alone having any chance of using skills or strategies.

In terms of the third stream of opinion, depending on some variables, the underlying factors were found to be the same as the two factors identified above: stimulus preference, and length of texts staying on the screen. For instance, 16F believed the DST was easier at a higher rate due to the sense of security from seeing the texts, indicating the function of stimulus preference in comprehension. 16C and 16E both mentioned the superiority of listening comprehension at the higher rate of 120 words/minute, because only short fragments could be seen in DST, restating the disturbance in reading comprehension caused by the short textual length in display at this rate.

8.2.1.2 At the input rate of 130 words/minute

At the rate of 130 words/minute, the comparison results between the DST and SI became more unified in 2015 and 2016. According to the responses in the final interview, the overwhelming

majority of the students chose SI as the easier task at this input rate, as summarised in Table 8.6.

Table 8.6 - Students' task evaluation between DST and SI at input of 130 words/minute

Year / Nominated easier task	Number of choices in 2015 (n=11)	Number of choices in 2016 (n=6)	Total (n=17)
DST	1	1	2
SI	9	4	13
Equally difficult	1	1	2

Table 8.6 shows that thirteen out of seventeen students in the two years thought SI easier at this rate. These 13 students also included the students claiming preference for visual input explicitly. This result suggests that the design might have contradicted the original purpose of skill transfer, in that the DST was intended to be an easier task simulating SI, while DST at this rate appears have imposed excessive difficulties for most students.

The students' evaluations of the task comparison between DST and SI at the input rate of 130 words/minute were consistent with their performance results of the final test. The students' performances for the final DST and SI were compared in terms of average accuracy (AI), misinterpretation (MI) and omission (OI) rates for the two tasks, as shown in Figure 8.1; and the AI rates of the two tasks for each individual are compared as seen in Figure 8.2.

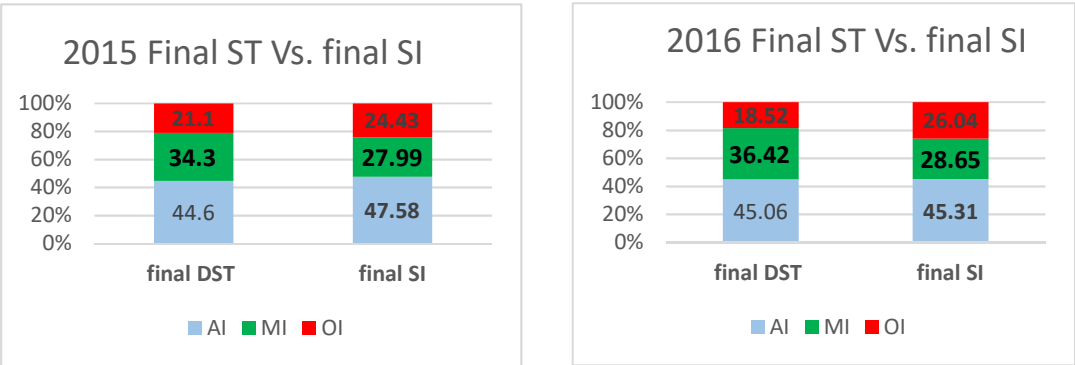

Figure 8.1 - Final inter-task performance comparison in 2015 and 2016

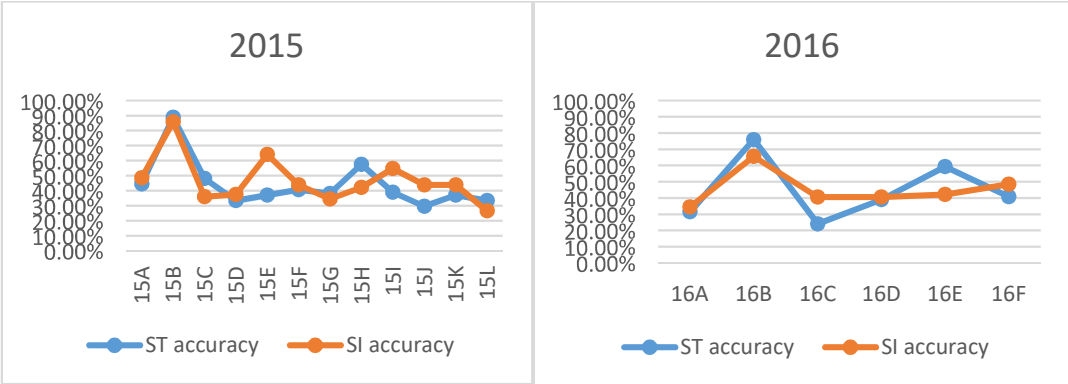

Figure 8.2 - Accuracy rate comparison between final DST and SI for each individual in 2015 and 2016

Figure 8.1 shows that, in both 2015 and 2016, the average accuracy rate was higher in the final SI at the rate of 130 words/minute. Figure 8.2 shows that the accuracy rate was higher in the final SI for most of the students in the two years. The statistically better performance in SI could suggest that DST at this rate became more challenging than SI.

The review of the students' comments on the two tasks in the final test (Q6 in Appendix 3.4) shows that reasons making the final DST harder were quite similar to the ones identified at the input rate of 120 words/minute. Seven students reported that the texts in the final DST disappeared too fast, leaving too little time for reading before the texts faded. For example, 15I described the fast disappearance in final DST as "*...so it may leave only the last word in my mind, and then information before and after was all gone".* 16D commented that, "*I can only see one word clearly, and the previous word already disappeared*". Both comments, among other similar comments, indicate that the fast-fading texts had negative impacts on the cognitive processing. One side-effect was that visually capturing the texts became a challenge due to the short-staying and constantly changing texts. Moreover, the excessively short textual display at this rate almost reduced the comprehension process to the discrete identification of individual lexicons. As a function of the fast unfolding and fading, the display length of texts was often shortened to only one word at the time of reading, making it unlikely for the students to comprehend and process based on meaning segments.

To sum up, two factors were found to be imposing excessive cognitive burdens on the DST, undermining the intended simulation of SI. One is that the dynamic textual display could be a distraction to the students with audio stimulus preference and thus of lower resilience to the dynamic display featuring simultaneous unfolding and fading. Such an impact could be compounded by the increase in the unfolding rate. The other factor is the excessively decomposed display of texts unfolding at 120 words/minutes and above. The visual capturing and meaning segment-based input processing became exceptionally difficult, which difficulty did not discriminate between students with audio or visual stimulus preferences.

8.2.2 Demerits reflected by failure in transfer of simultaneity

In the third questionnaire (see Appendix 3.3), students were asked about the skills that were not well transferred to SI (Q6) and simultaneity was chosen by nine out of twenty-five students in the course of three years. In addition, quite a few also chose more than one subskill constituting simultaneity and the chosen skills were for different sub-processes, which was the case in 2015 and 2016 in spite of all the adjustments implemented. Except for indicating inadequate skills for the individual sub-processes of comprehension, translation and production, the reported failures possibly also index coordination among the concurrent sub-processes. Even students who were generally confident about their simultaneity level in DST exercises and showed better performance than the group average in the tests claimed that they could not meet the simultaneity requirement in SI. This gives rise to the question that whether the simultaneity developed in DST is adequate to meet the demand of SI.

8.3 Analysing the sources of demerits

With all the feedback taken into consideration, along with the analysis of the students' final test performance, the crux of the problem was found in the task resemblance and disparity between these DST and SI. The issues identified above could be attributed to two causes: 1) design defects; and 2) the intrinsic characteristic of visual input. The following analysis expounds why and how these two aspects might have influenced the cognitive processes and affected the simulation of DST.

8.3.1 Exercise design defects

In terms of the exercise design, two neglected factors could contribute to the failure of DST to be a facilitator for simulating SI: 1) the lack of coordination of the unfolding and fading rates; and 2) the insufficient consideration of implications of the dynamic textual display for individuals with different stimulus preferences.

8.3.1.1 The lack of coordination of the unfolding and fading rates – impacts on comprehension and production

The original design of Level 3 dynamicity only focused on simulating the features of information input in SI but neglected the impacts of display rates on the visual effect. The level 3 dynamicity display was designed to maximally simulate the task condition of SI in terms of linearly forward and continuous information presentation, and evanescence of the input information. To achieve such simulation, there is a time lag between the text unfolding and

fading, and the two actions finish at the same time on each PowerPoint slide to keep the seamless connection to the following slide. This means that the fading rate must be higher than the unfolding rate to achieve the intended effect, and any increase in the unfolding rate requires the fading rate to amplify the increase in proportion to maintain the display pattern. This leads to the inverted change to the length of the time lag between unfolding and fading actions, and the reduced time lag means a shorter window space for the textual display. In this AR, the feedback from the students indicates that, when the unfolding rate was below 120 words/minute, the time lag between the two actions could leave window spaces long enough for the display of adequate textual lengths. When the input rate increased to 120 words/minute and above, the time lag was reduced to the extent that the window space became too short, leaving the display length too short.

The display issue of excessively short text length might have implications for comprehension and production processes in DST. On the comprehension side, the display issue could aggravate the dilemma of EVS and WM load facing the novice students. The dilemma is that, if they choose short EVS to reduce cognitive load on WM, they might not acquire enough information for delivery (Goldman-Eisler, 1972). If they want to keep a longer EVS to have a more comprehensive and clearer view of the evolving message, they may experience overload in WM, both in information storage and computation (MacWhinney, 1997). In the DST at high rates (at 120 words/minute and above in this research), the students reported that they were more visually tempted to interpret based on whatever information that was visually available at a given moment of reading. This means that, when the text length in display was reduced to being excessively short, the students were likely to be led to adopting a short EVS, having inadequate information to constitute adequate segments of sense or to clarify meaning ambiguity before they started delivering. Besides this, the WM was under strain since the comprehension of the overly decomposed texts requires frequent and repeated memory and retrieval of the input information for computation, increasing the processing time and cognitive load for the input analysis and comprehension. That could be the reason why most students reported difficulties in comprehension, including those who claimed to have a general preference for visual stimuli, finding the reading comprehension inferior to the listening comprehension in DST at the input rate of 120 words/minute and above.

On the production side, the adoption of a short EVS under the influence of the visual effect could put the students under more pressure. This is likely because short EVS is associated with increased numbers of syllables in the production, which means that more words are uttered and longer time is required in the production (Lee, 2002).

8.3.1.2 Neglected implication for individuals with various stimulus preference –visual distraction and impacts on WK

Visually, the display effect of the Level 3 dynamicity at high rates could be distracting, especially to the students with preference for audio stimuli. 15B's case is a good example, in that the student reported that he/she found it visually uncomfortable and very easy to miss the lines when reading the fast-changing texts displayed at Level 3 dynamicity, thus feeling more anxious and nervous. The possible explanation could be that the students with less preference for visual stimuli could also have lower tolerance for visual disturbance. To them, the dynamic texts displayed at Level 3 dynamicity could require extra time and effort to adapt to the textual display visually before they could start discerning and analysing the texts cognitively. It appears that such an effect began to even affect some students with a visual stimulus preference when the input rate exceeded 120 words/minute in this AR. The principal difficulty reported was in clearly capturing the texts, regardless of the stimulus preference.

Cognitively, the dynamic textual display could cause an extra burden on WM among the students with audio stimulus preference. These students reported that the information temporarily stored disappeared faster in reading, i.e. the visual decay was reported to be faster than audio decay in their WM. Given that the information staying active in the WM is the prerequisite for computation to accomplish reading comprehension (Daneman & Carpenter, 1980), it is reasonable to assume that faster decay of stored information makes the retrieval and computation more difficult, impacting on the speed and accuracy of the comprehension.

To sum up, these design defects of DST could impose extra cognitive loads on comprehension and production, or set barriers to visual perception, making DST unexpectedly harder than SI to the students and thus undermining the design intention of providing an easier simulation of SI for scaffolding purpose.

8.3.2 The intrinsic characteristic of input in DST

The limited simulation achieved by DST could also be due to the intrinsic characteristic of input in DST, which is fundamentally different from SI. Comments over transfer failures in the final interview were analysed with a view to discovering clues of possible causes. Among the sparse comments on the causes made by the students, 15B mentioned that less interference was felt in DST because it was easier to execute simultaneous comprehension, translation and production when the input and output were divided by reading and speaking. To interpret this comment, the simultaneity developed in DST was not adequate for SI that features vocal input and output.

Such feedback brought the interference between input and output channels (see Section 3.3.1) to the foreground. As Lambert (2004) and Moser (1997b) argue, the concurrent vocalization of input and output in SI is a unique feature, making the simultaneity involved special. Such simultaneity of SI involves articulatory suppression to keep the audio input and vocal output apart, which requires extra attention to execute (Christoffels & De Groot, 2004). To manage this, SI interpreters have developed superior coordination for concurrent processes that involves the articulatory suppression (Padilla, Bajo & Macizo, 2005). Although DST and SI both involve execution of concurrent sub-processes and thus both require coordination, the presence of articulatory suppression in SI means extra attention to manage the channel interference, which raises the demand for coordination in comparison to DST. As a result, the simultaneity required in DST exercises is at a lower hierarchy than that in SI. The increase in the unfolding rate and the dynamicity level could only contribute to practicing the agility for the sub-processes at such lower-level simultaneity without channel interference but could not elevate it to the higher-level simultaneity involving channel interference as in SI.

To sum up, the absence of channel interference as an intrinsic characteristic of DST-related exercises makes them cognitively less demanding to manage and coordinate attention for than in SI, and thus brings limitation to their value in simultaneity transfer. Even for the Level 3 dynamicity, which was designed to maximally simulate SI, such a limitation remains. The implication of the channel interference for the simultaneity was not able to be mitigated by the manipulation of dynamic features of textual display in the DST-related exercises.

8.4 Suggested remedies for the demerits

To address the sources of limits identified above, some actions could be taken to minimize the impacts on the learning outcomes. Two remedies are suggested: keeping the exercises accommodative; and complementing DST with other pedagogical tools.

The first suggestion is to acutely detect the compatibility between the DST exercises and the students' development needs and individual characteristics. That is, the decision on the input range of exercises and progression of input/unfolding rates should consider the students' stimulus preference for perception and their general tolerance to the dynamic display of texts at different combinations of dynamicity levels and unfolding rates. In this AR, the students' complaints about English-to-Chinese DST-related exercises concentrated on the DST of Level 3 dynamicity with the unfolding rate of 120 word/minutes and above. However, the tolerance limit could vary among different student groups and language pairs, which could only be decided case-by-case during the teaching.

The second solution is to complement DST-related exercises with other types of exercises in SI teaching. DST-related exercises are not able to develop simultaneity that involves and coordinates attention for managing channel interference due to their intrinsic visual input, but other didactic tools might compensate. For instance, to make up for the limit of simultaneity induced by the absence of channel inference in DST, other exercise components involving channel interference, such as shadowing, could be used at the same time with DST.

8.5 Conclusion

To serve the purpose of skill development and transfer in SI, DST-related exercises have been experimented with, and the empirical findings reveal both merits and demerits. The exercises' merits were mainly reflected in their variety and flexibility in terms of the exercise forms and different levels of simulation. These features have two didactic benefits for the teaching and learning. Firstly, the cohort of exercises could be sequenced to form progressive learning for better serving the purpose of scaffolding. Secondly, the students could choose the exercises from the cohort to enhance particular skills or address specific deficiencies according to their own needs.

At the same time, demerits of DST-related exercises also existed, posing extra cognitive difficulties or limiting the simulation achieved. Defects in the exercise design, and intrinsic and unmodifiable characteristic of the input could be sources of these demerits. As possible remedies to mitigate the influences of the identified limitations, cautions about manipulation of exercise features in their design and use were made, and the use of complementary didactic tools was suggested, which all require testing and refining in future teaching and research.

Comprehensive understanding of DST-related exercises help trainers to develop a right expectation to the didactic roles of DST-related exercises in SI skill development and transfer. Adequately designed and used, these exercises are valuable at the initial stage of SI learning. Nevertheless, their transfer effects could reduce or even disappear at later stages. Therefore, these exercises should be used as a complementary exercise component in the teaching of SI, and should work with other teaching components to make SI teaching an integrated process.

The pedagogical research on the optimal use of one didactic component involves much intricacy and complexity, which calls for approaches to accommodate such complexity, and AR is found to be an appropriate approach. The pedagogical benefits of AR in the inquiry of the present research and those of a similar kind are discussed in the following chapter.

9 BENEFITS AND LIMITATION OF THIS AR

This chapter reviews the methodological benefits of AR in the present research on SI pedagogy, and its limitations. As for methodological benefits, evidence is provided to justify and support the incorporation of AR into didactic inquiries on complicated issues regarding how to facilitate skill acquisition. Dialectically, the limitations are also discussed with a view to highlighting the complexity of AR in terms of design and, in particular, implementation.

This chapter consists of three sections. Section 9.1 sets out the evidence from the findings of this study to justify and support the incorporation of AR from two perspectives. By specifying the advantages of AR in exploring the complex issue of SI skill development and transfer in this study, it first corroborates the claimed benefits for the use of AR as the research methodological framework in the pedagogical literature. What follows is a discussion of the benefits for teaching and learning development, with the support of examples from findings of this AR.

Section 9.2 discusses the limitations of this AR project in terms of design and implementation, due to the complexity of both process of the skill acquisition and of AR. These outlined limitations are analysed with remedies suggested to provide references as well as assistance for future researchers intending to take the same or similar approach to any pedagogical research of this kind.

The two-pronged review leads to an objective yet critical evaluation of AR in Section 9.3. As is discussed thereof, on the one hand, AR can be a promising research methodological framework in SI pedagogical studies which deserves more adaptation in studies of this kind; on the other hand, its complexity also requires cautious considerations of situated contexts and further research for a better integration into the process of exploring pedagogically complicated issues.

