The Efficacy of the Subskills Training Approach on the Rendition of Numerical Data, Proper Names, and Abbreviations in the Teaching of Simultaneous Interpreting from English into Arabic

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The Efficacy of the Subskills Training Approach on the Rendition of Numerical Data, Proper Names, and Abbreviations in the Teaching of Simultaneous Interpreting from English into Arabic

Doctoral Dissertation

In partial fulfilment of doctoral candidate requirements for the PhD program in Translation, Interpreting and Intercultural Studies

by

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List of Acronyms

Abbreviation	Acronym
AIIC	International Association of Conference Interpreters
BA	Bachelor of Arts
CP	Cognitive Processing
DI	Dialogic-based Interaction
ELO	Extreme Low Outlier
EM	Effort Models
ESIT	Paris School of Interpreting Training
ITT	Interpretive Theory of Translation
KSA	Kingdom of Saudi Arabia
LOCOSSI	English - French Louvain Corpus of Students' Simultaneous Interpretation
MA	Master of Arts
MNL	Mental Number Line
NL	Neurolinguistic
PNU	Prince Nourah University
SI	Simultaneous Interpreting
SNARC	Spatial Numerical Association Response Code
TL	Target Language
UAB	The Autonomous University of Barcelona
UN	The United Nations

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Abstract

Many different approaches can be employed in the training of simultaneous interpreting (SI). As SI is a complex process that includes several inter-dependent subskills, it is worthwhile to explore the efficacy of a subskills training approach in the teaching of SI; it is an approach that targets specific SI micro-skills such as split-attention, fluency, self-monitoring, output control, interpreting of numerical data, proper names, or abbreviations.

Thus, two experimental studies were conducted at Princess Nourah University in Saudi Arabia on a sample of undergraduate translation and interpreting students from English into Arabic to investigate the impact of a subskills training approach on the rendition of numerical data, proper names, and abbreviations in the teaching of SI.

This research aims to (1) To investigate the extent to which the subskills approach would impact students' performance and accuracy rate when interpreting numerical data from English into Arabic, (2) investigate the extent to which the subskills approach would impact students' performance and accuracy rate when interpreting proper names and abbreviations from English into Arabic, (3) propose a successful interpreter training approach that has been tested to be used in SI university level training, for the specific language combination of English > Arabic in order to improve curricular design and planning in the teaching of SI, and (4) contribute to new findings in interpreting pedagogy research.

Results of the research studies show that the experimental group receiving the subskills training approach achieved higher accuracy and lower omission rates in their renditions compared to the control group. Thus, the subskills approach could indeed optimize the teaching of simultaneous interpreting from English into Arabic, and it is of significant value to investigate it further to help create and develop effective interpreting pedagogical approaches.

Keywords: Interpreter training, interpreting pedagogical approaches, interpreting subskills training.

Resumen

Se pueden emplear muchos enfoques diferentes en la formación de la interpretación simultánea (SI en sus siglas en ingés). Dado que SI es un proceso complejo que incluye varias subhabilidades interdependientes, vale la pena explorar la eficacia de un enfoque pedagógico basado en subhabilidades, es decir, en microhabilidades específicas de la SI, como la atención dividida, la fluidez, el autocontrol, el control sobre la producción oral, la interpretación de información numérica, los nombres o las abreviaturas.

En esta tesis se realizaron dos estudios experimentales en la Universidad Princess Nourah en Arabia Saudita sobre una muestra de estudiantes de Traducción e Interpretación del inglés al árabe con el objetivo de investigar el impacto del enfoque basado ensubhabilidades en la enseñanza de SI. Para dichos estudios se eligieron dos tipologías de problemas particularmente recurrentes en la SI inglés > árabe: por un lado, la información numérica (cifras y números), y por otro los nombres propios y las abreviaturas.

Los objetivos específicos de la tesis son: (1) investigar hasta qué punto el enfoque basado en subhabilidades afectaría al rendimiento y a la tasa de precisión de los estudiantes al interpretar información numérico del inglés al árabe; (2) investigar hasta qué punto el enfoque basado en subhabilidades afectaría al rendimiento y a la tasa de precisión de los estudiantes al interpretar nombres propios y abreviaturas del inglés al árabe; (3) proponer un enfoque exitoso para la formación de intérpretes a nivel universitario en la combinación lingüística específica inglés > árabe, y ello con el fin de mejorar el diseño curricular y la planificación en la enseñanza de SI del inglés al árabe; y (4) contribuir a nuevos hallazgos en la investigación en didactica de la interpretación.

Los resultados de los estudios de investigación muestran que el grupo experimental que recibió una formación basada en el enfoque por subhabilidades logró una mayor precisión y menores tasas de omisión en sus interpretaciones, en comparación con el grupo de control. Por lo tanto, el enfoque por subhabilidades podría optimizar la enseñanza de la interpretación simultánea inglés > árabe, por lo cual merece seguir siendo investigado con el fin de ayudar a crear y desarrollar enfoques pedagógicos de interpretación efectivos.

Palabras clave: Formación de intérpretes, enfoques pedagógicos de interpretación, formación en subhabilidades de interpretación.

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INTRODUCTION

Motivation, Interest and Research Question

The first simultaneous interpreting (SI) class I have taught was back in 2012. It was a mandatory undergraduate course as part of the bachelor's degree in translation and interpreting (Arabic><English) in Princess Nourah University (PNU) in Saudi Arabia and delivered in the final year of a 5-year undergraduate program. As each semester went by, I have noticed that some errors were more frequent than others and I observed that my students were struggling in the interpretation of specific speech items, namely, numerical data, proper names and abbreviations. I felt that the error rate was quite high and unusual, and that there must be an underlying reason for which my students have such a hard time dealing with them while interpreting. I also felt that there has, be a way to help them tackle this issue or at least reduce the error rate and frequency. Thus, I was confident that if I am able to get down to the root cause of this problem, I would be able to find or propose a solution.

Thus, I first discussed the issue with my colleagues who were teaching the same course, and they reported that they have also noticed the same errors over and over again. After that, I did some reading and research on this matter, and I have stumbled upon several articles that specifically discuss this issue and explain it from an in-depth scientific perspective. Eventually, my readings lead me to neuroscience journal articles that explicitly explain the reason for which these items of speech are a problematic area for interpreters amongst many others such as cultural references, speed rate whether it is too fast or too slow, the passive voice, differences in syntactic structure between language combinations, and many more. I have selected to further investigate numerical data, names, and abbreviations as they were the items of speech that most of my students complained about and have received very low correct renditions. Also, all the resources confirm that numerical data, names and abbreviations are indeed very common areas of error amongst interpreting students of all languages; yet, there was little resources specifically on Arabic><English language combination.

Later on, as I was reading on methods to approach this issue and help my students perform better, I have come across what is known as the subskills approach in teaching simultaneous interpreting. The subskills approach is a teaching strategy that targets the micro skills of interpreting such as number conversion between languages and rendition of names and abbreviations.

Finally, the idea of my doctoral thesis has emerged. I felt that the most reliable way to investigate the efficacy of the subskills approach is to put it under experimentation. And thusly so, I have decided to conduct experimental studies that would answer my research question: Is the subskills approach effective in the teaching of the simultaneous interpreting of numerical data, proper names, and abbreviations?

Structure

My dissertation is comprised of six chapters followed by the bibliography which lists all the resources and references I have resorted to while writing my thesis, followed by the appendices which include all attachments such as the materials used in the experimental studies, pre-tests and post-tests, samples of participants' evaluation sheets, subskills ecercises and drills, and so on. Here, I will guide you through the different chapters of my thesis and what each chapter covers.

Introduction: This is the introductory part of my thesis where I explain how the idea of my research has emerged, why I have decided to conduct this research, and why this research is of value for interpreting pedagogy research. I also state the objectives of my research.

Chapter one: The first chapter of my thesis is the theoretical framework. The theoretical framework starts with a brief history of interpreter training research and how research has evolved over the years. I also discuss the significance of research on interpreting pedagogy. After that, I cover the literature relevant to my research and the theories on which my research is carried out. Then, I go over the main interpreting research models, trends and approaches. And finally, I will thoroughly discuss the subskills approach in the training of SI which is the proposed approach in my experimental studies.

Chapter two: The second chapter is the pedagogical approach. It describes in detail the pedagogical approach employed in th SI course in PNU and explain how I have implemented in my experimental study course. It covers all didactic aspects, such as description of the SI course, length of the course, syllabus and structure of classes, materials used in class, teaching tools, student profile, expected learning outcomes, and evaluation and assessment.

Chapter three: The third chapter is the methodology. In this chapter I start by going over the different methodological approaches adopted in interpreting research. I, then, describe the methodological approach I have selected for my research, which is Action Research. I discuss

the origins of action research and why it is the most relevant methodological approach for my research study and how it is used in interpreting pedagogy research. After that, I describe and discuss all aspects related to the research methodology of my experimental studies which include research design and plan, instructional material, tools, participant selection and recruitment, phases of the experimental study, data collection, and data treatment and analysis.

Chapter four: The fourth chapter includes the first experimental study. In the first experimental study I investigate the efficacy of the subskills approach on the rendition of numerical data from English into Arabic. The study was conducted in PNU where I designed an SI course similar to the actual SI course delivered at the university. I taught the course over a period of four weeks to two groups, the experimental group where I implemented the subskills training approach, and the control group that did not receive any subskills training.