9.1 Evidence of the AR benefits

The findings from this research verify the claims reviewed in Chapter 3, that the features of AR are suitable for the pedagogical inquiries on complex issues such as skill acquisition. Obtained through this AR inquiry was the enriched didactic knowledge of how to use DST-related exercises to facilitate skill development and transfer in SI. Besides this, the AR helped to reformulate the ways and styles of teaching and learning during a string of upward cyclical actions. The following review details the benefits reflected in both teaching and learning dimensions, with the supporting evidence obtained from this AR.

9.1.1 Benefits for the skill acquisition inquiry

As this inquiry proves, the complex nature of skill acquisition requires an approach such as AR to investigate the didactics for facilitating SI skill acquisition through a dynamic process. The complexity lies in the different stages of the process, during which multiple factors such as the heterogeneity of the learners and contexts interplay with and influence one another (see Section 2.2.1). The interactions among multiple variables and the presence of uncertainty and unpredictability all influence the results of skill acquisition. As such, a single qualitative or quantitative research method, especially the traditional one-off experimental approach, cannot satisfy the demand of this inquiry - to explore the efficient use of DST-related exercises as didactic tools in the interactions of curricular context. By comparison, AR has the features to enable the obtaining of multisource and multimethod data, engaging all involved in constant reflection and introspection, making responsive and informed adjustments, and testing out the efficacy in an authentic teaching and learning setting (see Section 4.1.2). Just as proved in this study, it has the potential to accommodate the complex factors and their interconnections involved in the dynamic process of scaffolding skill acquisition.

What deserves notice first, particularly for SI instructors, is the disruptive and dynamic nature of AR, which supports one objective of this study - to make changes to the previous teaching practice of using CST to enhance its value in scaffolding skill development and transfer in SI. The status quo was that CST, which has long been used in SI teaching but normally on an ad-hoc basis, is limited in its role in facilitating skill development and transfer in SI. To expand its existing role in SI pedagogy, dynamic features were added to CST in a way that is fundamentally based on the interpreting processing models, cognitive skill acquisition theories, and CST's inadequate assistance observed by the researcher herself. Driven by the theme of changing the status quo in AR, these new features were tested and evaluated for efficacy, and adjusted, which involved constant adjustments to both testing tools and arrangements of teaching. For instance, the findings upon the completion of the action in 2014, which could be regarded as pilot research, flagged unaddressed skill deficiencies in comprehension, while the originally designed questions in the data collection tools did not acquire sufficient data upon which to make proper analysis for causes. Therefore, two adjustments were made in 2015 and 2016: adjustments to data collection tools comprising the mode of pre-test and survey questions; and adjustments to the teaching arrangement in the strategy sequence and rate progression (see Chapter 7). These adjustments were made to adapt the new features to specific needs of learning and to shift the inquiry focus onto more specific connection between some new features and

their effects on skill acquisition, accumulating to necessary changes to the current teaching practice.

Secondly, the dynamic adjustments implemented in this inquiry were effectively tested, and the use of the experimented tools were refined, even though the pedagogical inquiry process is filled with unpredictability thanks to the iterative multiple cycles of AR, which feature reflection and variations from original plans (Kember, 2000; Norton, 2009). In the present study, the cyclicality of AR, with adjustments made on an as-needed basis, was proved highly effective in enabling adaptation and flexibility to respond to the variations and uncertainties during teaching and learning. In the course of the three years, the students with different characteristics, aptitudes and competencies reacted differently to the effects of skill development and transfer, thus gradually revealing unforeseen problems to be solved. As part of responses, adjustments were made in 2015 and later in 2016, consistent with the findings from both the previous year and the students' feedback of the same year. These adjustments, ranging from exercise sequencing and exercise progression to test formats, were made and implemented in the new rounds of action, and generated additional data to deepen understanding of the effects of the experimented didactic tools.

Guided by the grounded theory that is embedded in the use of AR, the hypotheses about the functions of DST-related exercises in the skill development and transfer, which were formed from the theoretical review and interpretative explorative analysis of data in 2014, also underwent constant refinements. The iterative cycles in 2015 and later in 2016 generated findings that verified or modified those hypotheses in different contexts, providing a clearer understanding of the value as well as limitations of DST-related exercises in scaffolding the skill acquisition in SI. For example, a hypothesis put forward in 2014 was that the Level 3 dynamicity plus input rate of 130 word/minutes, the highest combination of the two dynamic display variables in this exercise design, could maximally contribute to mental agility and input analysis in comprehension at the early stage of training. However, the adjustments made and implemented in 2015 and further in 2016 continuously fine-tuned the clarity of this hypothesis. It was found that the pre-mature introduction of Level 3 dynamicity could not achieve the intended purpose but hindered the students' progress in the comprehension skills which was the focus of training at its early stage. Besides this, the rate range of 100-120 words/minute was more helpful than the rate of 130 words/minute for the novices' skill development at the early stage, because the lower rates would not impose excessive visual distraction and cognitive burdens upon the students, while keeping the exercises adequately challenging.

Thirdly, AR rendered this study locally-situated and democratic in facilitating skill development and transfer, because it acknowledges that specific contextual factors both constitute and impact on the pedagogical process, such as pedagogical adjustments, emotional factors, and individual features of students; and it advocates an open view to collecting and interpreting data from various perspectives and using various tools. In addition, AR recognizes personal bias or limitation in observation and interpretation as an important part of the inquiries, and cautions against the risk of arbitrary conclusions based on one-sided input (O'Brien, 1998). Guided by this principle of AR, the use of DST-related exercises to facilitate skill acquisition, functioning as an additional teaching element in a unit of the MCI course, was well documented and analysed in the authentic teaching environment of the classroom. Thanks to the multiform and multisource data collection and analysis tools set in place in the teaching-learning interaction, the subjective experiences and views of all participants (both of the students and the teacher/researcher) were collected and considered as valued contextual elements. Furthermore, the analysis and interpretation of these data were subject to all the factors constituting the specific context for the skill acquisition each year, making a contextually-relevant understanding of the implications possible. For instance, despite the improved performance in the test in 2015 subsequent to some adjustments in comparison to 2014, the AR-directed analysis, based on the multisource data, took into consideration both the didactic adjustments and the students' different aptitudes and competence, rather than jumping into the conclusion of confirming the efficacy of the implemented adjustments.

Finally, the collaborative feature of AR maximized the holistic view on teaching-learning interaction promoted by Norton (2009) and Strauss and Corbin (1990) in this pedagogical inquiry, where skill acquisition is expected to be the result of such an interaction. The present AR incorporated the collaboration and active engagement of all parties involved in the skill acquisition, i.e. the teacher/researcher and the student participants in the whole course of exploration. For a start, the design of DST-related exercises was based on the students' unsatisfactory feedback about CST and the researcher's knowledge about SI pedagogy and observation of the use of CST in SI teaching. During the implementation of the designed exercises in authentic teaching, the students were engaged as equal parties to provide constant feedback about the efficacy of the exercises, and the researcher's interpretation of the data was constantly compared with the input from the students. The data from the two sides were valued as equally important in evaluating the effects of the exercises, and jointly led to the decisions whether adjustments or refinement were necessary and appropriate in the specific context. For instance, the exercise of cloze DST was primarily included in teaching based purely on the findings from literature reviews on the importance of making inferences in SI and the

characteristics of the cloze test (see Sections 5.2.5.1.2 and 5.3.1.2). It was initially assumed that the practice of this exercise could effectively develop anticipation skills among the students. However, during the rounds of action, the learning effects and feedback from some students ran counter to the researcher's expectation, leading to the reconsideration of its value and timing of introduction, and to the reflection on exercise design, to achieve a better connection between the researcher's teaching intentions and the students' various learning needs.

As a necessary methodological approach to explore the complex issue of skill acquisition, AR doubtlessly yields the benefits in its contribution to the body of didactic knowledge on facilitating skill development and transfer as a complicated and dynamic process.

9.1.2 The benefits for teaching and learning

Beyond its contribution to didactic knowledge, AR also adds value to the development of teaching and learning at a higher level. As reviewed in Section 4.3.2, the AR conforms to the transition of paradigms in interpreting teaching: the previous teacher-centred, decontextualized and inactive teaching approach has shifted to a student-centred, situated and empowering approach in interpreting (Class & Moser-Mercer, 2013; Ficchi, 1999; Kiraly, 1995, 2013, 2014, 2015; Li, 2017; Risku, 2016; Sainz, 1993).

Complying with this trend, AR benefits both the trainers and the students in their respective development. To the trainer/researcher, who conducts the inquiry during the authentic teaching, what is accomplished is professional development in terms of teaching beliefs (Richardson, 1996) and teaching skills. To the students, who are engaged as equal parties in the research, thus becoming more autonomous in thinking and learning independently and critically, the participation in and of itself has turned them into active and responsible learners. The benefits from these two dimensions are elaborated with evidence from this AR, in the following two sections.

9.1.2.1 Benefits for teaching

AR provides a pathway to improving potentially insufficient teaching skills and reviewing the teaching beliefs of the trainers. Good teaching practice is associated with the teacher's inquiry, reflection, and professional development (Harris, 1998), and AR has the advantage of combining all these elements, in that the AR inquiry featuring reflective teaching makes the trainers reconsider and improve their teaching contents and the way to deliver the teaching (Ferraro, 2000).

Firstly, AR contributes to the development of teaching skills for interpreting trainers. For interpreting training, a consensus on the best candidates for interpreting trainers is that practicing interpreters are ideal for their understanding of and experience in interpreting (Seleskovitch, 1999). This criterion is well followed by many conference interpreting courses, but an important problem currently is that only a minority of these practicing interpreters have formal teaching training when they start their training career (Setton & Dawrant, 2016). The practicing interpreters who have decided to teach at the same time cannot automatically turn their interpreting expertise and experience into teaching competence. In other words, it is not enough to become competent trainers only with interpreting expertise and experience. As Seleskovitch (1999) insightfully emphasizes, in addition to detecting mistakes made by the students, interpreting trainers must also be able to explain the causes of mistakes and assist the students in overcoming their difficulties. This means that, apart from interpreting skills, teaching skills are equally if not more important for trainers. Furthermore, such skills do not come naturally with interpreting experience, since "understanding how an expert deals with a specific knowledge or skill does not automatically decipher how to best teach that knowledge" (quoted and translated in Calvo, 2015, p. 311). Given that taking formal training courses to improve teaching skills is always impeded by the trainers' time or budgetary concerns (Setton & Dawrant, 2016), AR is a viable alternative in that its featured reflective teaching allows the trainers to deliver the teaching in the local context and search for improvements in teaching skills as a result.

In addition, AR helps to forge the adequate teaching beliefs that orient teaching behaviours to the teaching paradigm transition to learner-centred teaching, an ongoing task in the world of education. Teachers' decisions and behaviours in teaching are under the influence of their teaching beliefs, broadly referring to the teacher's mental state and attitude towards the contents of teaching and the roles of different parties involved (Li, 2017); and social constructivist beliefs encourage a student-centred instructional approach (Isikoglu, Basturk & Karaca, 2009) which makes the learning more productive (Cornelius-White, 2007; Hagenauer & Volet, 2014). In the spirit of such social constructionist beliefs, AR is particularly useful in empowering and fostering a student-centred relation as compared with many other professional development programs (McNiff, 2010). While many professional learning programmes are only conducted "from the point of view of the person who is conducting them" and "the emphasis is often on teaching or training", AR-based professional development is also conducted from the learner's perspective (McNiff & Whitehead, 2012, p. 22). Aiming at making changes in a democratic and collaborative manner (see Section 4.1.2), AR is set to be learner-centred, reinforcing the significance attached to the learners' needs in the reflective teaching.

The AR benefits for teaching development, manifested in both teaching skills and teaching beliefs, were well proven in the present pedagogical AR, especially in facilitating the teacher-student communication. The original teaching plan was, for instance, developed based on the theoretical reviews and the researcher's observation and experience from the teaching. However, when implemented in the authentic environment of classroom, the learner-centred orientation and research methods in AR prompted the researcher to closely observe the students' reactions and solicit their feedback, making timely adjustments accordingly for potential improvements. The discrepancies between the students' needs and the assistance offered in the teaching from the subsequent findings urged the researcher to reconsider the efficacy of the teacher-student communication, apart from the possible inadequacy of the didactic tools. In 2014 and later in 2015, the researcher mainly solicited students' feedback through prescribed tools at fixed time points, including through post-test questionnaires and the interview, with fairly sporadic additional informal exchanges. To fortify the existing efforts in inviting timely and genuine feedback from the students, the researcher supplemented these existing tools with more informal communication with the students in 2016, such as casual discussions about their reactions to the implemented teaching during the class breaks, more invitation of opinions in the class, and offers of consultation emails. In making these adjustments, the researcher developed a keener sense and skills in detecting the students' needs and requests, encouraging mutual communication, and thinking from the students' perspective. More importantly, the teaching belief of student-centred teaching was further reinforced in these practices.

9.1.2.2 Benefits for learning

AR transforms the students from passive receivers of instructions to active contributors to the learning process, making them more initiative and autonomous in the learning. Nurturing the students to be more responsible, active and reflective in their learning is aligned with the purpose of higher education and the spirit of empowerment in the social constructivist approach (see Section 2.1.2). The collaborative and democratic features of AR can promote the students' motivation for learning, which helps to achieve successful results in interpreting training in interaction with other factors (Gringiani, 1990; Moser-Mercer, 2008).

First of all, AR is proved effective in stimulating the students' motivation for active learning, seen in their independent and active reflection. For instance, 15C and 15D reported that the close engagement in the course of inquiry gave them more incentives to reflect on the fundamental difference between CST and DST and the similarities between DST and SI. A function of such reflection was more deliberate practice of the linear information processing to

simulate the cognitive processes of SI, even in their own ST practice with static text materials from newspapers or other printing sources.

Such purposeful practice based on understanding and reflection in turn can facilitate skill transfer (Calvo, 2015). In the course of this AR, the students who reported after-class reflection over skill use tended to report more prominent skill transfer effects in every action cycle. As part of the reflection, these students reviewed the heuristic solutions to difficulties encountered in the DST-related exercises, and weighed the efficacy of different alternatives in reference to their own circumstances. As a result, the students felt more prepared with the skills consolidated to respond to problems in SI practice. For instance, 15B, 15C, 15D 15E, 15I all mentioned that their own reflection and reviews of skills practiced in the class constituted a part of their after-class learning, from which a link between difficulties and possible solutions was gradually established and reinforced. 15B and 15C specifically reported on their reflection on the strategy use involving analysing and reviewing the merits of different strategies in DST and then applying them in SI to compare the results. Therefore, their use of strategies in SI could be informed by their constant reflection-directed practice. These cases of better transfer resulting from more active reflection attests to the stance of Moser-Mercer (2008, p. 12), that "learning with understanding and reflection is more likely to promote transfer than simply memorizing information or developing routine skills".

Besides this, AR empowers the students to become autonomous learners, who are able to acquire knowledge or skills independently (Chene, 1983) or direct their own learning (Merriam, Caffarella & Baumgartner, 1999). In universities, it is believed that students should be nurtured to be autonomous learners (Chemers, Hu & Garcia, 2001; Macaskill & Taylor, 2010). They should be able to take the initiative in learning by finding new resources and opportunities (Ponton, Carr & Confessore, 2000; Ponton & Rhea, 2006). AR, featuring active engagement of all parties, is better positioned to stimulate the students to explore additional resources to replenish their self-directed learning.

A sign of the stimulated autonomous learning was detected during the AR-framed teaching-learning interaction in the present study. 14B and 15B reported their independent search for new resources of practice, and respective use of tele-text subtitles and web prompter software as supplementary tools to the DST-related exercises provided by the trainer. 15B explicitly commented in the interview that the consciousness of the students' role as equal participants in the AR gave rise to these incentives and initiatives for seeking and trying new means that could serve the purposes of learning. Once establishing the consciousness of independent and active learning and realizing their capacities for autonomous learning, the students are more likely to

take more initiative in their future learning and to extend this practice to sustain a life-long development.

9.2 The limitations in this AR

Despite all these benefits, it must be acknowledged, however, that this research has its limitations. In face of the complex nature of pedagogical inquiry involving unpredictability and uncertainty and multiple factors influencing the process of skill acquisition, this AR was not able to take all aspects into consideration in its planning and implementation. That being said, the confinement of the action conditions and the limitation in the researcher's knowledge of and experience in AR also played a role to a certain extent. Consequently, these drawbacks brought about some limitations to the present research and its findings.

Among others, two main limitations are worth noting. One is the inability to attend to two individual special cases, and the other is the lack of coordination between the DST-based teaching and other units in the curriculum. This section reviews these limitations, largely focusing on making sense of their causes and implications, together with suggested possible remedies, the validity of which is open to further testing in future inquiries.

9.2.1 Two special cases

The importance of attending to the issue of individuality in the pedagogical inquiries has been widely acknowledged, since individual differences do influence the process and outcomes of the knowledge and skill acquisition (Ackerman, 1988). In this spirit, Moser-Mercer (2008) also points out that the individual capacities, intelligence and skill acquisition patterns all influence the skill development and transfer in interpreting. To optimize skill development and transfer for the students with different intelligences, cognitive capacities and learning patterns, customized pedagogical tools might be required.

Despite the awareness of the significance of addressing individuality in the pedagogy, two special cases were discovered during the actions in the present study which, however, were not able to be attended to due to the limitation of time. These two cases are associated with a resistance of two students to the cloze DST and weak capacities of one student.

9.2.1.1 Resistance to the cloze DST

In the course of the three years, most of the students provided positive feedback to cloze DST, claiming that it helped propel them into alertness to various clues and inklings for inferences, thus contributing to the execution of anticipation in SI. Only two students, 16B and 16D, were

found in the survey to have a resistance to the cloze DST designed for the practice of anticipation skill, and they rated this type of exercise as the least useful. According to 16B, the cloze blanks forced inference making against the individual choice, arousing an uncomfortable feeling of duress. 16D reported that the practice of inference making was largely hindered by the student's insufficient thematic knowledge. Frustrated by frequent failed attempts at filling out the cloze blanks, 16D later chose to take no actions for the cloze blanks in the cloze DST, and even lost confidence in making anticipation in SI practice.

This case was not attended to in the action then because of the limited time assigned to the teaching. The resistance to the cloze DST was not detected until the end of the action undertaken in 2016, which was unfortunately the last round of action in this AR, thus no time was available to experiment for solutions.

To address the feeling of duress and lack of thematic knowledge, two tentative measures are suggested retrospectively. They are based on the instructional advice for addressing students' negative feelings to innovative teaching by Keeney, Gunersel and Simpson (2008): to address the sources of resistance at the beginning, and to be responsive to the student' concerns. To mitigate the feeling of being forced to do inference making, the purpose and the assumed value of using cloze DST can be better clarified to the students through equal communication. When the students perform the task and encounter difficulties, a diagnostic discussion between the trainer and students should be conducted to identify the underlying cause(s) so that responsive assistance can be provided. Besides this, verbal recognition of progress in the practice should be provided to enhance the students' confidence. To address the issue of inadequate thematic knowledge, more time can be allowed for thematic preparations. In the implemented teaching action, the researcher assigned the task of making advanced thematic research one week ahead and provided reading passages at the beginning of each session as supplementary materials of background knowledge. To take it further, the topics of practice can be provided at the beginning of the semester so that the students can start doing thematic research immediately and prioritize the topics for research according to their own knowledge base. Apart from more time for preparation, another suggestion is to intensify the exposure to a topic at one time, which requires coordination between DST-related exercises and other units of the curriculum; and this is to be discussed in detail in Section 9.2.2.1.

9.2.1.2 Student with weak capacities

The second special case involves a student whose progress was slow in skill development due to weak capacities. As suggested by all the test results and feedback from the student, 15D had

prominent difficulties in keeping pace with the progression of the skill development planned in this AR. In the mid-test, 15D gave up upon the test half-way, explaining in the subsequent questionnaire that he/she was "unable to proceed performing the task", when other students only reported occasional difficulties. For the DST and SI of the final test, 15D's performance was well below the group average, with much lower accuracy rate and higher misinterpretation and omission rates. The self-identified reason for this unsatisfactory performance in the final interview was inadequate comprehension under temporal pressure. From the students' comments, two contributing factors were mentioned: tendency to look up new words at sight, and difficulties in processing long sentences and complex structures.

These two factors indicate the underlying capacity deficiencies of 15D in both linguistic knowledge and cognitive capacities. The overreliance on the dictionary for unknown lexicons could indicate the student's inability to make inferences based on the contextual clues and inklings as practiced in the cloze DST. The difficulties in syntactic processing could be associated with a lack of linguistic knowledge such as grammar, or cognitive deficiencies in parsing and working memory responsible for information storage and information computation and integration (Christoffels, De Groot & Waldorp, 2003). As Dillinger (1994) argues, comprehension in SI requires the application of existing skills under more unusual circumstances compared with general comprehension. For 15D, who reported these issues to be disruptive in the comprehension of CST practice, the "more unusual" circumstances boil down to the dual presence of lexical and syntactic difficulties under higher temporal pressure in DST-related exercises, which demands too many cognitive resources and leaves too few resources for the use of skills.

Little chance was given to explore any possible solutions to this case, since this problem of 15D fully emerged at the end of the action cycle in 2015, and it remained as a unique case in the course of the three-year action.

To those students showing prominent deficiencies in interpreting capacities but not screened out in the aptitude test of SI, provision of special assistance is suggested via an exercise portfolio with a focused customization. Targeting their weakness in comprehension capacities, as in the case of 15D, exercises focusing on comprehension skills, such as paraphrasing and summarizing, should bear more weight in the composition of the exercise portfolio, with either longer duration or higher intensity in practicing these exercises. Meanwhile, the dynamicity of these exercises must be meticulously manipulated, controlled and observed, to keep the cognitive load as adequately challenging to these students. For instance, DST of Levels 1 and 2 dynamicity at lower rates of 90-100 words/minute could be adopted as the mainstream

exercises. One question is open to exploration: how to balance the time allocation for the whole class proceedings and tailored exercises for individuals, i.e. the ratio between the class exercises and the tailored exercises suggested to these students.

9.2.2 Lack of coordination in the teaching plan

As the second limitation of this AR, the DST-related exercises experimented during each cycle of action failed to closely coordinate with other units in the curriculum of MCI. The DST-related exercises were included as an element in TRAN865 on the premise that the teaching objectives for the two are consistent (see Section 5.1.1). However, the exercises were not well planned in accordance with TRAN 865, let alone other units in the curriculum.

Apart from the complexity in factoring in all relevant elements in the AR design, the limited experience of the researcher is partly responsible for this limitation. With underestimation of the importance of curricular coordination and insufficient communication with other colleagues, the teaching plan of the DST-related exercises was designed and implemented in isolation in terms of the sequence arrangement for two componential parameters: the topics, and the skills. Their respective pedagogical implications and tentative solutions are discussed in the following two sections.

9.2.2.1 Lack of coordination in the sequence of topics

The topics selected for the DST-related exercises in this AR were based on the common topics in the general interpreting training. The planned sequence of those topics indeed considered the progression in thematic specialization (see Section 5.3.1.3.2.1), but due reference to the topical arrangement in TRAN865 or other units was neglected.

The pedagogical implication of this design defect was that it could require extra time and work to reinforce the thematic knowledge which is crucial for comprehension (Déjean Le Féal, 1981). Despite the researcher's invested efforts in enhancing the thematic knowledge, the reported deficiencies in background knowledge prove that the current measures were not sufficient, possibly due to the limited scope of the supplementary materials and/or the students' failure in doing enough thematic research.

To fix this problem, the suggested solution is to align the topical sequence in the DST-related exercises with those in other units, at least with the unit in which the component is included. Such a coordinative approach is advised and illustrated by Sampaio (2015), who provides good suggestions for teaching ST in a curricular context, including the choice of topics in different

units as an important component. Sampaio (2015, p. 68) advises the choice of materials in one unit to be in reference with other units, to make sure that a topic could be approached from different angles with "a variety of sources, registers and style". The focused exposure to one topic in different units can largely extend the background knowledge of the students, achieving higher efficiency of thematic preparation.

9.2.2.2 Lack of coordination in the sequence of skills

The DST-related exercises were intended to be a teaching component supplementing the skill practice in the existing units in MCI. All four units delivered in the first semester of MCI entailed the element of skill development in the teaching objectives, be it: theory-oriented TRAN865[13] which introduces students to "models of SI process, skills acquired and their development, and strategies employed to cope with constraints in SI" via reading and reflecting on relevant literatures; or practice-oriented units including Advanced Consecutive interpreting, Simultaneous Interpreting into LOTE, and Simultaneous Interpreting into English (see Section 5.1.1). However, the sequence of the skill-focused practice in the DST-related exercises was not planned in reference to other units; and the isolated planning undermined its synergy with other units for a concerted effort of the skill development in the curriculum.

To achieve a better synergy of skill development among different teaching components and units in the curriculum, a more coordinated teaching is thus suggested. Salvá, Calvo and Cloquell (2001) argue that coordination among different units can save duplicative effort and maximize the learning outcomes. That is, the skill components practiced in each unit should be synchronized with or complementary to one another. In the context of MCI, for instance, the skill sequence of the DST-related exercises can be at least pegged to unit TRAN865 by matching the skills with the literatures the students read, maintaining a theory-practice coordination. To extend such coordination, the skill sequence in DST-related exercises can be aligned with other practice-oriented units, such as Simultaneous Interpreting into English, so that the skills practiced at the same time in different units can reinforce and complement one another, better integrating into the curriculum as a whole. Moreover, when the DST-related exercises morph into the skill-integration phase, these can be integrated into other practice-oriented units as warm-up exercises, along with other supplementary practice such as shadowing, to consolidate the skill development with diversified exercise types. Such structural inclusion can prevent the skill practice in one element from being isolated, and can situate the element in the context of SI practice more closely.

[13] See http://handbook.mq.edu.au/2019/Units/PGUnit/TRAN865.

Such integration also requires more communication and openness from all the teachers as a prerequisite. To fulfil the collaboration in the pedagogical AR, the communication between teachers teaching different units should be promoted, even though this might not be a norm observed by all interpreting training institutes. Collaboration with other teachers and units is one standard for T&I trainers in the higher education context (Kelly, 2005, 2008), and it is an essential feature for a student-centred approach to teaching (Cannon & Newble, 2000), so that the trainers should forgo any reluctance or narrowmindedness, to have exchanges over teaching plans or pedagogical ideas. Only through communication can the consensus over coordination be achieved and teaching details settled for connectivity among all the related units. Such teamwork can, in turn, contribute to both interpersonal relationships and a more motivating academic environment for teachers (Kelly, 2005)

9.3 Summary

To sum up, the findings from this study prove that the AR has its advantages in making pedagogical inquiries into issues of a complex and dynamic nature. As demonstrated in this research, the features of AR rendered the inquiry flexible, upwardly spiralling, locally-situated, and mutually informative, making dual contributions to the teaching and learning. On the teaching side, the AR facilitated the knowledge gain of the experimented didactic tools and the development of student-centred awareness and corresponding teaching skills. On the learning side, AR stimulated the students to turn towards being active and autonomous learners. These benefits are all in accordance with the request of the prevailing constructivist approach in interpreting pedagogy.

Nevertheless, the complexity and dynamic characteristic of AR also requires well-balanced design and tactful implementation to take into account influential factors that can jointly maximize the effectiveness and efficiency of skill development and transfer. Being an operational example of not being able to attend to all factors, this AR shows its limitations in the design and implementation. Some limitations were caused by the confined condition of the inquiry, which was hard to control. However, other limitations can be addressed or avoided by improving the trainer-student communication, and trainer-trainer communication for unit coordination in the curricular context. These experiences provide advice and directions for future AR-integrated inquiries to be thorough in investigation and empowering to all parties involved.

10 CONCLUSION

This chapter summarizes the whole study in terms of its scope and the significance, its main findings, and their implications in three sections. Section 10.1 revisits the two major themes of this inquiry, the didactic functions of DST-related exercises and methodological approach of AR; and reiterates their significance in interpreting pedagogy in general and SI skill development and transfer in particular. In Section 10.2, the main findings of this AR inquiry are highlighted to respond to the four research questions. Finally, Section 10.3 sets out the important implications of these research findings and this inquiry as a whole, not only for interpreting teaching but also in a broader sense for learning development.

10.1 The inquiry scope and the significance

This inquiry is woven together with two threads of research themes: adaptation of AR to explore the didactic use of DST-related exercises for skill development and transfer in SI teaching; and exploration of AR as a research approach to respond to pedagogical trends. With such a dual didactic and methodological theme, the significance of the present inquiry accordingly lies in exploration of both SI didactics and pedagogical methodology. The findings this research has yielded help bridge some gaps in the current SI research at two levels.

At the didactic level, the use of the exercises investigated in the "reflective action" provides more valuable knowledge of scaffolding skill development and transfer in SI teaching with DST, the new variants of CST. The successful outcomes from the skill development and transfer indicate the feasibility of extending the didactic role of CST in SI teaching. Some new dynamic features added to CST can better simulate SI and create flexibility to accommodate the novice students' needs in skill acquisition for an easier transition to SI. Meanwhile, the failures that occurred in skill development and transfer exemplify how the inappropriate manipulation of the newly added features may hinder instead of facilitating the simulation of SI. Some failures also flag an intricate limitation of the DST-related exercises, associated with the absence of demand for auditory suppression in comparison to SI, which can only be compensated for by using these with other complementary exercises. In a larger context, with the request for diversity in pedagogy and expansion of new didactic tools due to the proliferation of SI teaching, and changes to student profile and market demands (see Section 2.1.2), the inquiry has met, to no insignificant extent, the need for developing new tools to respond to these trends.

At the methodological level, the use of AR as the methodological framework in the present study verifies the benefits and complexity of AR, supplementing the current mainstream

research methods in interpreting pedagogical inquiries. On the one hand, the benefits are obvious that the features of AR accommodate inquiries with complexity and uncertainty, give space for development for both teacher-researchers and students, and provide solutions that are responsive and relevant to the local issues in the authentic teaching context (see Section 9.1). On the other hand, the complexity of AR is also verified in that rigorous research design and flexible responsiveness in implementation are imperative to navigate AR with factors included in and as constituents of the contexts, especially when it is compounded by the complexity of subject matters. In this AR, two limitations arising from the failures in accommodating such intertwined complexities are identified in two areas. Firstly, while trying to cater to all participants' needs, it is hard to strike a viable balance between group and individual needs in the definite time frame. Secondly, while setting the study in a local curricular context, it is difficult to achieve a synergy between the individual teaching elements and the whole curriculum. The acknowledgement of these limitations is to show the consequent limitations of the findings from the present research. At the same time, the identified limitations have marked some pitfalls for future pedagogical research conducted using this approach, providing some reference and direction to future inquiries.

10.2 The findings

Under the AR framework, the exploration was made in three cyclical rounds of action from 2014, via 2015, to 2016, with the findings presented in Chapters 6, 7, 8 and 9. These four chapters present the process of making gradual and progressive refinements of DST-related exercises as didactic tools to better serve the purposes of skill development and transfer, and unfold the benefits and complexity of AR as a methodological framework in the course of the action.

Chapter 6 documents the process of the complete action cycle in 2014 as a pilot in detail. The main findings are students' negative feedback and unsatisfactory test results, indicative of potential drawbacks in the original exercise design. Along with a new literature search, tentative adjustments were implemented in the subsequent rounds, the effects of which are reported and analysed in Chapter 7, focusing on how the manipulation of dynamic features and the adjustments of exercise sequence generated different results in terms of skill development and transfer. Aggregating all the findings from the action of three years, Chapter 8 sheds light on both the benefits and limitations of DST-related exercises as didactic tools in SI learning. To balance the whole thesis, Chapter 9 reviews the AR as a methodological framework under which the actions were conducted in terms of the benefits and limitations of the present AR-

framed inquiry, expounding both the advantages and complexity of AR in the exploration of skill acquisition, and the extended benefits for teaching and learning in a larger context.

All these findings provide responses to the research questions about both the didactical use and value of DST-related exercises and the methodological choice of AR in pedagogical inquiries. The responses to the research questions with their pedagogical implications are outlined as follows.

Question 1: What are the primary deficiencies of skills and capacity that must be addressed to help students to transit from CI to SI mode in the early stage of SI learning, and when and how they should be addressed?

Although the skill deficiencies of the novice students were anticipated before the actions started, the prominent deficiencies identified from the findings varied at different stages with different cohorts of students. In the two micro-cycles embedded in one action cycle, the deficiency variations at different stages necessitated making an emphasis on changes of skill practice through exercises. Despite the implementation of adjustments in each cycle (see Chapters 7) of this AR, some common deficiency variations were identified at different stages, i.e. the beginning, the middle and the end of the cycle, providing revelations associated with the choice of exercises as adequate skill development tools at different stages of learning. In general, the findings show that, among multiple deficiencies facing novice students at the early stage of SI learning, comprehension deficiencies, as the most prominent issue, must be addressed first as a top priority. Afterwards, deficiencies in translation and production should be addressed in particular with exercises for comprehension skills carried out in tandem.

At the beginning of the first micro-cycle, the main difficulties the students encountered include adaptation to the task condition featuring cognitive simultaneity and temporal pressure as shown in the pre-test in the three years. These difficulties reflect the underlying skill deficiencies in the input text processing, especially in the speed of identifying and computing the meaning segments. The skills of enhancing efficiency of input processing, therefore, should be developed as the priority from the start of cycle and continued to be practiced.

In the first micro-cycle, the simulation tasks should aim at gradually adapting the novice students to the interpreting mode involving the concurrent input and output under time pressure; and at focusing on practicing skills for comprehension first. To serve these ends, exercise types suggested for the first micro-cycle are dynamic summarizing, dynamic paraphrasing, and DST including cloze DST, of Levels 1 and 2 dynamicity and at low–to-medium input rates (referring to 90-100 words/minute in this AR). These exercises are all focused on developing

comprehension skills under temperate time pressure, which include comprehension-enhancing strategies such as segmentation and anticipation (see Section 7.1). Set at lower dynamicity levels and input rates, the cognitive load on translation and production arising from these exercises could be controlled, thus sparing more cognitive resources for students to deal with the input processing in comprehension.

At the beginning of the second micro-cycle, the skill deficiencies in production began to come to the students' attention after focused practice of skills for comprehension in the first micro-cycle. As shown in the students' post-test feedback in the mid-semester across the three years, the progress in segment identification and computation was acknowledged, although to various extents. Comparatively, the lack of skills in organizing and reformulating the translated segments became more prominent in hindering fluent and adequate delivery, which was discovered in all three years. The underlying skill deficiencies were manifested in the inadequate use of production strategies, especially the language-specific ones that can resolve linguistic variations, including syntactic discrepancies, between the source and target languages. This reveals that, after the deliberate practice of skills for comprehension in the first micro-cycle, the focus of skill practice is suggested to partly shift to production skills in the second micro-cycle.