Chapter five: The fifth chapter includes the second experimental study where I examine the efficacy of the subskills approach on the rendition of proper names and abbreviations from English into Arabic. This study is almost identical to the first experimental study with the exception of the subskills exercises where the participants of the experimental group received the subskills exercises on names and abbreviations instead of numerical data.

Chapter six: The sixth chapter is the final chapter of my thesis where I present the findings of my research. I also discuss how my findings relate to those of other researchers who conducted similar experimental studies, and how my research aligns with the theoretical framework. I then illustrate the contributions of my experimental studies to interpreting pedagogy research. After that, I discuss how I have achieved and fulfilled the objectives of the research. I also go over very intriguing points that I have taken note of while conducting the experimental studies. These notes would be of significance for future research. And finally, I present the concluding remarks to my thesis.

Objectives of The Research

As I mentioned in the motivation section above, one of the reasons for which I have decided to conduct this research is due to the frequency of errors made by my students in regards to numerical data, proper names, and abbreviations. Another reason is my curiosity and desire to explore and examine strategies that would help me become a more competent interpreter trainer. Finally, another reason is my aspiration to help my students with their SI performance. From this motivation, the main and specific goals of this thesis have emerged. As for the

general objective of my work, it is to explore whether a subskills approach is effective in simultaneous interpreter training from English into Arabic. Concerning the specific objectives, I list them below:

1. To investigate the extent to which the subskills approach would impact students' performance and accuracy rate when interpreting numerical data, names and abbreviations from English into Arabic.
2. To investigate the extent to which the subskills approach would impact students' performance and accuracy rate when interpreting names and abbreviations from English into Arabic.
3. To propose a successful interpreter training approach that has been tested to be used in simultaneous interpreting university level training, for the specific language combination of English>Arabic . This approach aims to improve curricular design and planning in the teaching of simultaneous interpreting from English into Arabic.
4. To contribute to new findings in interpreting pedagogy research.

1. THEORETICAL FRAMEWORK

In this chapter I present an overview of interpreter training research history and its evolution over time. I also discuss the significance of interpreting pedagogy research, and review the relevant literature and theories. After that, I present the main approaches, trends, and models of interpreting research. And finally, I discuss the subskills approach, which is the proposed training approach in my experimental studies.

1.1 Conference Interpreter Training and Research: Brief History, Evolution, and Criticism

Research on interpreter training has been of interest since the early 50s; one of the earliest publications on interpreter training is The Interpreter's Handbook by Jean Herbert in 1952. Although it does not explicitly touch upon how interpreters' skills should be taught and trained, it covers fundamental didactic themes such as linguistic and intellectual requirements of interpreter trainees and skill progression. For instance, he explains the importance of introducing sight interpreting as a method to train interpreters' quick response and reaction before simultaneous interpreting training, dealing with complex speech components such as proverbs, preparing for different accents and dialects, managing ambiguity, and many more. Earlier research and publications regarding interpreting included many components that mainly constituted the process. For example, Herbert's study (1952) divided the task of interpreting into three parts: comprehension, conversion, and output production. Similarly, Seleskovitch and Lederer (1984) also identified three constituents of SI: comprehension, deverbalization, and renderring. With the growing interest of psychologists in these components of interpreting, the field gained more recognition among psychologists as they tried to understand language processing in the interpreter's mind.

Later in the 1960s, interpreting research became more observational, focusing widely on the interpreting process. This was mainly due to the involvement of cognitive science and cognitive psychology in interpreting and the interest of psychologists and psycholinguists in studying the interpreting cognitive processes (Gile, 2001). In the 1970s, interpreting research shifted more towards experimental research. Again, with much interest from psychologists, the first model of the cognitive processes of simultaneous interpreting was developed by Gerver in his doctoral

thesis in 1971. Other early prominent researchers on cognitive processing who developed models are Barik (1975), Moser (1978), and Lambert (1988). Scientists and psychologists were strongly attracted to interpreting and invested much in interpreting research because they viewed it as a gateway to the mysteries of the human mind and how it works during mental linguistic processing. As many researchers in interpreting of that era were from a psychological background, they had little experience in conference interpreting. But most experimental research has been conducted in an environment recreated solely for the purpose of their research, meaning that data used for analysis was not extracted from real interpretings but from simulated ones. This subjected their research to much scrutiny which received criticism doubting the validity and reliability of the results. Nevertheless, interpreting researchers have adopted much from experimental psychology to create interpreting models and investigate their theories and those of previous researchers.

In addition, during the 70s was the emergence of the Interpretive Theory of Translation (ITT) known in French as *théorie du sens* by Seleskovitch (1978), one of the founders of the Paris School of Interpreting, making it the most sought center by interpreting researchers worldwide. She explains that the process of translation goes through three stages, the first is comprehension, and then deverbalization in which the idea is detached from language, and finally reformulation where the translator renders the idea into the target language.