Suggested exercises are DST of Levels 2 and 3 dynamicity in the second micro-cycle, during which generic (such as summary and generalization) and language-specific production strategies (such as addition, change to the part of speech and syntactic transformation) that can alleviate the burden on production should be discussed and practiced. Meanwhile, the input rate can be set at higher input rates when the students become comfortable with the input rates for the first micro-cycle, or the trainer intends to enhance cognitive load by increasing the information evanescence (in this AR, rates up to 120 words/minute appeared to be adequate for this stage).

At the end of the second micro-cycle, the findings show that the insufficient coordination of different cognitive efforts became the main deficiency. Despite the reported progress by the students in accuracy and speed of on-line comprehension, speed of translation equivalent retrieval and production efficiency, the findings still show deficiency in the simultaneity in those DST-related exercises that were meant to maximally simulate SI in terms of the cognitive load, i.e. DST of Level 3 dynamicity. This confirms, apart from deficiencies to be better addressed in sub-processes, the necessity of integrating all the subskills practiced in a global task that has balanced cognitive demands on all sub-processes and the coordination among them. At the final stage of the scaffolding effort in the DST component, DST of Level 3 dynamicity

at input rates from 100 to 120 words/minute (as found in this AR) is suggested, hinging on the students' progress after the earlier staged practice of skills.

Question 2: What subskills can be developed and enhanced as a result of different DST-related exercises?

The findings prove that the subskills for comprehension, translation and production can all be enhanced through DST-related exercises. This success of skill development was identified among and by the majority of the students in the three years, although to different extents.

For the comprehension process, the segment identification and computation under time pressure were improved by practicing the strategies of segmentation and anticipation. The findings suggest that these strategies can contribute to the better function of working memory, which is a crucial element of comprehension (MacWhinney, 1997). When the students practiced processing evanescent and partially presented input information in the SI-simulated exercises, these strategies alleviated the memory load and accelerated the information processing. Although the practice of these strategies might not lead to improvement in performance immediately, the resulting improvements in the consciousness of and monitored use of these strategies can bring about a long-term impact on comprehension quality (see Section 7.1.2).

For the translation process, the translation retrieval speed was improved as a result of the gradually growing level of information evanescence constituting incremental dynamicity level and input rate. As reviewed in Section 5.3.1, the translation retrieval speed is closely associated with lexical retrieval, while the role of lexical retrieval can be mediated by general language proficiency, both in A and B languages (Christoffels, De Groot & Kroll, 2006). Since language proficiency is unlikely to improve dramatically within a short period of time, a more likely explanation for the quicker retrieval speed is that the exercises directly improve the retrieval speed of equivalents from the long-term memory (Moser-Mercer, 2000a).

For the production process, the speed of delivery and the linguistic naturalness of the production were improved by practicing the production strategies including summarization/generalization and language-specific reformulation strategies. As supported by the findings, these exercises contribute to the alleviation of cognitive load in production, in that summarization and generalization shorten the output massage, and language-specific reformulation strategies (such as changing the part of speech, addition and syntactic transformation) address syntactic differences between the source and target languages (see Section 7.2.2).

For the purpose of skill development as a whole, DST-related exercises present high diversity in exercise types and high flexibility for manipulation to accommodate various development needs of various stages and students (see Section 8.1). To different students, various exercises can be particularly useful in addressing their individual deficiencies. Although it is difficult to establish a definite linkage between one type of exercise and a specific skill development result due to the complexity of multiple parameters compounded by the individuality in skill acquisition, it can be concluded that the cohort of DST-related exercises can develop and enhance the following skills in all efforts involved in the cognitive processes of SI, as shown in Table 10.1.

Table 10.1 - Skills developed through the cohort of DST-related exercises

Effort involved in SI / Skill developed through DST-related exercises cohort	Comprehension	Translation	Production	Coordination
	Segment identification and computation; Use of WM; Comprehension strategies (segmentation, anticipation)	Speed of retrieval of equivalents	Production strategies (summarization, generalization, reformulation)	Simultaneity

Question 3: Whether and how can the developed skills be transferred to SI with the assistance of the DST-related exercises?

Both success and failures were observed in skill transfer via the DST-related exercises.

In terms of the success, the applicability of skill transfer between DST and SI was confirmed and successful transfer was reported in skills for all cognitive efforts (see Section 8.1.2). Nevertheless, the extent to which the skills are transferred may vary, depending largely on two factors found in this research. It appears that the skills that are reported to be more solidly developed through DST-related exercises are transferred in SI practice to a larger extent (with simultaneity as an exception, as explained in Section 8.3.2). In addition, the success of transfer is in proportion to the students' efforts devoted to the reflection. In this AR, the students reporting overt skill transfer were those who were more active in reflecting upon and deliberately using the practiced skills in both DST and SI practice (see Section 9.1.2.2). For

these students, their constant reflection and monitoring of the skill progression make them more prepared to transfer the shared skills in SI, thanks to easier identification of problem patterns, and quicker retrieval and use of relevant skills. Such finding resonates with Calvo (2015, p. 309), that the reflection made during practice in meaningful contexts resembles the "practice-related theorization" that can make the learning more transferrable. This finding also implies that, to enhance the effect of transfer, apart from refining the exercise tools to achieve better simulation, encouraging and enabling the students' reflection on the practice is also a decisive factor.

However, failures associated with transfer, despite all attempts at making adjustments and readjustments, were found at the same time, which points to two limitations of the didactic tools (see Section 8.2.2).

The findings accentuate that the exercises must be designed appropriately to minimize the potential side effects of the dynamic features (see Section 8.2.2.1). As didactic tools aiming at helping to scaffold skill development for SI, the exercises should be designed to be less difficult tasks as compared to SI, imposing less cognitive demands. The findings prove that introducing Level 3 dynamicity too early could distract the emphasis on practicing comprehension skills; and excessively high input rates may impose extra visual distraction in information reception, and generate excessive cognitive burden on comprehension and production associated with the excessively decomposed display of the texts (with 130 words/minute found as a limit for the majority and 120 words/minute mainly for the students with audio stimulus preference in the present research). The revelation is that the manipulation of the dynamic features of the exercises must be in reference to the students' reactions and needs.

The findings also reveal an intrinsic limitation of DST-related exercises in skill development (see Section 8.2.2.2). Most students reported that they could not execute the same level of simultaneity in DST as in SI, meaning that their execution of coordination were inferior in the latter. One possible explanation is that the lack of channel interference between the input and output in the DST-related exercises subdues the request for articulatory suppression in SI, imposing less demand on working memory and resource coordination and thus making simultaneity practiced lower in hierarchy than that in SI (see Section 8.3.2). This attests to the findings of Christoffels and De Groot (2004), that only situations where listening to and articulating speech are simultaneously involved can mimic a condition requesting articulatory suppression. The visual input in the DST-related exercises, as an innate feature that results in separate sensory channels in input and output, cannot be changed through manipulation of the textual display patterns. Such a gap in the simultaneous articulatory suppression imposes an

unresolvable limit in simulating SI. This finding thus suggests the significance of complementing DST-related exercises with other exercise elements involving articulatory suppression to complete the scaffolding toolkit for SI.

Question 4: How well does the implementation of AR contribute to SI skill development and transfer, and extend the benefits to improving ways of teaching and learning in a broader context?

The findings show that the integration of AR into interpreting pedagogical studies naturally responds to the current trends of interpreting pedagogy (see Section 9.1.2). Following the paradigm shift from teacher-centred to learner-centred learning-teaching approach in interpreting pedagogy, both trainers and students need to reposition themselves in the teaching-learning interaction. To attend to both parties, Kiraly (1995) proposes that the training should be conducted under a framework to identify both cognitive resources required by the students and the search for pedagogical tools. The features and process of AR were proved to be an appropriate research framework with the capacity for meeting these requirements.

To trainers, the change-driven, locally-situated and cyclical features of AR advance the constant improvement of teaching tools and teaching practice in authentic classroom teaching, while the feature of collaboration substantiates the emphasis on students' inputs to construct the learning process. Through AR inquiry, trainers undergo self-development in developing and reinforcing the teaching beliefs and teaching skills to be facilitators in the student-centred teaching approach (see Section 9.1.2.1).

To students, the close engagement in AR stimulates their role as responsible and autonomous learners who take more initiatives in the learning. Valued as an equal partner in the AR inquiry, students can feel more obliged to actively make reflection and seek further resources to have independent learning, enabling a more meaningful study and prospect of autonomous life-long development (see Section 9.1.2.2).

Meanwhile, the findings also flag the complexity of AR in operation. Given the multiple and unpredictable factors that may influence the inquiry process and the results, it can be challenging to factor in all elements in the design and implementation of AR, which thus requires both deliberation and flexibility. That being said, the complexity does not negate its benefits or outweigh its positivity. On the contrary, our recognition of its complexity and identification of the limitations of this AR can provide reference and experience to future AR inquiries on interpreting pedagogy (see Section 9.2).

10.3 Implications of this AR

This inquiry, an AR exploration on skill development and transfer, is significant in terms of its dual implications at didactical and methodological levels, and of its extended implication for teaching and learning development in a broader context.

Didactically, the findings about the use of DST-related exercises provide both SI trainers and students with additional alternatives of didactic tools that are able to enrich SI teaching and learning.

To trainers, the findings about manipulating the exercise features further enrich and extend the exploration of SI pedagogy at a more operational level, in additional to the earlier exploration of SI curriculum design, including in curriculum environment and interaction, teaching components and skill sequences (Sawyer, 2004, pp. 60-73). Besides this, with the increase in the prevalence of SI teaching as a trend, innovative didactics for different language pairs, especially non-European languages, are required, and the findings based on Mandarin-English SI from this AR are ready to be extended to other language pairs.

To students, the DST-related exercises provide a user-friendly instrument for independent training. With the prevalent use of technology in the learning, and heterogeneity of students, as new trends in the market (see Section 2.1.3), the learners do not necessarily choose to attend the full SI course at institutes, but can rely on Internet and different software applications to access independent SI practice. Outside of formal SI courses, skill-scaffolding tools that are easy to adopt with minimal technical demands but responsive and adaptive to individual needs can provide more assistance to students with heterogeneous characteristics. In this sense, the DST-based exercise cohort, with the potential to develop into a prospective DST-based application capable of producing DST exercises at various combinations of dynamicity levels and rates, is an accessible didactic tool that is more tailored and self-directed to students of increasing diversity and heterogeneity.

Methodologically, the findings provide more support to the advantages of AR and facilitate its use in future pedagogical research. By proving the benefits of AR and highlighting the cautions that should be taken, the researcher not only provides other researchers with more confidence to integrate AR into SI pedagogical exploration but also reminds them to eschew potential pitfalls. These proved significances of the reflective teaching in AR make it a valuable research and development tool for trainers, both current and prospective. To current trainers, to integrate AR into their teaching constitutes their continuous professional development. Such benefits

may be maximized if AR can be systematically integrated in all related units in the curriculum. For prospective trainers, they should also be equipped with relevant competences to be reflective practitioners in their training to become teachers. As a result, AR is suggested to be included in training courses for prospective trainers, not only in interpreting but also in other disciplines, as a promising element.

APPENDICES

Appendix 1: All texts for class exercises[14]

Week 2

The generation that's remaking China

My generation has been very fortunate to witness and participate in the historic transformation of China that has made so many changes in the past 20, 30 years. After fierce completion and several rounds of auditions, I was on a national television prime-time show. And believe it or not, that was the first show on Chinese television that allowed its hosts to speak out of their own minds without reading an approved script. And my weekly audience at that time was between 200 to 300 million people.

After a few years, I decided to go to the U.S. and Columbia University to pursue my postgraduate studies, and then started my own media company, which was unthought-of of during the years that I started my career. So we do a lot of things. I've interviewed more than a thousand people in the past. I was in Beijing's bidding for the Olympic Games. I was representing the Shanghai Expo. I saw China embracing the world and vice versa. But then sometimes I'm thinking, what is today's young generation up to? How are they different and what are the differences they are going to make to shape the future of China, or at large, the world?

So today I want to talk about young people through the platform of social media. First of all, who are they? What do they look like? A lens to see through is Microblog boomed in the year of 2010, with visitors doubled and time spent on it tripled.Sina.com, a major news portal, alone has more than 140 million micro bloggers. The most popular blogger --it's not me --it's a movie star, and she has more than 9.5 million followers, or fans. About 80 percent of those micro bloggers are young people, under 30 years old. And because, as you know, the traditional media is still heavily controlled by the government, social media offers an opening to let the steam out a little bit. But because you don't have many other openings, the heat coming out of this opening is sometimes very strong, active and even violent. (351)

Through microblogging, we are able to understand Chinese youth even better. So how are they different? First of all, most of them were born in the 80s and 90s, under the one-child policy.

[14] See Appendix 1 on the CD attached for the examples of DST of dynamicity levels 1, 2 and 3.

And because of selected abortion by families who favoured boys to girls, now we have ended up with 30 million more young men than women. Most of them have fairly good education. The illiteracy rate in China among this generation is under one percent. In cities, 80 percent of kids go to college. But they are facing an aging China with a population above 65 years old coming up with seven-point-some percent this year, and about to be 15 percent by the year of 2030.And you know we have the tradition that younger generations support the elders financially, and taking care of them when they're sick. So it means young couples will have to support four parents who have a life expectancy of 73 years old.

So making a living is not that easy for young people. College graduates are not in short supply. In urban areas, college graduates find the starting salary is about 400 U.S. dollars a month, while the average rent is above $500. It is especially difficult for young people born in rural areas. Among the 200 million migrant workers, 60 percent of them are young people. They find themselves sort of sandwiched between the urban areas and the rural areas. Most of them don't want to go back to the countryside, but they don't have the sense of belonging. They work for longer hours with less income, less social welfare. And they're more vulnerable to job losses, subject to inflation, tightening loans from banks, appreciation of the Renminbi, or decline of demand from Europe or America for the products they produce.

For those who do return back to the countryside, they find themselves very welcome locally, because with the knowledge, skills and networks they have learned in the cities, with the assistance of the Internet, they're able to create more jobs, upgrade local agriculture and create new business in the less developed market. So for the past few years, the coastal areas, they found themselves in a shortage of labour.

So through some of the hottest topics on microblogging, we can see what young people care most about. Social justice and government accountability runs the first in what they demand. For the past decade or so, a massive urbanization and development have let us witness a lot of reports on the forced demolition of private property. And it has aroused huge anger and frustration among our young generation. Sometimes people get killed, and sometimes people set themselves on fire to protest. So when these incidents are reported more and more frequently on the Internet, people cry for the government to take actions to stop this.

Similarly, many other issues concerning public safety is a hot topic on the Internet. We heard about polluted air, polluted water, and poisoned food. All these things have aroused a huge outcry from the Internet. And fortunately, we have seen the government responding more timely and also more frequently to the public concerns.

While young people seem to be very sure about their participation in public policy-making, sometimes they're a little bit lost in terms of what they want for their personal life. China is soon to pass the U.S.as the number one market for luxury brands --that's not including the Chinese expenditures in Europe and elsewhere. But you know what, half of those consumers are earning a salary below 2,000 U.S. dollars. They're not rich at all. They're taking those bags and clothes as a sense of identity and social status. A girl explicitly claims on a TV dating show that she would rather cry in a BMW than smile on a bicycle. On the other hand, some young are displaying their distinctive personal values. A very popular phenomenon called "naked" wedding, or "naked" marriage is prevailing. It shows that these young couples are ready to get married without a house, without a car, a diamond ring and without a wedding banquet, to show their commitment to true love.

Happiness is the most popular word we have heard through the past two years. Happiness is not only related to personal experiences and personal values, but also, it's about the environment. People are thinking about the following questions: Are we going to sacrifice our environment further to produce higher GDP? How are we going to perform our social and political reforms to keep pace with economic growth, to keep sustainability and stability? I guess these are the questions people are going to answer. And our younger generations are going to transform this country while at the same time being transformed themselves. Thank you very much.

(Adapted and modified for education purpose)

Week 3

Passage: Speech to 2012 Graduates in Finance at Yale University by Robert J. Shiller

Best of luck to you as you leave the academy for your chosen professions in finance. Over the course of your careers, Wall Street and its kindred institutions will need you. Your training in financial theory, economics, mathematics, and statistics will serve you well. But your lessons in history, philosophy, and literature will be just as important, because it is vital not only that you have the right tools, but also that you never lose sight of the purposes and overriding social goals of finance.

You have been studying at the bottom of the ocean since you know that the financial sector has come under severe criticism – much of it justified – for thrusting the world economy into its worst crisis since the Great Depression. While some of this criticism may be over-stated or misplaced, it nonetheless underscores the need to reform financial institutions and practices. Finance has long been central to thriving market democracy. With your improved sense of our

interconnectedness and diverse needs, you can do that. Indeed, it is the real professional challenge ahead of you, and you should embrace it as an opportunity.

Young finance professionals need to familiarize themselves with the history of banking, and recognize that it is at its best when it serves ever-broadening spheres of society. Today, the best way forward is to update financial and communications technology to offer a full array of enlightened banking services to the lower middle class and the poor.

Graduates going into mortgage banking are faced with a different, but equally vital challenge: to design new, more flexible loans that will better help homeowners to weather the economic turbulence that has buried millions of people today in debt.

Young investment bankers have a great opportunity to devise more participatory forms of venture capital, to spur the growth of innovative new small businesses. Meanwhile, opportunities will abound for rookie insurance professionals to devise new ways to hedge risks that real people worry about, and that really matter – those involving their jobs, livelihoods, and home values.

Beyond investment banks and brokerage houses, modern finance has a public and governmental dimension. Setting the rules of the game for a robust and socially useful financial sector has never been more important. Recent graduates are needed in legislative and administrative agencies to analyse the legal infrastructure of finance, and regulate it so that it produces the greatest results as it can for society.

Those of you deciding to pursue careers as economists and finance scholars need to develop a better understanding of asset bubbles – and better ways to communicate this understanding to the finance profession and to the public. As much as Wall Street had a hand in the current crisis, it began as a broadly held belief that housing prices could not fall – a belief that fuelled a full-blown social contagion. Learning how to spot such bubbles and deal with them before they infect entire economies will be a major challenge for the next generation of finance scholars.

Equipped with sophisticated financial models and formula, you are certainly and justifiably interested in building materially rewarding careers. There is no shame in this, and to a large degree, your financial success will reflect your effectiveness in producing strong results for the firms that employ you. But, the rewards for success on Wall Street, and in finance more generally, are changing, just as the definition of finance must change if is to reclaim its stature in society and the trust of citizens and leaders.

Finance, at its best, does not merely manage risk, but also acts as the steward of society's assets. The next generation of finance professionals will be paid its truest rewards in the satisfaction that comes with the gains made in extending its benefits into corners of society where they are most needed. This is a new challenge for a new generation, and will require all of the imagination and skill that you can bring to bear. The world needs you to succeed.

(Adapted and modified for education purpose)

Week 4

Australian PM Address to the Davos Forum 2014

For more than 40 years, this World Economic Forum at Davos has been an important contributor to global progress. It has brought together some of the best thinkers and most important decision-makers: not to dwell on problems but to focus on opportunities.

As 2014 begins, it's easier to be optimistic. In the United States, economic growth is set to rise from under two per cent to almost 3 per cent, with a million jobs created in the last year. China's growth is moderating but likely to remain over 7 per cent. Even the Eurozone is finally growing again. Of course, the recovery remains fragile. The US taper will need deft management.

Around the world, over 300 million young people are neither working nor studying and the global economy needs 30 million more jobs just to restore employment levels from before the Global Financial Crisis. The challenge, everywhere, is to promote sustainable, private sector-led growth and employment – and to avoid government-knows-best action for action's sake.

It's worth noting – if only to remind ourselves of the good that can be done – that in the past few decades, more has been achieved to reduce poverty than in any other period in history. In countries such as China, India and Indonesia many hundreds of millions have been lifted from subsistence to the middle class.

Despite the Crisis, worldwide, income per person is still up by over 60 per cent in the past decade. The global middle class is growing from 1.8 billion now to over 3 billion in 10 years' time. This progress is partly due to better science and technology; and partly to the constant aspiration to do better.

Mostly, though, it's been driven by the intellectual and philosophical conviction that free trade and smaller government will strengthen prosperity; the instinct that empowered citizens can do

more for themselves than government will ever do for them. As soon as people have economic freedom, they create markets. Markets are the proven answer to the problem of scarcity.

The challenge, as we continue to work through the weaknesses that brought on the Crisis, is to strengthen governance without suppressing the vitality of capitalism.

The Crisis, after all, has not changed any of the basic laws of economics. The lesson of recent history, whether it's the collapse of Soviet-style communism, the phenomenal growth of Asian economies, or the slow and painful recovery from the Crisis of 2008 and 2009 is that real progress is always built on clear fundamentals.

You can't spend what you haven't got. No country has ever taxed or subsidized its way to prosperity. You don't address debt and deficit with yet more debt and deficit. After all, you can't have strong communities without strong economies to sustain them and you can't have strong economies without profitable private businesses.

Above all else, policy-makers need to understand that every dollar government spends comes from the people, either through taxes and borrowings; or, over the past few years, through the process known as quantitative easing which is not indefinitely sustainable. Richer people, stronger countries and a better world all depend upon policy-makers' grasp of these fundamentals and there's no better place to reiterate them than the World Economic Forum – creator of the global competitiveness index as well as this conference.

As always, stronger economic growth is the key to addressing almost every global problem. Stronger growth requires lower, simpler and fairer taxes that don't stifle business creativity. And stronger growth requires getting government spending under control so that taxes can come down; and reducing regulation so that productivity can rise. In the decade prior to the Crisis, consistent surpluses and a preference for business helped my country, Australia, to become one of the world's best-performing economies.

Then, a subsequent government decided that the Crisis had changed the rules and that we should spend our way to prosperity. But after the recent election, Australia is under new management and open for business. To boost private sector growth and employment, the new Government is cutting red tape and reducing the tax burden by scrapping the carbon tax and the mining tax.

If the largest economies can individually achieve higher growth and can cooperate to achieve higher global growth, obviously, every country benefits. I'm looking forward to respectful but robust discussion of each country's national plan. Each of us can learn from the problems that

we all face; and even more importantly, the problems that can only be solved by countries working cooperatively together.

Like last year, this year's G20 must be more than a talkfest. As always, trade comes first. People trade with each other because it's in their interest to do so. Every time one person freely trades with another, wealth increases. Just as trade within countries increases wealth, trade between countries increases wealth – that's why we should all be missionaries for freer trade.

At the very least, the G20 should renew its commitment against protectionism and in favour of freer markets. Each country should renew its resolve to undo any protectionist measures put in place since the Crisis. Better still, each country should commit to open up trade through unilateral, bi-lateral, and multi-lateral actions and through domestic reforms to help businesses engage more fully in global commerce.

As a trading nation, Australia will make the most of its G20 presidency to promote free trade. Over time, everyone benefits because, in a global economy, countries end up focusing on what they do best. A more global economy with stronger cross-border investment eventually helps everyone because it generates more wealth and ultimately creates more jobs.

Then, there's the worldwide "infrastructure deficit", with the OECD estimating that over 50 trillion dollars in infrastructure investment is needed by 2030.Developing countries need new infrastructure, developed countries need rebuilt infrastructure and almost every country is struggling to finance the infrastructure it needs.

We can enhance out infrastructures through attracting more private capital through sensible pricing policies and better regulatory practices. As an "infrastructure prime minister", my hope as G20 host, is to bring policy-makers, financiers and builders together to identify practical ways of increasing long-term infrastructure financing.

What investors really need is greater confidence that governments won't change the rules after the investment has been made.

The G20 assumed its current form in response to the Crisis triggered by bad banking practices. So at the heart of the G20's work is building the resilience of the financial sector: helping to prevent and manage the failure of globally important financial institutions; making derivatives markets safer; and improving the oversight of the shadow banking sector.

Financial regulation is always a work-in-progress but these reforms now need to be finalized in ways that promote confidence without eliminating risk. The challenge for authorities is to keep abreast of developments, not to lag behind them as they did pre-Crisis, and to maintain the public's trust.

Finally, governments must always remember that an economy is far more like an organism than a machine. A strong economy is far less likely to be one responding to central control than one spontaneously generating its own growth. After all, government doesn't create wealth; people do, when they run profitable businesses.

Government's role is always to nurture its citizens rather than to promote itself. Australia is determined, as a responsible and committed G20 chair, to promote better global governance. We will strive for for further progress under Turkey in 2015.

Ultimately, the G20 is not about us in government; it's about the people, our masters.
(Adapted and modified for education purpose)

Week 5

Remarks by President Obama at Business Council Dinner
Good morning, I am always pleased when I get a chance to speak to our business leaders, and I am very much rooting for your success, because what is absolutely true is that when your companies are thriving, then the possibilities of jobs and growth and people being able to achieve their dreams are greatly enhanced.

Now, the good news is, is that after four years of difficult times, we have seen a steady recover. And we've seen over 6 million jobs created over the last 35 months. Housing is finally beginning to recover. There is reason for optimism as we move forward. Having said that, I think everybody here is also aware of, though, that we've got a long way to go. Unemployment is still too high. Middle-class families are still feeling enormous stresses and strains. And what I think everybody is concerned about is the enormous uncertainty in terms of the political framework, the tax framework, the debt framework within which all of you are going to be operating over the next several years.

Both private sector and public sector economists are estimating that we could lose as much as six-tenths of a point, or even a little bit more, of economic growth. And that means, inevitably, hundreds of thousands of people who are out of jobs would still not get them. It means that you

have fewer customers with money in their pockets ready to buy your goods and services. This can be the worst scenario but we can actually prevent it from occurring.

What we should be doing - and what I've been calling for repeatedly over the last several years -- is a balanced approach to deficit reduction that combines some tough spending cuts, and a tax reform agenda that without raising tax rates further could in fact raise sufficient revenues. Those combined would yield about $1.5 trillion in deficit reduction over the next decade; would replace the sequester; would bring our deficit-to-GDP ratios below the 3 percent threshold that we need for stabilization; and would lay the groundwork for more expansive growth because we would have simplified our tax system, closed some loopholes, seen an opportunity for corporate tax reform that could also make the whole system more sensible and give you guys a more competitive posture internationally. That's what we should be doing.

I thought this would be a good chance to reflect on an important development that has stood out in my mind over the past year. That is what's been happening in China, which has an important bearing on the economy here in Australia.

China's economic development has been truly remarkable by any measure. For three decades now it has sustained growth at an average of around 10 per cent per annum. China now accounts for a substantial and increasing share of global economic activity. Over the past 10 years, it has almost tripled its share of the global economy to become the second largest economy after the United States. Correspondingly, China now uses a large share of the global output of commodities, not only because it's a large economy, but also because it makes relatively intensive use of raw commodities. One driver of this has been the rapid urbanisation of China. This requires the construction of new housing and places of work, as well as transport, communications, power, and water storage and treatment facilities.

Still, the path of growth in China has not been a smooth one, and China will continue to experience cyclical variation in economic conditions that will need to be carefully managed. Such cycles will have important implications for the prices of commodities because of the size and makeup of China's economy. Changes in commodity prices will in turn influence the outlook for the resources sector in Australia.

A gradual slowdown in the trend growth rate of China's economy is to be expected as the process of economic development runs its course. What the path for trend growth will look like though is very hard to know. One way to think about this is to break China's productive capacity

into its key elements – its supply of labour, its stock of capital and how productively it can combine these to produce goods and services.

The working-age population for the country as a whole is expected to peak sometime around the middle of this decade. Without a significant increase in the rate of labour force participation, this implies less growth in the overall labour force. Perhaps the more important question is what will happen to the growth of the urban workforce. This is critical because urbanisation is the means by which relatively unproductive labour in the rural sector finds its way to more productive activities in urban centres where much of the capital resides. It seems that urbanisation still has a way to go – particularly in the central and western regions of the country. Nevertheless, the pace of urbanisation is likely to slow over time.

The prospects for Chinese demand for commodities will depend not just on the growth rate of the economy, but also on the composition of that growth. As growth in China, and elsewhere in the world, was slowing through 2012, growth in the demand for steel slowed, leading to sharp declines in the spot prices of iron ore and coal from July through to early September. But through 2012, the more accommodative stance of financial policies and increased public spending in China have helped to support an increase in the growth rate of investment in infrastructure and dwellings and thereby helped to stabilise growth of the economy overall .

In short, with a lower rate of trend economic growth, Chinese demand for commodities will grow somewhat less rapidly than in the past. But the expectation is that it will still grow strongly for quite some time. And because the Chinese economy is so much larger now, even a somewhat slower rate of growth represents a large quantity of new demand for raw materials.
(Modified for education purpose)

Week 6

The Interconnected Global Economy: challenges and Opportunities for the World
Good afternoon. I am especially pleased to be with you today. IMF has a longstanding objective—and a responsibility—to serve society through a set of shared values: a commitment to expand economic opportunity for *all*; a belief in human potential; a desire to ensure that the right conditions are in place for private enterprise to fulfil its potential as an engine of growth and prosperity.

In a world of increasing economic interconnections, the challenges facing all of us are greater; but so too are the opportunities. The question is how we can best come together—business

leaders, labour groups, policymakers and others—to find the solutions that we need to secure a lasting, balanced, and widely shared recovery.

I recently returned from the G-20 Summit and had the opportunity to meet with business and labour leaders. Their presentations at a joint meeting underlined the importance of business, labour and government working together to secure sustainable and inclusive growth.

The Summit took place in the context of a challenging and changing global economic environment. For now, let me say that while we are seeing some signs of recovery, global growth remains subdued.

However, the story is more complex than that. More and more economies are moving at different speeds. We also know that the fruits of growth are far from being shared widely.

Certainly, the advanced economies are in a better place than they were six months ago. We see that growth is picking up in the United States. For the first time in a long time, the Euro Area is also beginning to grow, although there is still much to be done. And while Japan's reform efforts are still ongoing, it is also doing better thanks to aggressive policy support.

Emerging market countries are the other side of the story. In large part, they helped keep the global economy afloat during the crisis. Now, while still dynamic, their momentum is slowing. For some, this may be a shift toward more balanced and sustainable growth. For others, it reflects the need to address imbalances that have made them more vulnerable to the recent market turbulence.

We all have a large stake in these interconnections. What happens elsewhere in the world—be it the success of recovery in Europe or the continued smooth functioning of supply chains in Asia—matters increasingly.

This brings me to my point: the role of the IMF in the global economy—and why an effective IMF is important for our global membership. The IMF was born from the ashes of the Great Depression and World War Two, and grounded in the principle of good global citizenship: if countries work together to serve our common interests, everybody wins.

Like a credit union for the world, the IMF's member countries pool resources that can provide a lifeline to members in need along the history. The IMF helped the newly independent countries during decolonization. When the Berlin Wall fell, the Fund supported Eastern Europe's efforts to transform from centrally-planned economies into market economies. In

between, the IMF has helped its members to overcome economic crises—in Latin America in the 1980s, Asia in the 1990s and, most recently, in the Eurozone.

As the needs of our member countries have changed over time, so too the IMF has refined, repurposed and restocked its toolkit. During this crisis, this has included a significant increase in our financial support, with over $300 billion in loans in over 50 countries—not just in Europe, but also in many other parts of the world, including in Africa and other low-income nations. We also introduced more flexible types of support that act as insurance for crisis prevention and have helped countries like Colombia, Mexico, and Poland.

Above all, the IMF has given much greater emphasis to global interconnections in its analysis—in particular, economic spill overs between countries, and also the critically important financial sector. To be effective into the future, we must continue to evolve and anticipate what lies ahead.

In this context, the IMF is currently working toward a set of governance reforms that will strengthen further our capacity to prevent and resolve crises; and at the same time, will help broaden our representation to better reflect the changing dynamics of the global economy. These "quota" reforms need the support of all our member countries. I very much look forward to continuing our work together. Thank you.

(Adapted and modified for education purpose)

Week 8

Aung San Suu Kyi Nobel Peace Prize speech

As I have said repeatedly in many interviews, I heard the news that I had been awarded the Nobel Peace Prize on the radio one evening. It did not seem quite real because in a sense I did not feel myself to be quite real at that time. Often during my days of house arrest it felt as though I were no longer a part of the real world. There was the house which was my world, there was the world of others who also were not free but who were together in prison as a community, and there was the world of the free; each was a different planet pursuing its own separate course in an indifferent universe. What the Nobel Peace Prize did was to draw me once again into the world of other human beings outside the isolated area in which I lived, to restore a sense of reality to me. This did not happen instantly, of course, but as the days and months went by and news of reactions to the award came over the airwaves, I began to understand the significance of the Nobel Prize. It had made me real once again; it had drawn me back into the wider human community. And what was more important, the Nobel Prize had drawn the

attention of the world to the struggle for democracy and human rights in Burma. We were not going to be forgotten.

When the Nobel Committee awarded the Peace Prize to me, they were recognizing that the oppressed and the isolated in Burma were also a part of the world, they were recognizing the oneness of humanity. So for me receiving the Nobel Peace Prize means personally extending my concerns for democracy and human rights beyond national borders. The Nobel Peace Prize opened up a door in my heart.

In my own country, hostilities have not ceased in the far north; to the west, communal violence resulting in arson and murder were taking place just several days before I started out on the journey that has brought me here today. News of atrocities in other reaches the earth abound. Everywhere there are negative forces eating away the foundations of peace. Everywhere can be found thoughtless dissipation of material and human resources that are necessary for the conservation of harmony and happiness in our world.

A positive aspect of living in isolation was that I had ample time in which to ruminate over the meaning of words and precepts that I had known and accepted all my life. As a Buddhist, I had heard about the term of suffering, since I was a small child. However, it was only during my years of house arrest that I got around to investigating the nature of the great sufferings. These are: to age, to sicken, to die, to be parted from those one loves, to be forced to live in propinquity with those one does not love. I examined each of the great sufferings, not in a religious context but in the context of our ordinary, everyday lives. If suffering were an unavoidable part of our existence, we should try to alleviate it as far as possible in practical, earthly ways. I was particularly intrigued by the last two kinds of suffering: to be parted from those one loves and to be forced to live in propinquity with those one does not love. I thought of prisoners and refugees, of migrant workers and victims of human trafficking, who have been torn away from their homes, parted from families and friends, forced to live out their lives among strangers who are not always welcoming.

We are fortunate to be living in an age when social welfare and humanitarian assistance are recognized not only as desirable but necessary. I am fortunate to be living in an age when the fate of prisoners of conscience anywhere has become the concern of peoples everywhere, an age when democracy and human rights are widely, even if not universally, accepted as the birthright of all. How often during my years under house arrest have I drawn strength from my favourite passages in the preamble to the Universal Declaration of Human Rights: "…disregard and contempt for human rights have resulted in barbarous acts which have outraged the

conscience of mankind, and the advent of a world in which human beings shall enjoy freedom of speech and belief and freedom from fear and want has been proclaimed as the highest aspirations of the common people".