The ITT researchers from the Paris School of Interpreting have developed guidelines for interpreter training, making it one of the first interpreter training paradigms. Yet, in the early 1980s, according to Liu (2020), ITT has received criticism by interpreting researchers claiming the need for more scientific and empirical examination and advocating the implementation of quantitative research approaches to investigate the ITT. Liu (2020) states:

> The new generation of researchers conducted quantitative research, aspiring to attain scientific standards. One of their research focuses was an interpreter's management of attentional resources and information processing, an area long-neglected by the Paris School. (p. 31)

Furthermore, some of the criticism on the ITT was that it lacked an explanation of the "how", meaning, how messages were mentally stored before they were deverbalized and transferred into another language. During this time, one of the most significant events for interpreting

research was the Trieste Symposium in 1986, which supported interdisciplinarity and empirical research on interpreting. At this symposium, researchers expressed their doubts about the ITT. In this regards, Liu (2002) states:

> At the landmark Trieste Symposium in 1986, many researchers openly proclaimed that they rejected the prescriptive approach of the Paris School and started empirical and quantitative research, regarding experimentation as a necessary means to achieve reliable results. (p. 32)

In this era of interpreting research, Gile's Effort Models (EMs) have come to light, becoming one of the most influential theories of interpreting and interpreter training. Gile's EMs are also considered interdisciplinary contributions to research as much of the interpreter's limitations or challenges are attributed to cognitive and psychological factors. The EMs do not specifically explain the mental process of interpreting. Instead, they focus on the difficulties that arise during the different phases of the cognitive processes of interpreting and suggest strategies for interpreters to handle and manage these difficulties. This was a very important breakthrough in the evolution of interpreter training and interpreter training research.

As mentioned earlier, from the very beginning, the history of interpreting research focused on the professional endeavours and cognitive processes of interpreting. These researchers were primarily concerned about the personal and cognitive skills of the interpreters and how they perform the interpretation tasks. Psychologists were keen to identify the characteristics that guide the person in fulfilling the mission of understanding and delivering the content appropriately to the audience. The pioneering work of Jesus Sanz Poch (1930), who was Geneva's educator, laid the foundation of the discipline of interpretation research work. He was interested in the interpreters that worked for international organizations during the 1920s. Sanz conducted the interviews using a sample of twenty practitioners and presented the results at the Sixth Congress of Applied Psychology in Barcelona in 1930. The study's findings identified the abilities and aptitudes required during the interpretation process. The listed qualities consisted of physical and mental requirements such as intellectual aptitud, focus and attention skills, instinct, and memory, as well as moral characteristics, such as dignity, loyalty, and discretion. Interestingly, he had not touched upon the possibility of the cognitive qualities being taught to interpreters and the potential of further research aimed explicitly at teaching methodologies of these qualities.

Memory was considered a significant aspect of the interpreter's profile, but the speculations on having strong memory skills is a must, remained inconclusive. Several other experiments refuted this idea and developed the theory of automated brain systems (Styles, 1997). It was believed that the automation of brain processes due to continuous training led to increased memory capacity and cognitive skills for improved interpreting. Hence, the research primarily focused on the abilities of interpreters rather than the pedagogical or didactic implications of the research conducted, or how to increase memory capacity, deal with output management, or balance between the components of the interpreting process.

The adoption of interpreting at the Nuremberg Trials in 1945 and 1946 and the United Nations (UN) was one of the most prominent events that piqued psychologists' curiosity to conduct research on interpreting. As psychology was a field of interest, the thoughts have differed regarding the abilities and skills of humans, and as assessing these cognitive tasks is rather complicated, further experiments were conducted. Barik (1969) conducted a set of complex experiments on professional SI interpreters with a language combination of English><French. The main area of concern for the researcher was the simultaneity of the task from a purely cognitive perspective, as the original speech often overlapped with the production of the interpreter's speech. Barik (1969) claimed that the pause between the speeches was an advantage to the interpreters as they could cram as much information to produce it later. Specifically, he studied the impact on the interpreters' output due to input speed, sound quality, and prosody of source speech.

During the same period, the researchers and practitioners focused a lot on the discipline's organization. The pioneering work was done under the International Association of Conference Interpreters (AIIC). Further, they also realized the need for the association of professional training with academic institutions. As Mikkelson and Jourdenais (2015) researched and stated:

> Danica Seleskovitch, who served as the organization's executive secretary in the early 1960s and played a vital role as an interpreter trainer at ESIT, the École Supérieure d'Interprètes et de Traducteurs in Paris, came to epitomize the close link between the profession and university-level training institutions such as ESIT, within which she also established interpreting (and translation) as a branch of scholarly study. Her forceful defense of a compact theoretical and methodological approach was highly consequential for the field's evolution. (p. 124)