If I am asked why I am fighting for human rights in Burma the above passages will provide the answer. If I am asked why I am fighting for democracy in Burma, it is because I believe that democratic institutions and practices are necessary for the guarantee of human rights. Over the past year, there have been signs that the endeavours of those who believe in democracy and human rights are beginning to bear fruit in Burma. There have been changes in a positive direction; steps towards democratization have been taken. It is because of recent changes in my country that I am with you today; and these changes have come about because of you and other lovers of freedom and justice who contributed towards a global awareness of our situation.

The peace of our world is indivisible. As long as negative forces are getting the better of positive forces anywhere, we are all at risk. It may be questioned whether all negative forces could ever be removed. The simple answer is: "No!" It is in human nature to contain both the positive and the negative. However, it is also within human capability to work to reinforce the positive and to minimize or neutralize the negative. Absolute peace in our world is an unattainable goal. But it is one towards which we must continue to journey, our eyes fixed on it as a traveller in a desert fixes his eyes on the one guiding star that will lead him to salvation. Even if we do not achieve perfect peace on earth, because perfect peace is not of this earth, common endeavours to gain peace will unite individuals and nations in trust and friendship and help to make our human community safer and kinder.

There are refugees in all parts of the world. Ultimately our aim should be to create a world free from the displaced, the homeless and the hopeless, a world of which each and every corner is a true sanctuary where the inhabitants will have the freedom and the capacity to live in peace. Every thought, every word, and every action that adds to the positive and the wholesome is a contribution to peace. Each and every one of us is capable of making such a contribution. Let us join hands to try to create a peaceful world where we can sleep in security and wake in happiness.

When I joined the democracy movement in Burma it never occurred to me that I might ever be the recipient of any prize or honour. The prize we were working for was a free, secure and just society where our people might be able to realize their full potential. When the Nobel Committee chose to honour me, the road I had chosen of my own free will became a less lonely

path to follow. For this I thank the Committee, the people of Norway and peoples all over the world whose support has strengthened my faith in the common quest for peace. Thank you.

(Adapted and modified for education purpose)

Week 9

Address on International Day of Peace at UN

It is my great honour to attend this event to share with you the impressions and hopes of the United Nations for this year's International Day of Peace. I would like to express our gratitude to the Peace International Foundation for inviting me to attend this important event.

Today, as a number of violent conflicts still continue in different parts of the world, it is time to renew efforts to stop the tragedy of war and conflict. Peace can be built only through action, and not with passivity.

The UN continues to lead efforts towards achieving global peace. As we have done every 21st of September since 1981, the UN Secretary General and the United Nations community make a global call to observe this International Day of Peace and to promote one of the most fundamental of human rights: the Right to Peace.

Weapons of mass destruction and nuclear weapons continue to present one of the greatest threats to humanity. The use of such weapons has devastating consequences for they are the most powerful tool for destroying life. These weapons pose a serious threat to a world that wants and seeks peace. In recognition of this threat, the Secretary General of the United Nations Mr. Ban Ki Moon, has made a global call for states to react to the tragedy of war by taking part in a joint concrete action: disarmament. This call is directed first to States and State leaders to join efforts in a global partnership for peace, imploring them to choose peaceful paths for resolution of international conflict.

Second, it is a call to all international organizations to strengthen their commitment to the promotion of peace and stability. With their capacity to act as tools for peace, build bridges between states and peoples and facilitating intercultural dialogue, international organizations are in a unique position to reinforce a system of collective security and to make the world a safer place.

But promoting peace is also the task of individuals. Indeed, it is the responsibility of all of us to take action in supporting a global movement for the construction of a culture of peace based

on the universal values of respect for life, justice, solidarity, human rights and equality between men and women.

The 20th century left us a legacy of war and conflict among nations. Unfortunately, the 21stcentury started in a similar way. However it is not a time to despair, since the dream of having a better and safer world has not vanished. A reflection of the tremendous human cost of war and internal conflict has moved civil society to express, more vividly than ever, its desire for peace. Further, despite the ongoing conflicts, there are many examples of nations that have chosen the path of peace to resolve their disputes.

Peace is at the core of the work of the United Nations. Since its inception, the UN has been committed to "*save succeeding generations from the scourge of war*". In accordance with this commitment, countless efforts have been made to keep and promote peace and to prevent conflict. For example, as we speak, there are thousands of UN peacekeepers far away from their homes, risking their lives in many different locations to ensure that conflict ceases and does not recur. Yet we need to do much more to achieve peace for all. Peace is much more than the absence of war. Through years of experience in many countries around the world, the UN has understood that peace can only be achieved through a framework of justice, freedom and tolerance.

In order to address the complex task of promoting a culture of peace globally, the UN General Assembly proclaimed the period 2001-2010 as the International Decade for a Culture of Peace and Non-violence for the Children of the World. It promotes a change of thinking, based on values and attitudes that reject violence and promote dialogue and negotiation for the resolution of conflict. The result has been positive, as many steps have been taken to promote a transition from a culture of war to a culture of peace. I am personally involved and committed to this task. Let me share with you some of the things the UN is doing collectively.

As Mahatma Gandhi famously stated: *"If we are to teach real peace in this world, and if we are to carry on a real war against war, we shall have to begin with the children"*. To this end, the UN is contributing its knowledge and experience to the creation of educational curricula, materials and text books that promote peace. Extensive work has also been done building awareness and capacity among teachers to improve their skills in acting as active agents of peace. Ensuring education for all is helping to spread this culture of peace, especially in those countries deeply affected by war.

As Peace cannot be achieved without justice, reduction of poverty and inequality is also one of our major challenges. In this regard, the UN is making efforts in promoting sustainable economic and social development, reducing inequalities and contributing to poverty reduction and environmental sustainability.

The overriding principle in our path to peace must be the Universal Declaration of Human Rights. The United Nations has established numerous internationally approved instruments to protect the rights of all, but especially the most vulnerable, aiming at eliminating all kinds of discrimination, inequality between women and men, and advancing the values of tolerance and solidarity.

However, globalization and the emergence of new challenges and threats to humankind have made the need for dialogue among peoples ever more topical. In this context, I am pleased to announce that the UN General Assembly endorsed UNESCO's call for 2010 to be the International Year of Rapprochement of Cultures, which will involve activities on interreligious and intercultural dialogue, understanding and cooperation for peace throughout next year.

To conclude, the UN is working for international peace and security, mediating in conflicts, acting to stop violence and encouraging confidence-building measures and efforts for negotiating peaceful settlements. The Secretary-General's call urges all states to engage in a comprehensive negotiation towards disarmament, increasing the transparency of national nuclear programs and providing assurance to non-nuclear States that they will not be the subject of the use or threat of use of nuclear weapons. Today, I am sure I can speak for all of us in stating our strong support to the UN Secretary General for his message of peace to all nations and all peoples. Ultimately, we have no choice but to take the path of peace.

Let me finish with a powerful message from one of the greatest peace activists of our time, Mahatma Gandhi: "The cry for **peace** will be a cry in the wilderness, so long as the spirit of nonviolence does not dominate millions of men and women". Thank you.

(Adapted and modified for education purpose)

Week 10

Technology innovation and its economic impact

I am pleased to be able to speak before your third annual National Technology Forum. As you may know, I have addressed in considerable detail in recent months various issues related to technology and its impact on the economy.

When historians look back at the latter half of the 1990s a decade or two hence, I suspect that they will conclude we are now living through a pivotal period in American economic history. New technologies that evolved from the cumulative innovations of the past half-century have now begun to bring about dramatic changes in the way goods and services are produced and in the way they are distributed to final users. Those innovations, exemplified most recently by the multiplying uses of the Internet, have brought on a flood of start-up firms, many of which claim to offer the chance to revolutionize and dominate large shares of the nation's production and distribution system.

However, until the mid-1990s, the billions of dollars that businesses had poured into information technology seemed to leave little imprint on the overall economy. The investment in new technology arguably had not yet cumulated to be a sizable part of the U.S. capital stock, and computers were still being used largely on a stand-alone basis. The full value of computing power could be realized only after ways had been devised to link computers into large-scale networks.

By 1995 the investment boom had gathered momentum, suggesting that earlier expectations of elevated profitability had not been disappointed. In that year, with inflation falling, domestic operating profit margins started to rise, indicating that increases in unit costs were slowing. These developments signalled that productivity growth was probably beginning to move higher, even though official data, hobbled by statistical problems, failed to provide any confirmation. Now, five years later, there can be little doubt that not only has productivity growth picked up from its rather tepid pace during the preceding quarter-century but that the growth rate has continued to rise, with scant evidence that it is about to crest.

At a fundamental level, the essential contribution of information technology to this process is the expansion of knowledge and its obverse, the reduction in uncertainty. Before this quantum jump in information availability, most business decisions were hampered by a fog of uncertainty. Businesses had limited and lagging knowledge of customers' needs and of the location of inventories and materials flowing through complex production systems. In that environment, doubling up on materials and people was essential as a backup to the inevitable misjudgements of the real-time state of play in a company. Decisions were made from information that was hours, days, or even weeks old. With technology development, information has become vastly more available in real time--resulting, for example, from developments such as electronic data interface between the retail checkout counter and the factory floor or the satellite location of trucks. This surge in the availability of more timely information has enabled business

management to remove large swaths of inventory safety stocks and worker redundancies. Stated differently, fewer goods and worker hours are now involved in activities that, although perceived as necessary insurance to sustain valued output, in the end produced nothing of value.

The process of information innovation has gone far beyond the factory floor and distribution channels. Computer modelling, for example, has dramatically reduced the time and cost required to design items ranging from motor vehicles to commercial airliners to skyscrapers. In a very different part of the economy, medical diagnoses have become more thorough, more accurate, and far faster. With access to heretofore unavailable information, treatment has been hastened, and hours of procedures have been eliminated. Moreover, the potential for discovering more-effective treatments has been greatly enhanced by the parallel revolution in biotechnology, including the ongoing effort to map the entire human genome. That work would have been unthinkable without the ability to store and process huge amounts of data.

The influence of information technology has also been keenly felt in the financial sector of the economy. Perhaps the most significant innovation has been the development of financial instruments that enable risk to be reallocated to the parties most willing and able to bear that risk. Many of the new financial products that have been created, with financial derivatives being the most notable, contribute economic value by unbundling risks and shifting them in a highly calibrated manner. Although these instruments cannot reduce the risk inherent in real assets, they can redistribute it in a way that induces more investment in real assets and, hence, engenders higher productivity and standards of living. Information technology has made possible the creation, valuation, and exchange of these complex financial products on a global basis.

In sum, indications that the extent of the application of existing technology is still far from complete, plus potential benefits derived from continuing synergies, support a distinct possibility that total productivity growth rates will remain high or even increase further. Despite the fact that there exists uncertainty about the pace of productivity growth in the years to come, knowledge is essentially irreversible, so much--if not most--of the recent gains in productivity appear permanent.

(Adapted and modified for education purpose)

Week 11

Renewable energy in Australia's Clean Energy Future

Thank you for inviting me to speak at Clean Energy Week. The theme of your conference - 'Meeting Australia's 20 per cent Renewable Energy Target by 2020' - is one that goes to the heart of what has been one of the most politically contested issues in recent history.

But the fact is that we must reduce the emissions intensity of our economy, play our part in the international effort to tackle climate change, and stimulate investment in clean energy. The economies that accept this challenge are those that will be more competitive in the years ahead. Australia is determined to transit from high polluting energy sources to cleaner energy sources, including greater use of renewables, low emissions technologies and greater energy efficiency.

The Government accepts the advice of scientists that greenhouse gas emissions are contributing to climate change and that there are great risks to our environment, our economy and our society. That is why Australia must join with the rest of the world in cutting carbon pollution dramatically over coming decades. To play our part in the global effort to tackle climate change, Australia will have to transform one of the most emissions-intensive electricity systems in the world.

Bloomberg New Energy Finance estimates that global investment in renewable power and fuels increased 17 per cent to a new record of $257 billion in 2011, with solar being the fastest growing sector. The global clean energy economy is an opportunity; a necessity; an integral part of our continued prosperity. The economies that are driven by clean energy will be the ones that prosper in the next century. It is an almost universal rule of industrial development that the nations that innovate benefit most. O the country, if we do not take action and decarbonise the economy, we be unable to compete against modern manufacturing industries powered by clean energy.

Reflection on the history will provide better demonstration for the significance of taking opportunities. The first great transformation of the global economy was based on iron smelting, textiles and steam power. The United Kingdom developed these technologies and industries first, gaining the greatest benefit and dominating the early 19th century economic world. The second industrial revolution which transformed economies was based on steel, electricity, chemicals and mass production. The countries that most eagerly embraced this transformation were the United States and Germany, countries that came to dominate the next half century. The third economic transformation was the telecommunications revolution, based on

electronics. This transformation was led by the United States and Japan, the dominant economies of the second half of the 20th century.

This brings us to the present day and the great economic transformation that is beginning – the low carbon or clean energy industrial revolution. The countries that develop and deploy the technologies and products which decouple production from pollution will be the countries that prosper most in the 21st century. So, Australia must ask itself this question: Do we want to be among the countries that embrace this industrial transformation, or do we want to be a follower – compromising our opportunity to benefit from change?

The Government has now legislated comprehensively in favour of clean energy with a policy framework which delivers different elements. Just as no single clean energy technology is a silver bullet, we have a holistic and comprehensive set of measures to drive the clean future. This is a policy framework which will allow our economy to grow and employment to grow with less pollution. An attack on any one of these policies is an attack on the effectiveness of all of these policies.

Renewable energy has an important role to play in Australia's transformation to a clean energy future. The Government recognises that a stable and predictable investment environment is essential for any form of energy investment and for minimising the price impact of reform on electricity consumers. As a clean energy sector we expect you to compete with each other to get the greatest share of the clean energy opportunities we have delivered.

We expect you to continue to press for our policies to be implemented effectively and for energy market reform to assist the transformative task ahead of us. We expect you to engage in the review processes which are underway to enhance our energy markets, the RET and other complementary policies. We also expect you to play your part in explaining why this transformation is important, how your solutions contribute to this transformation and why a comprehensive set of policies is essential.

The Government will continue to do its part in explaining why we have priced carbon pollution, assisted households with the cost impacts and implemented a suite of complementary policies and support to transform the economy. We will fight the misinformation and lies which are being spread in an attempt to undermine confidence in the clean energy sector. With the economic prosperity of future generations at stake, no responsible Australian Government can turn its back on the reforms we have now legislated. I am proud to be part of a government that has legislated for Australia to be part of the clean energy revolution and I hope we can work together to grow these sustainable industries and create the jobs of the future.

Week 12

Ambassador Xie Hangsheng's speech at the reception held by Department of Cross-Cultural and Regional Studies of Copenhagen University

It's a great pleasure to be invited here. I hope these books could improve the understanding of China. In this era of globalization, few people would doubt the importance of culture exchange and communication. But I'm still deeply impressed by the farsighted decision the Copenhagen University made as early as 6 years ago to establish a new department focusing on Cross-Cultural and Regional Studies.

Talking about comparative cultural studies, I'm not a specialist. However, after ten years' work in Europe, 4 years of which is in Denmark, I've also got some personal feelings and reflections on culture exchange. Today, from an ordinary Chinese people's point of view, I would like to share those observations with all guests and friends here. You could also title this as "Chinese on Denmark".

Now, I will start from some common values that I think Chinese and Danish cultures share. The first one - social harmony and cooperation. One of the core values of Chinese culture is prioritizing harmony. The ultimate goal of that is to establish a harmonious and cooperative relationship between government and citizen. As to my observation, harmony and cooperation also exist in every aspect of Danish people's life. Here is a good example. In Denmark, there is only one minister assigned by the ruling party(ies) to ensure the implementation of political policies, whereas in UK, they need more party-assigned Vice Ministers as assistants.

Furthermore, taking the conflicted relationship between employers and the Union for example, the Danes also managed to build a good cooperation and dialogue between them, which even made the British surprised. In Denmark, among departments of government, corporations, institutions and NGOs, there are always cooperation and collaboration. Personally, I think this is partly why Denmark has always been regarded as one of the happiest countries.

I've also noticed that both of us cherish the spirit of innovation and creation. The glorious civilization of China, which has been flourishing and developing for over 5,000 years, has benefited greatly from anti-conventionalism and innovation. In Denmark, innovation and creation can also be found everywhere. It is in literature, arts, social institutions, science and technologies. Besides the famous Danish design and Andersen's fairy tales, in fields of environment protection, energy-saving and emission-reducing, recycling energy, bio-pharmacy, and new nano materials, Denmark's competence in innovation and creation has earned its fame and deserves our respect. The value of advocating innovation and creation in Danish culture

and education has not only promoted the competitiveness of Danish industry, but also made Danish people's life much more lively and colourful. I always ask a question to my Danish friends and myself. During Denmark's transformation from an agricultural country to an industrialized country, and furthermore to a post-industrial service-oriented society, what's their secret of success? The spirit of innovation and creation, I believe, would be one of the answers.

What's more, both of our people have the virtue of being modesty and craving to knowledge. Chinese culture values modesty very much. There is even a saying like "modest gentleman". Thus, modesty is a must for a Chinese gentleman. Interestingly, modesty is also one of the features of Danish tradition. Modesty means open and "eager to learn". Learn from others in communications and then create something new from what has been learned. When I first arrived in Denmark, I used to ask my Danish friends: in fashion, music, and cuisine, what is the Danish style originated from the old tradition? Later, I realized that style is not only something old like Bulgarian's over 100 types of traditional clothing, but also new creations based on in-take and learning from others, such as those famous products of Denmark. Certainly, this has much to do with the cultural context. But Danish people's open-mindedness and modesty do play a part. Thanks to that, Copenhagen amazingly turned to be the Capital of Jazz. With this spirit of learning and innovation, it will not surprise me if Copenhagen becomes the centre of Beijing Opera someday.

Frankly speaking, it is not the differences between our cultures, but the above-mentioned common values, that impress me most. China and Denmark are far from each other. The differences and discrepancies between these two cultures are not beyond expectation. However, globalization is connecting the two countries closer and closer to each other. It is of common interest and with great potential to enhance our communication, improve our mutual understanding, promote our cooperation, and finally achieve a win-win relationship.

This is what we are willing to achieve and heading for. The comparative study of Chinese and Danish cultures is an important part of this endeavour. Thus, all the ladies and gentlemen attended today are also part of it.

Still, I think the media should be the main channel of communication and information for improving the cultural exchange between the two countries. Unfortunately, some of them prefer being eyeball-catching to being honest. Therefore, readers and audience can hardly get an objective and comprehensive image of China from them. To my understanding, prejudiced reporting is unwise in this inter-dependence era. It is also unfair and irresponsible for those who trust them. The public are entitled to know the truth. Not long ago, a Danish friend anxiously

told me that Denmark is losing its economic competency according to statistics. He supposed that this is partly related to Danish public's current global view. To some extent, I think the media are responsible for that.

To my opinion, our concepts and values should be updated with this dramatically changing world. The world is composed of many different cultures, among which there should be respect rather than hostility, integration rather than discrimination, tolerance rather than fight. The communication and exchange of different cultures need discussions and dialogues to enhance mutual understanding. This should be a long and complicated process. Therefore, I'd express my appreciation to all the attendance for your effort and work. Thank you!

(Edited for education purpose).

Appendix 2: Participant Information and Consent Form and Ethics Approval

Name of Project: How to Use Sight Translating for Skill Development and Transfer in Simultaneous Interpreting Training

You are invited to participate in a study of simultaneous interpreting. The purpose of the study is to discover how sight translating can be employed in the simultaneous interpreting to progress skill development and transfer.

The study is conducted by Kun Yan, a student at Macquarie University, Australia (Office phone: +61 02 98504865; Emails: kun.yan@students.mq.edu.au.) to meet the requirements of PhD program under the supervision of Stanley Song (Office phone: +61 02 98509608; Email: Zhongwei.song@mq.edu.au) of the Department of Linguistics, Macquarie University).

If you decide to participate, you will be asked to participate in scheduled class learning activities for 12 weeks in the semester (one hour per week, twelve hours in total). In the teaching, you will be asked to do sight translating practice under instructions. Three tests will also be involved at the beginning, in the middle and at the end of the semester. Please be noted that you performance of assessment tasks will be recorded and analysed by the researcher and comments will be provided by the researcher. You will be asked to provide written reflection upon your performance and feedback on the effectiveness of the exercises, which will be collected as part of data for my PhD study. At the conclusion of the study, a gift card of AUD$50 will be rewarded for your full participation

Any information or personal details gathered in the course of the study are confidential, except as required by law. No individual will be identified in any publication of the results. Only the chief investigator and the co-investigator will have the access to all data collected. Feedback on your performance for each test will be sent to your email individually.

Participation in this study (as a supplementary component to Tran865) is entirely voluntary: Your mark of this unit will not be influenced by your decision to participate or by the study outcomes in any way. If you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, *(participant's name)* have read *(or, where appropriate, have had read to me)* and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:_____

(Block letters)

Participant's Signature: _____ Date:_____

Investigator's Name:_____

(Block letters)

Investigator's Signature:_____ __ Date:_____

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

MACQUARIE University

KUN YAN <kun.yan@students.mq.edu.au>

HS Ethics Application - Approved (5201400072)(Con/Met)

Dear Dr Song,

Re: "How to use sight translating for skill development and transfer in simultaneous interpreting training"(5201400072)

Thank you for your recent correspondence. Your response has addressed the issues raised by the Faculty of Human Sciences Human Research Ethics Sub-Committee and approval has been granted, effective 10th March 2014. This email constitutes ethical approval only.

This research meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). The National Statement is available at the following web site:

http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72.pdf.

The following personnel are authorised to conduct this research:

Dr Zhongwei Song
Miss Kun Yan

Please note the following standard requirements of approval:

1. The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2. Approval will be for a period of five (5) years subject to the provision of annual reports.

Progress Report 1 Due: 10th March 2015
Progress Report 2 Due: 10th March 2016
Progress Report 3 Due: 10th March 2017
Progress Report 4 Due: 10th March 2018
Final Report Due: 10th March 2019

NB. If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project.

Progress reports and Final Reports are available at the following website:
http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five-year limit on renewal of approvals allows the Sub-Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. All amendments to the project must be reviewed and approved by the Sub-Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:
http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5. Please notify the Sub-Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the continued ethical acceptability of the project.

6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites:
http://www.mq.edu.au/policy
http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide the Macquarie University's Research Grants Management Assistant with a copy of this email as soon as possible. Internal and External funding agencies will not be informed that you have approval for your project and funds will not be released until the Research Grants Management Assistant has received a copy of this email.

If you need to provide a hard copy letter of approval to an external organisation as evidence that you have approval, please do not hesitate to contact the Ethics Secretariat at the address below.

Please retain a copy of this email as this is your official notification of ethics approval.

Yours sincerely,

Dr Simon Boag
Acting Chair
Faculty of Human Sciences
Human Research Ethics Sub-Committee

Faculty of Human Sciences - Ethics
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Email: fhs.ethics@mq.edu.au
http://www.research.mq.edu.au/

Appendix 3: Three questionnaires and interview [15]

3.1 Questionnaire One

Based on your own performance, please answer the following questions. Please circle the answer(s) that applies when options are provided and write comments in the blanks.

1. **How do you describe the text?**

a. Very easy
b. Easy
c. Moderate
d. Challenging
e. Very difficult

Why so: _____

(E.g. subject topic, lexical difficulty, information complexity and sentence structures, etc.)

2. **How do you assess your own performance?**

a. Excellent
b. Good
c. Moderate
d. Unsatisfactory

The most outstanding quality/problem in your delivery is
_____

(E.g. fluency, lack of lexical resource, broke sentences, unnatural expression, etc)

3. **For unnecessary pauses in your delivery, what was/were the cause(s)?**

a. Inadequate comprehension after reading through so have to go back to read again
b. Find it difficult to read ahead while rendering the previous part at the same time
c. Find it difficult to locate the equivalents for certain words or phrases immediately
d. Unsure how to arrange the interpretation in the delivery properly

4. **Why did you make self-corrections?**

a. Realize you have missed out important information
b. Find it difficult to continue with the sentence that you start with

[15] Underlined parts indicate questions adjusted or added in different action cycles.

c. Find the previous version unacceptable although all key information has been rendered
d. Lose track of your own rendition in the middle and have to start all over again

5. Did you do reverse reading in sight translation? If so, why?

a. Yes. Just a habit from previous ST training
b. Yes. To double check the information due to inconfidence
c. Yes.Find it difficult to hold information from previous reading before rendering
d. No.

6. <u>How do you define input rate of the sight translation task in the test?</u>

a. Generally Slow
b. Generally manageable
c. Manageable most of the time with difficulties at some points
d. Generally a bit overstretching
e. Too fast to deliver before the texts disappear

7. <u>When you found yourself lagging behind, what did you tend to do?</u>

a. Always finish the segment you were working on but is aware that the following segment(s) are missing, then pick up from wherever you can follow
b. In a hurry to jump to the next segment/part leaving the current part unfinished
c. Summarize the information quickly and try to catch up with information immediately after
d. Intentionally leave information that you deemed less important behind in order to keep up
e. Simply try to speak faster to catch up

8. <u>Did you feel any pressure due to the vanishing texts?</u>

a. Not at all
b. A little bit
c. Don't know yet
d. It makes me very nervous
e. It severely distracts me from interpreting

3.2 Questionnaire Two

Based on your own performance, please answer the following questions. Please circle the answer(s) that applies when options are provided and write comments in the blanks.

1. **How do you describe the text?**

a. Very easy
b. Easy
c. Moderate
d. Challenging
e. Very difficult

Why so: _____

(E.g. subject topic, lexical difficulty, information complexity and sentence structures, etc.)

2. **How do you assess your own performance?**

a. Excellent
b. Good
c. Moderate
d. Unsatisfactory
e. Have no idea

3. **In what aspects do you believe you have made progress?**

a. Accuracy and swiftness in comprehension
b. Simultaneity
c. Agility in equivalent retrieval
d. Fluency
e. Delivery appropriateness
f. Confidence

4. **<u>What kind of dynamic ST exercises are most helpful to your skill development so far?</u>**

a. Summary exercise
b. Blank filling
c. Dynamic sight translation with gradually vanishing texts
d. Dynamic sight translation with gradually unfolding and vanishing texts

5. **What do you think is the outstanding problem in your performance?**

a. Accuracy in comprehension

b. Simultaneity

c. Agility in equivalent retrieval

d. Fluency

e. Syntactic handling

f. Expressional appropriateness

g. Confidence

h. Others(please specify):_____

6. **What strategies are adopted as you are aware of?**

a. Anticipation

b. Guessing

c. Generalization

d. Summarization

e. Omission

f. Others(please specify):_____

7. **What strategy/strategies is/are the most useful to you?**

a. Anticipation

b. Guessing

c. Generalization

d. Summarization

e. Omission

f. Others(please specify):_____

Why do you think so: _____

_____

8. **Please indicate areas in the text that that you find particularly difficult to handle :**

1)_____
2)_____
3)_____

9. **<u>In the following skill exercise, what do you expect from this component? Put your response in the space provided below.</u>**

3.3 Questionnaire Three

Based on your class and exercise experience of sight translation (ST) component, please answer the following questions. Please circle the answer(s) that applies when options are provided and write comments in the blanks.

1. **How do you describe dynamic ST tasks provided in the second half of the semester?**

a. Easy

b. Moderate

c. Challenging

d. Very difficult

Why so: _____

(E.g. Textual features: topic, technical terms, syntactic complexity, input rate and etc. Or Skill deficiency: insufficient lexical resource, lack of simultaneity, failure in finding strategies, failure in applying strategies in time)

2. **How do you assess your own performance generally so far in dynamic ST? / <u>What do you think of the arrangement of exercises in terms of difficulty level?</u>**

a. Excellent / <u>Progressive</u>

b. Good / <u>Constant</u>

c. Moderate / <u>Getting difficult abruptly</u>

d. Unsatisfactory / <u>Have no idea</u>

e. Have no idea

3. **Do you think skills discussed and practiced in ST can contribute to your SI performance?**

a. No.

-Reasons:

a). Not relevant to SI

b). Too simple compared with SI

c). Others (please specify):_____

(Now you can go directly to Q5)

b. Yes

4. **If your answer is "YES" in last question, what aspect(s) of skills practiced in ST do you think results in better performance in your SI practice:**

a. Accuracy and swiftness in comprehension

b. Practice of simultaneity

c. Agility in equivalent retrieval

d. Availability of skills including techniques and strategies

e. Confidence in transition from consecutive to SI mode

f. Others (please specify):_____

5. **Which type of exercise do you think benefit you most in your skill acquisition and development for SI? <u>And please specify the relevant skills enhanced by the chosen exercise type.</u>**

   a. CST without preparation

   Skill(s) enhanced_____

   b. DST of level 1 dynamicity

   Skill(s) enhanced_____

   c. DST of level 2 dynamicity

   Skill(s) enhanced_____

   d. DST of level 3 dynamicity

   Skill(s) enhanced_____

6. **Is there any aspect in which you can manage in ST but have difficulties in SI?**

   a. Yes:

   a) Accuracy and agility in comprehension
   b) Simultaneity
   c) Agility in equivalent retrieval
   d) Fluency
   e) Use of skills (such as lagging adjustment, generalization, summarization, anticipation, omission, segmentation and chunking and etc.)
   f) Syntactic handling
   g) Expressional appropriateness
   h) Others(please specify):_____

   b. No.

7. **What strategy/strategies is/are the most useful to you?**

   a. Anticipation
   b. Guessing
   c. Generalization
   d. Summarization
   e. Segmentation

f. Omission

g. Others(please specify):_____

Why do you think so: _____

_____

8. **Please indicate areas of ST exercise sessions that you think should improve:**

a. More exercises

b. More challenging tasks

c. Others (please specify):

1)_____

2)_____

3)_____

3.4 Interview

1. Do you practice ST after class?
2. If yes, how much time you averagely spend on ST practice after class every week? When you practice, what is your purpose and focus? Do you practice in a specific way? For instance, do you do it before you do SI, having ST as a warmup? Or no specific order is followed. If no, why not?
3. When you practice the dynamic ST, what are your focus of the performance? (e.g.: fluency, accuracy of comprehension and rendition, use of strategies or something else?) Are they the same aspects you pay attention to in SI?
4. What do you think of the usefulness of the DST-related exercises for SI? Do you think the skills practiced in DST could be transferred to SI? Do you find any exercise type(s) particularly useful to you? What is it/are they?
5. Generally speaking, do you think dynamic ST is easier or harder than SI if the similar speech is chosen and the input rate is the same? Why?
6. For the DST and SI tasks in the final test, do you think one task is more challenging than the other? If so, why?
7. Is there a point at which you find certain type of dynamic ST exercise is really challenging to you? Or at certain point you find the exercise do not help much at all?
8. Now when you perform SI, do you transfer what you learn from ST to SI? Did you expect ST to be useful to SI at the beginning of the semester?
9. Now do you do CST in the same way as you used to do before the ST session we had this semester?

Appendix 4: Texts for three tests and text analysis results by Coh-metrix[16]

4.1 Pre-test

The key to success-Grit[17]

When I was 27 years old, I left a very demanding job in management consulting for a job that was even more demanding: teaching. I went to teach seventh graders math in the New York City public schools. Like any teacher, I made quizzes and tests. I gave out homework assignments. When the work came back, I calculated grades.

What struck me was that I.Q. was not the only difference between my best and my worst students. Some of my strongest performers did not have impressive I.Q. scores. Some of my smartest kids weren't doing so well.

And that got me thinking. The kinds of things you need to learn in seventh grade math, sure, they're hard: ratios, decimals, but these concepts are not impossible, and I was firmly convinced that every one of my students could learn the material if they worked hard and long enough.

After several more years of teaching, I came to the conclusion that what we need in education is a much better understanding of students and learning from psychological and emotional perspective. In education, the one thing we know how to measure best is I.Q., but what if doing well in school and in life depends on much more than your ability to learn quickly and easily?

So I started studying kids and adults in all kinds of super challenging settings, and in every study my question was, who is successful here and why? We went to the National Spelling Bee and tried to predict which children would advance farthest in competition. We studied rookie teachers working in really tough neighborhoods, asking which teachers are still going to be here in teaching by the end of the school year, and of those, who will be the most effective with improved learning outcomes with students. We partnered with private companies, asking, which of these salespeople is going to keep their jobs? And who's going to earn the most money? In all those very different contexts, one characteristic emerged as a significant predictor of success. And it wasn't social intelligence. It wasn't good looks, physical health, and it wasn't I.Q. . It was grit or determination.

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[16] http://141.225.42.101/cohmetrixgates/Design1.aspx.

[17] See Appendix 4.1 on CD attached for the pre-test.

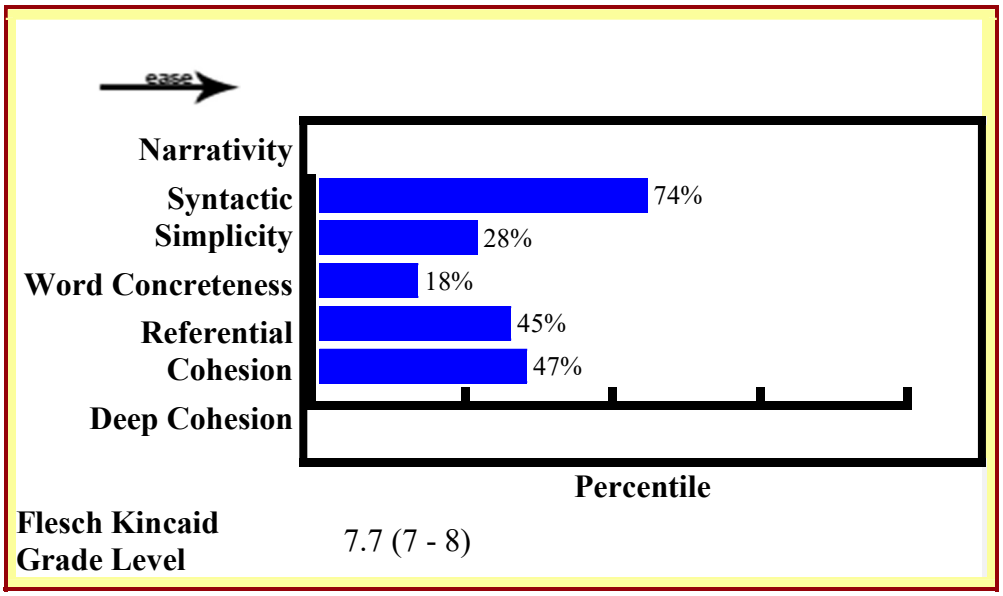
Grit is passion and perseverance for very long-term goals. Grit is having stamina. Grit is sticking with your future, day in, day out, not just for the week, not just for the month, but for years, and working really hard to make that future a reality. Grit is living life like it's a marathon, not a sprint.

To me, the most shocking thing about grit is how little we know, how little science knows, about building it. Every day, parents and teachers ask me, "How do I build grit in kids? What do I do to teach kids a solid work ethic? How do I keep them motivated for the long run?" The honest answer is, I don't know. What I do know is that talent doesn't make you gritty. Our data show very clearly that there are many talented individuals who simply do not follow through on their commitments. In fact, in our data, grit is usually unrelated or even inversely related to measures of talent.