Seleskovitch and her colleagues made significant efforts to develop a disciplinary framework, which was later adopted in the academic and professional world of interpreting. After that, the opposing opinions and contradictory views sparked the development of a new framework where she developed a theory known as the Interpretive Theory of Translation (ITT) or *théorie du sens* (1978). She discusses, as explained above, that the process of translation goes through three stages, the first is comprehension, and then deverbalization in which the idea is detached from language, and finally reformulation where the translator renders the idea into the target language. This theory deviated from the earlier works on translation and interpretation that stated that memory processes hindered interpreters' abilities to produce a meaningful text. Instead, it was based on the sense that an interpreter understands and adapts to communicate effectively. In this phenomenon of deverbalization, the interpreter forgets the speaker's exact words and seeks to retain the purpose and message of the content that the speaker tries to convey.

Another evolutionary event would be the Paris School of Interpreting Training (ESIT, in its French acronym) and the Paris School of Research Training. Seleskovitch and Lederer (1989) used the support of European institutions and developed a teaching manual in interpretation known as *Pédagogie raisonnée de l'interprétation*. It was further translated into different languages, and is still considered a vital resource, and is used as a guide for interpreter training. Apart from providing the training manual, the Paris School also made significant contributions to research related to interpreting. It was done initially as part of the doctoral studies program at the University of Paris in 1974. The theses supervised by Danica Seleskovitch in the 1970s and 1980s contributed greatly to a new generation of researchers building upon the principles of the ITT. While Seleskovitch and colleagues developed the theoretical assumptions and methodological areas, the paradigm was further strengthened by the first journal of interpreting studies. This journal, which started as a newsletter in 1988, managed the communication of the interpreting community. Soon after the rise of interest in the research work, the newsletter was quickly turned into the official journal for research. Initially, it managed the bibliographic data on interpreting studies that updated the recent publications and resources. The second in line was the IRTIN Bulletin, which was set up by Daniel Gile, who formally created the information network for interpreting.

In the late 80s and early 90s, interpreting research went through drastic growth, evident in the increasing number of publications in periodicals and specialized journals dedicated to interpreting research. In this era, interpreting paradigms have become essential in interpreter training (Pöchhacker, 2004). The following section covers the most prominent paradigms and models of interpreter training that had the most impact on interpreter training research since their emergence in the field.

1.2 Interpreter Training Research Paradigms and Models

1.2.1 Interpreting Paradigms

One of the first interpreter training research paradigms is Seleskovitch's ITT (1978), explained in the history section above. This paradigm has later received criticism from practicing interpreting researchers, claiming it lacks a scientific basis (Liu, 2020). This led to the emergence of the Cognitive Processing (CP) interpreter training research paradigm in the mid-70s by Gerver (1976). CP embraces a more experimental and scientific approach that investigates the cognitive processing of simultaneous interpreting. During this time, interdisciplinarity was at its peak, and researchers in interpreting appreciated the value and contributions of other fields' research approaches to decipher the interpreting mental processes, namely neurolinguistics and neuropsychology. This has led to the third interpreting research paradigm, the Neurolinguistic (NL) Paradigm. Later in the late 80s and early 90s, after the Trieste Symposium and the Critical Link conferences interpreting research drew more attention to the communicative element of interpreting, leading to the emergence of the Dialogic-based Interaction (DI) Paradigm, which focuses more on the social and cultural aspects of interpreting. Although some researchers lean more towards the ITT paradigm and others lean more towards the CP paradigm, this does not affect the significance of each individual paradigm. Each paradigm serves a purpose, both of wh.,mkmnn ich are essential in the training of interpreting and complementing one another; as Shlesinger explains, "we do not have—nor do we desire—a unifying paradigm" (1995, p. 9).

1.2.2 Interpreting Models

Models of interpreting were developed as a means to help interpreters and interpreting students to overcome any cognitive processing issues they face while interpreting. The two types of models used in interpreting research are social or relational models, or cognitive

processing models. Social or relational models highlight the dynamics of the communicative relationship between participants in the mediated event (including the interpreter) and are well suited to studying dialogue interpreting such as Colonomos' model (1992). Cognitive process models focus more on the interpreter's mental operations and are the favoured approach for modelling conference interpreting or simultaneous interpreting (Setton, 2015). There are several models of interpreting, the next section covers the models most relevant to the research of my thesis.

One of the very first models of simultaneous interpreting is Seleskovitch's model developed in 1968 known as the Triangular Process Model. It is based on the ITT in which interpreting in done through transferring the meaning of the message instead of merely translating the words of it. She explains that interpreting should not only involve linguistic conversion, but the conversion of the meaning from the source to the target language including the non-linguistic aspects of the speech that is not found in the words of the original text. According to this model, the interpreter deverbalizes the source speech and expresses the meaning in the target language rather than transcoding, and with no significant regards to the wordings of the original speech (Seleskovitch, 1978). This model is quite valued in interpreter training as it relies basically on transferring the message of the speaker which is one of the main and most important aspects of interpreting and training. Also, the cognitive processing of meaning and the transfer of meaning into another language is one of the most complex mental activities in simultaneous interpreting.