So far, the best idea I've heard about building grit in kids is something called "growth mindset." This is an idea developed by a research team at Stanford University , and it is the belief that the ability to learn is not fixed, but can be changed it with your effort.

So growth mindset is a great idea for building grit and that's the work that stands before us. We need to take our best ideas, our strongest intuitions, and we need to test them. We need to measure whether we've been successful, and we have to be willing to fail, to be wrong, to start over again with lessons learned. In other words, we need to be gritty about getting our kids grittier. Thank you. (653)

Coh-Metrix analysis result:



This text is high in narrativity that indicates that it is more story-like and may have more familiar words. More story-like texts are typically easier to understand. It is low in syntactic simplicity which means the sentences may have more clauses and more words before the main verb. Complex syntax is harder to process. This text has low word concreteness, which means there are many abstract words that are hard to visualize. Abstract texts may be more difficult to understand.

4.2 Mid-test

Trade, Tax and Transparency[18]

It's the UK's privilege to host the G8 this year and today I want to focus on our economic priorities, because for all the countries in the G8 and all the countries across the European Union there is a big, looming insistent question, and that is how do we compete and succeed in the global economic race that we are engaged in today.

It's the oldest observation of the modern age that we are all interconnected. Communication is faster than ever, finance is more mobile than ever and yet the paradox of this open world is that in many ways it's still so closed and so secretive. It's a world where trade is still choked off by barriers and bureaucracy. It's a world where, regrettably, corrupt government officials in some countries and some corporations rip off hard working people and to plunder their natural resources.

It is clear how devastating this can be for some developing countries. But frankly all this matters, and should matter, to developed countries too. When trade isn't free, we all suffer. When companies don't play by the rules, it drives more box ticking, more regulation, more interference and that makes life harder for other businesses to turn a profit. That is why I want this year's G8 to bring a new focus on these issues: trade and transparency. (223)

So first we're going to push for more openness on trade. You've got the US leading efforts on the Trans Pacific Partnership. In the European Union we're about to embark on our biggest-ever programme of free trade agreement negotiations. Now the EU and the US together, we actually make up about a third of all global trade. A deal between us could add over fifty billion pounds to the EU economy alone.

Trade between developing countries and within Africa is growing and we should work to encourage that further - and we must also continue to support the multilateral system. This

[18] See Appendix 4.2 on CD attached for the Mid-DST.

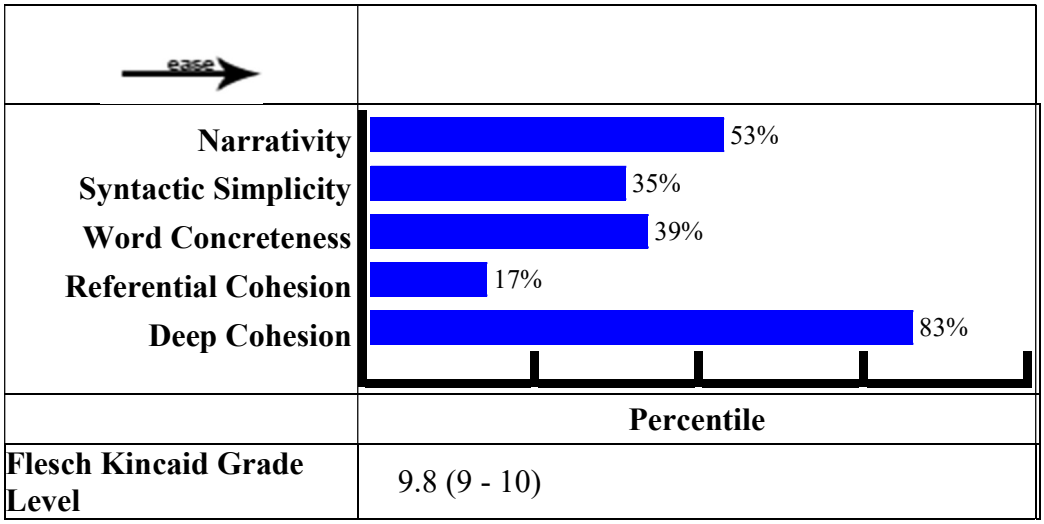
means working through the WTO to agree a deal to sweep away trade bureaucracy. That alone could be worth around seventy billion dollars to the global economy and help trade to flow freely across the world. It is ambitious, but we must seize these opportunities to give a massive boost to free trade across the world.

Now the other big push on our agenda is transparency: shining a light on company ownership, land ownership and where money flows from and to. This is critical to developing countries. Of course aid has played, and will continue to play, an important role in development, and I'm proud that the UK is keeping its aid promises. I'm also proud that we are leading the fight on global hunger, funding nutrition programmes for twenty million children and pregnant women over the next few years.

But at the same time as talking about aid we also need to move the debate on so we're not just dealing with the symptoms of poverty but we're tackling the causes. Now I've argued for years that there is a golden thread of conditions that enable open economies and open societies to thrive. The rule of law, the absence of conflict and corruption, the presence of strong institutions: these things are vital for countries to move from poverty to wealth.

It is an economic system that generated more wealth, unleashed more human potential and reduced more grinding poverty than any other in history. I don't believe that one person's wealth fairly gained through free exchange in an open market is somehow the cause of another person's poverty. I passionately believe that if you want open economies, low taxes and free enterprise, then you need to lay down the rules of the game and you need to be prepared to enforce them. Thank you very much indeed for listening. (410)

Coh-metrix analysis result



This text has low referential cohesion, indicating little overlap in words and ideas between sentences. Cohesion gaps require the reader to make inferences, which can be challenging and even unsuccessful without sufficient prior knowledge. It is high in deep cohesion. There are relatively more connecting words to help clarify the relationships between events, ideas, and information. Because of this added support, comprehension may be facilitated, especially when the topic is unfamiliar.

4.3 Final-test

Remarks at the 2013 Women in the World summit[19]

Part for final DST

I am so pleased to be here and as my long-time friend Pat Mitchell knows it wasn't too easy to work it out, but I figured if Ted women is in DC I've got to be there and be a part of this.

I look out at this audience and I see lots of friends and so many people who have done already such an incredible amount to move forward an agenda for girls and women.

Not just here in our country but around the world now I know there was a little bit of controversy over whether there should be a TED women conference or not. Because if there were a TED women conference, what about a TED men conference. But I think the right decision was made.

Because there is still so much that we have to talk about women and men together, about what we need to do to widen the circle about opportunity for women and girls, to give those of us who are lucky enough and blessed enough to have so many opportunities in our own lives to connect with, network with, contribute to that cause; because we are already seeing the power of women and girls as agents of change. It's something that I believe in with all of my heart. And as I travel around the country now as secretary of state with the great honour of representing the United States, I have made this clear that the rights and the roles of women and girls will be a central tenet of American foreign policy. Because where girls and women flourish, our values are also reflected.

Before I go too much further in talking about what we're doing in the government , and what I would like to challenge you to join us in doing, I want to acknowledge the passing of Elizabeth Edwards, someone whom I have the greatest respect and admiration for.

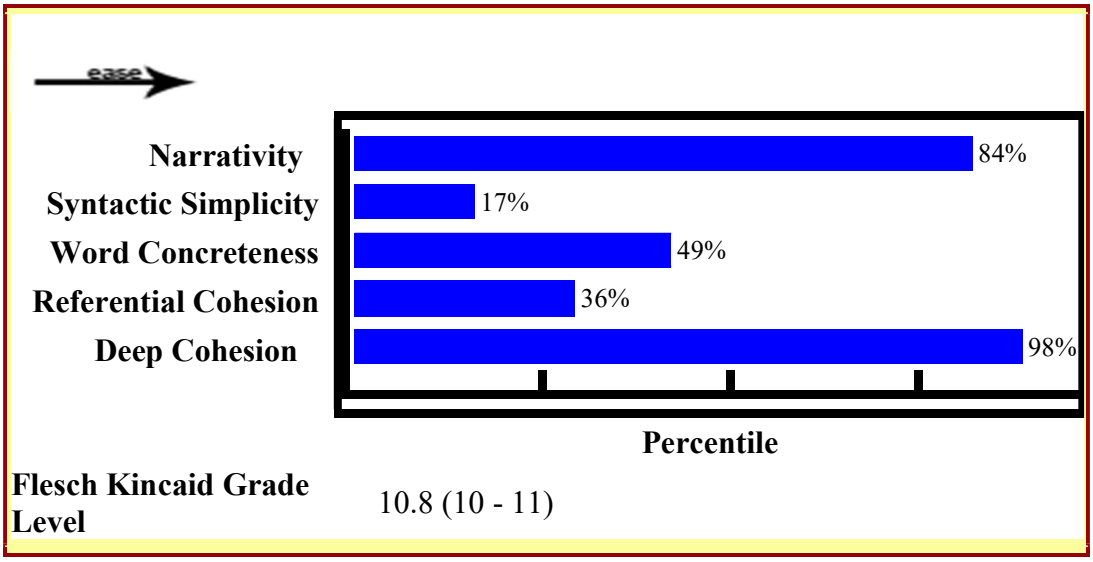
[19] See Appendix 4.3 on CD attached for the final DST.

She lived with a fierce intelligence, a passion, a sense of purpose. She was not only devoted to family and friends, but also to improving health care and finding a cure for cancer for once and for all. And she would have appreciated this event, where we are coming together to look for solutions.

And I want to express what so many people feel about the loss of Elizabeth. That is we've lost a voice and we've lost a very active blogger who was willing to put herself on the line time and time again. I see women like that everywhere I go. I just came back from Turkmenistan where there's a woman president, who was not only the first female head of state of government in post-soviet union Central Asia, but she is presiding over the first parliamentary democracy in the entire region. The courage it takes for her is something that I draw courage from; or when I go to visit projects that women have carved out literally with their own hands in places like South Africa, I see in action that sense of resilience and commitment are that can keep any of us including me going.

I know so well that there are women as we speak in our own country and elsewhere who will never hear of this conference and certainly could not even imagine attending, but who are living the kinds of life experiences and involvements that bring us here. (566)

Coh-Metrix analysis result



This text is high in narrativity which indicates that it is more story-like and may have more familiar words. More story-like texts are typically easier to understand. It is low in syntactic simplicity which means the sentences may have more clauses and more words before the main verb. Complex syntax is harder to process. This text is high in deep cohesion. There are relatively more connecting words to help clarify the relationships between events, ideas, and

information. Because of this added support, comprehension may be facilitated, especially when the topic is unfamiliar.

Part for final SI

And we want to do more to partner with all of you here in this room and online. With the support for example of the Rockefeller Foundation, we have launched the Innovation Award for the empowerment of women and girls to encourage and reward creative approaches to empowering women politically, economically and socially.

And I want to say a special word about the importance of girls. The low value that many families and societies place on girls makes possible many of the worst abuses they suffer. But even among girls who are spared the worst, too often it is a girl who is still the first to drop out of school, the last to be fed, the last to receive medical care. And in too many places she is taught there are special limits to what is possible for her. So we need to persuade families and nations to value girls, and to teach the girls themselves to understand their own value and their potential.

And so we need to reach out to faith leaders and community leaders to change the perception and treatment of girls, and to persuade men and boys to value their sisters and their daughters for their talents and their intrinsic worth. If we can convince societies to invest in girls, we will strengthen our efforts to fight poverty, drive development and spread stability. There are more than 600 million girls in the developing world alone. More than one quarter of the population of Asia, Latin America, the Caribbean and sub-Saharan Africa are girls and women between the ages of 10 and 24.

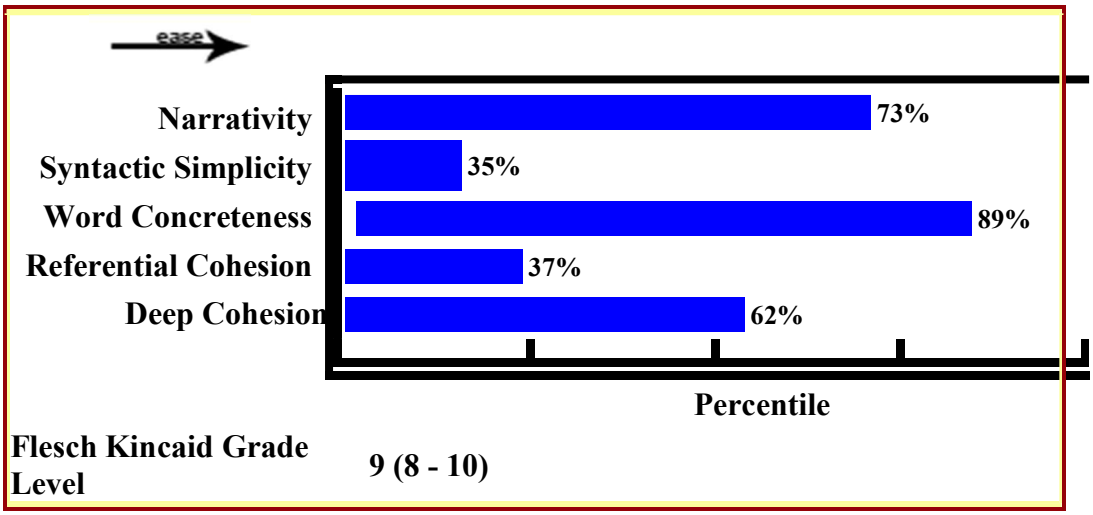
Now people sometimes talk about the youth bulge of the Middle East and the developing world solely as a group of unemployed young men, and that is a problem. But we also need to figure out how to tap the potential of girls. I love this story about a teenage girl and a cow, which drives home the challenge but also the opportunity that we face today. This teenage girl's father expected to force her into an early marriage, but she had been to school and she received a cow perhaps to the heifer project, designed to encourage her to stay in school. When her father demanded that she drop out of school and get married, she said no. When he insisted, she insisted right back. And finally she pulled out her trump card. “If I leave and get married, I'm taking my cow. That cow belongs to me!” So guess what. She stayed in school. She was spared an early marriage, all because her father couldn't bear to part with the cow.

But the lesson goes beyond the human nature of the story. Even a small intervention can change a girl's life. And you many of you, here and in the virtual world participating in this Ted women

conference are already doing remarkable work, you've already presented, you already have built the networks, but we need more partnerships more mentoring and more good ideas.

There truly are no limits to what we can do together on behalf of girls and women. and I am so delighted that you are here, not only for this first-ever conference, but fully ready and prepared to go forth from this conference to begin to do even more on behalf of your own dreams and aspirations, but also to make sure that every girl in the world has a chance to live up to her own dreams and aspirations as well. Thank you very much. (588)

Coh-Metrix analysis result



This text is high in narrativity which indicates that it is more story-like and may have more familiar words. More story-like texts are typically easier to understand. It has high word concreteness, which means there are many words that are easier to visualize and comprehend.

Appendix 5: assessment results of cloze blanks in final test in 2014-2016

5.1 2014 cloze blank results

Blanks / Students	Blank 1	Blank 2	Blank 3	Blank 4	Blank 5	Blank 6
A	Exact	Exact	Exact	n/a	Erroneous	Exact
B	Exact	Exact	Erroneous	n/a	Erroneous	n.a
C	Extract	Generic	n.a	Extract	Exact	Generic
D	Extract	n.a	n.a	n/a	Exact	Erroneous
E	Extract	Erroneous	Generic	n/a	Erroneous	n.a
F	n.a	n.a	n.a	n/a	Erroneous	Exact
G	Extract	Generic	Generic	n/a	n/a	n.a

Type of anticipation	Number of anticipation	Rate of anticipation type (n=42)
Extract anticipation	14	33.33%
Generic anticipation	4	9.53 %
Erroneous and no anticipation	24	57.14%

5.2 2015 cloze blank results

Blanks / Students	Blank 1	Blank 2	Blank 3	Blank 4	Blank 5	Blank 6
A	Exact	Exact	Erroneous	Erroneous	n/a	Erroneous
B	Exact	Exact	Exact	Exact	Exact	Exact
C	Exact	Erroneous	Erroneous	Erroneous	Erroneous	Exact
F	Exact	n.a	Erroneous	Erroneous	Erroneous	Generic
G	Exact	Exact	n.a	n.a	Erroneous	n/a
H	Exact	Erroneous	Erroneous	Erroneous	Erroneous	n/a
I	Exact	Erroneous	Erroneous	Erroneous	Erroneous	Erroneous
J	n.a	Erroneous	Generic	Generic	Erroneous	n.a
K	Exact	Erroneous	n.a	n.a	n.a	Generic
L	Exact	Erroneous	n.a	n.a	n.a	Erroneous

Types of anticipation	Total numbers	Percentage (n=60)
Extract anticipation	17	28.33%
Generic anticipation	4	6.67%
Erroneous and no anticipation	39	65 %

5.3 2016 cloze blank results

Blanks / Students	**Blank 1**	**Blank 2**	**Blank 3**	**Blank 4**	**Blank 5**	**Blank 6**
A	Exact	Erroneous	Erroneous	n.a	n/a	n.a
B	Exact	Exact	Erroneous	n.a	Generic	Exact
C	Exact	Erroneous	Erroneous	n.a	Exact	n.a
D	Exact	Erroneous	Erroneous	n.a	Generic	Erroneous
E	Exact	Erroneous	Exact	Erroneous	Exact	Exact
F	n.a	n.a	n/a	Exact	n/a	n/a

Types of anticipation	Total numbers	Percentage (n=36)
Extract anticipation	12	33.33%
Generic anticipation	2	5.66%
Erroneous and no anticipation	22	61.1 %

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