Another model of interpreting that is considered to be one of the earliest models of interpreting in Gerver's Processing Model of Interpreting developed in (1976). Gerver's model focuses mainly on memory functions and interpreter's control of output. This includes short and long-term memory, time lag, memory usage, storage/retention, and production. It also involves distribution of attention by the interpreting and output management. This model is specifically of importance in interpreter training due to its focus on the output in terms of processing, reprocessing, and output as an end product. It takes into account the interpreter's cognitive activities starting from reception of the message, short-term memory retention, transfer of message from the short-term memory to the working memory, and ending with mental monitoring of the output before production. Self-monitoring in this model is not only during production of output but also afterwards where interpreters are able to correct themselves later on if they observe an error in their output. Again, this is quite an essential

element in the training of simultaneous interpreting as it focuses on the end result or performance of interpreters through the mental processes they go through while interpreting. Additionally, it also helps interpreter students to be selective to which information and messages to prioritize and store in their working memory and which information to eliminate if retention of all information would burden their mental capacity.

In addition, Moser-Mercer's Cognitive Processing Model developed in 1978 is also one of the earliest influential models of interpreting. As its name suggests, the model essentially involves the cognitive processes of interpreting, as well as output, but more specifically on input. This means it focuses on comprehension, the cognitive processing of the incoming information/message. Since this model focuses more on units of meaning, it involves the syntactic and pragmatic levels rather than terminological or morphological levels. This entails that this model emphasizes the importance of anticipation, which is a crucial aspect of interpreter training. There are several activities recommended by researchers and practicing interpreters that could improve the anticipation strategies of students (see Gillies, 2013) all of which depend on input comprehension and analysis. These exercises can be implemented in the classroom as part of the interpreting course.

Finally, Gile's Efforts Model developed in 1995 is considered one of the highly influential interpreting models in interpreter training as it encompasses all the cognitive functions involved in the interpreting process. It was designed to help interpreters with the difficulties they encounter that revolve around cognitive load, and it is acknowledged to serve a pedagogical purpose (Gile, 2009). And although it was not essentially developed specifically as a research tool, many prominent researchers have reflected on Gile's Efforts Model and its didactic influence including Pöchhacker (2004), Gillies (2013), Setton (2015), Setton and Dawrant (2016), and many others. This model is used as a tool for practicing interpreters, interpreter students and trainers alike. It is also used by interpreting researchers as a conceptual framework in experimental studies. This model is based on the observation that difficulties that interpreters and interpreting students face occur the lack of mental capacity or the exhaustion of the cognitive load, which eventually results in different kinds of errors. It is also based on the notion that for successful interpreting performance to take place, interpreters should be able to manage and control the cognitive efforts. They also need to understand when and how to distribute attention to each of them as there is only a limited capacity for each effort as well as

all efforts combined. Overusing the supply available for each individual effort naturally results in poor performance by interpreters and interpreting students.

1.3 University Level Interpreter Training

As for interpreter training programs, one of the first recognized interpreting programs dates to 1941 at the *Ecole d'interprètes de Genève*, and some of the most renowned interpreter training programs were established in the 1950s; amongst the most prominent are those created in Geneva, Vienna, Paris, and Heidelberg. In 1953, the International Association of Conference Interpreters (AIIC) was formed to formalize conference interpreting and establish criteria that would govern this new profession and ensure the working rights of interpreters and ethical codes of conduct. Also, in the 1950s, interpreting research received noticeable attention (Riccardi, 2002); in the early years of interpreting research, the majority was theoretical and based on personal intuition and speculation (see Gile 1990,2009; Mackintosh, 1995; Sawyer 2004,2020; Pöchhacker, 2010), most of which involved professional traits of interpreters and practitioners' aptitudes in interpreting. One of the most prominent publications during this period is The Interpreter's Handbook by Jean Herbert (1952) from the Geneva Interpreting School.

Concerning university interpreter training, trainers were usually professional practicing interpreters regardless of their academic background and qualifications. Gile (1995) states that interpreting schools worldwide "pride themselves on having competent professionals rather than academics as teachers" (p. 20). On a similar note, Mackintosh (1995) has also observed that for hiring interpreter trainers, they are "practicing conference interpreters, preferably AIIC members" (p. 122). Such a view might be plausible as interpreting is an activity and skill-based profession that requires extensive reliance on practice and skill. In addition, many institutions view the quality of their interpreting programs according to the instructors being professional experienced interpreters, so practice and experience have always surpassed teaching competence. Sawyer (2020) explains that many trainers with teaching experience and who conducted academic research but less interpreting experience were denied employment as interpreter trainers when interpreting university programs were first founded, as institutions have always linked the strength of their programs with practicing interpreters. Sawyer (2004) also observes, "although leading interpreter education programs are in an academic environment, interpreter training has never left the realm of apprenticeship" (p. 76). Sawyer

(2020) also points out that universities and interpreter training programs often select practicing interpreters or former interpreters to teach the courses. Of course, interpreting teachers must have practical experience in the field. The more experience they have, the more knowledgeable they can be; this does not necessarily mean that each experienced interpreter can be a competent interpreting teacher without receiving proper training to train interpreting students. In this sense, Sawyer (2020) explains that recently there has been more awareness regarding the teaching competence of interpreter trainers and that the requirements of interpreter trainers should include knowledge of the theoretical and curricular aspects of interpreter training, in addition to experience. It is evident that the views on teaching competence have evolved in recent years; the prerequisites required for trainers include other aspects of teaching and training that go beyond their practical experiences as professional interpreters. This needs to be considered because, for many years, universities have struggled with this issue. As Kelly (2008) reports:

> Paradoxically, universities in many countries have traditionally paid little attention to teacher training. In many countries, compulsory training exists for all other levels of education, but at universities, it is simply assumed that those who know how to teach. It is still the case in many countries that new members of teaching staff are left literally to sink or to swim in the classroom, while more attention is paid, for example, to their training as researchers in their discipline. (p. 102)

Gile (2009) maintains that training courses must be structured according to empirical research and studies to provide the market with competent, reliable interpreters. It was important not to depend on intuition, instinct, and impulse when training interpreters. Unfortunately, this was, and might still be, the case in many universities around the world. In this respect, Gile (1990) discussed the shortage of interpreter training research since the early 90s and the scarcity of research investigating successful methodologies in the classroom, stating that training-oriented research "does not seem to have had any significant effect on training methods and results except in courses given by the researchers themselves, and sometimes in the schools where they teach, but on the whole, interpretation instructors prefer to keep their personal, most often traditional methods, and take no heed of research" (p. 33). Even though Gile makes this styatement over 30 years ago, research on interpreter training did not seem to have developed significantly in the following 20 years, as Pöchhacker (2010) comments on Gile's (1990) statement maintaining that "two decades later, it is not clear whether the situation has changed" (p. 5).

Gile (1995) states that since interpreter training has received more demand, interpreting trainers were normally practicing interpreters that relied mostly on "personal speculation, sometimes written up in academic language which, combined with normative principles on how interpretation should be conducted and taught, solidified into dogma." (p. 15). In his article, he explains that interpreting is perceived as a skill that requires training from a practitioner rather than an academic. Interestingly, it is important to mention, in this regard, what has been published by the International Association of Conference Interpreters (AIIC, 2017) on its website's directory regarding the criteria and requirements that must be met in interpreting schools; one of these criteria is that conference interpreters should teach the interpreting program; however, training of interpreter trainers is not a requirement, but merely a recommendation. Additionally, Pöchhacker (2010) explains that such a view might be valid and acceptable, but that does not necessarily mean it is sufficient for academic lectureship in university training. In this respect, Pöchhacker (2010) notes that "university-level interpreter education has undergone a process of academisation" (p. 6) and that many universities nowadays expect or require the faculty members teaching interpreting to have a doctoral degree or at least a graduate degree in addition to some years of practical experience. In this respect, Setton and Dawrant (2016) state that "to date, only a minority of conference interpreter trainers have received substantial teacher training. Most pick up key principles and techniques in-house by study and example" (p. 580). They also urge that "a more structured, scientific, and accountable pedagogy" (p. 15) through research is necessary to develop and enhance interpreter training and its quality. In a similar observation, Echeverri (2017) states, regarding interpreter training, that.

> One concern was that training traditions were passed on from generation to generation. Absent specific training for T&I trainers/teachers, new generations of trainers worked by imitation and used the same strategies as those who trained them. (p. 156)

In general, the interpreting community widely agrees that interpreting is a skill that can be taught and is not merely an innate capability that an individual is born with; it means that interpreting training requires a particular skill-set for learners to acquire this skill. Townsley (2011) states that "the observation that not all practitioners make good trainers is borne out by practical experience" (p. 311). She explains that being a professional interpreter or a published academic cannot teach efficiently as trainers "also need to teach, an ability that underpins the effective delivery of training" (p. 311). As Setton (2010) elaborates, "it soon becomes obvious to any would-be-teacher, in any field, that understanding, doing and teaching are three things" (p. 220). Furthermore, Setton and Dawrant (2016) explain that trainers need to have additional

characteristics beyond those of professional interpreters, such as class lesson planning, curriculum design, class management skills, feedback, assessment, and the consideration of learner's emotional and psychological factors such dealing with anxiety through student empowerment and motivation. They also emphasize the importance of understanding students' particular problems to address them specifically.

1.3.1 University-level Institutional Interpreter Training Models

Niska (2005) presents four of the most prevalent interpreter training models adopted by most interpreting university programs on the undergraduate and graduate levels. The first model is the Continental Model in a translation and interpreting undergraduate program. The program spans from four to five years of study. To enter the program, no translation or interpreting exam is required. Language courses on students' functional languages are part of the curriculum and are delivered during the first year or two of the programs. This could include various courses relevant to translation and interpreting, such as academic writing, linguistics, literature, and other courses. Some universities accept students with two working languages, and some universities require a C language. In the final two years of the program, all or most courses are translation and interpreting courses. Most universities start by training students in interpreting from students' B language to A and then the other way around; some universities, however, do not train students from their A language to B.

The second model is the mixed MA-level program in translation and interpreting. This program is usually a one-year program that fulfils the interpreting market demand. Many universities only offer consecutive interpreting as a mandatory course of the curriculum from and to both A and B languages, and offer simultaneous interpreting as an optional course. As far as the training paradigm is concerned, this model adopts the Paris training paradigm published in *Pédagogie raisonnée de l'interprétation* in 1989.

The third model is the Y-shaped BA and MA program in translation and interpreting. This program trains students to interpret between their A and B languages, and from their C languages into A and B. On the undergraduate level, the program is delivered over four years. The first two years include language enhancement and translation courses. After the first two years, students take an assessment exam and can choose between an MA in Translation or an MA in Interpreting. The curriculum design of this model is similar to the Continental Model; the difference between the two is that in this model, students are only accepted upon a formal language test of their B and C languages.

The fourth model is the Masters in Conference Interpreting. This is considered a professional postgraduate program as it is an intensive program and specifically aims to prepare graduates to work in conference interpreting upon graduation. Some universities offer it over one year and others over two years. This model adopts quality criteria of major professional organizations such as AIIC, where external examiners evaluate tests. An example is The European Masters in Conference Interpreting (EMCI), which received the highest ranking by AIIC. The program curriculum includes theoretical and practical courses in both consecutive and simultaneous interpreting. Two of the most prominent schools of interpreting, ESIT of Paris and FTI of Geneva, are the founder universities of this model.

1.3.2 The Subskills Approach

Interpreter trainers at PNU, the university where I work, mostly choose a more general and holistic framework of teaching interpreting students. The instructor plays a speech, and the students record their interpretation. Then the feedback given to the students involves the entire interpretation, including accuracy of delivering the message, voice control, output management, omissions, and compensation strategies, etc. They do so because such an approach aims at learners' holistic performance in delivering the message and the teaching aims to refine the overall quality of interpreting. In my meetings of reflection with my colleagues who taught the SI course, it was agreed upon that the holistic approach is efficient in the sense that the ultimate aim of SI training is to help learners achieve quality interpreting. Yet, the skill of simultaneous interpreting is comprised of several other micro-skills that altogether contribute to the degree of quality of the interpretation. Interpreting trainers and researchers agree that interpreting is a complex process that includes several inter-dependent subskills (Kurz, 1992; Moser-Mercer et al., 1997). Moreover, the isolation of component skills during practice and training is also advocated in Weber (1989, p.162); Van Dam (1989, p.168); Seleskovitch and Lederer (1995, p. 133); Moser-Mercer (1994, p.66); Setton and Dawrant (2016, p.61).

Nonetheless, there was still disagreement on whether these subskills should be taught separately, simultaneously, or in a specific order (Setton & Dawrant, 2016). Lambert (1992) advocates mixed componential-progressive training protocol steps. De Groot (2000) also proposes progressing gradually in teaching micro interpreting skills. Kurz (1992) states that "interpreters, instructors, and trainers agree that SI should be taught by [...] isolating problems and focusing on variables one at a time, and at a later stage, combining them into progressively

more intricate structures" (p. 245). Van Dam (1989) proposes the separation of interpreting skills in simultaneous interpreting training, where skills are introduced one at a time until internalized, and students can integrate them within the whole process on interpreting. In a similar study by Lotriet (2002), she argues that although at the beginning of the training where students found that the separation of skills was redundant, their "perception changed when they combined all the skills and things "clicked" (p. 86). She continues, "as trainers, our experience was that the gradual build-up and incorporation of the different skills made it easier for the trainees to ease into proper simultaneous interpreting" (p. 86). Therefore, it is essential to experiment with different methodologies and compare the outcomes for trainers to be better equipped when training subskills of SI. Hence, it is worthwhile to consider incorporating a combination of a holistic and subskills approach in the classroom according to students' needs.

According to Setton and Dawrant (2016), one of the most recurring difficulties that interpreting students express is receiving holistic feedback on their interpreting tasks. One can conclude that a holistic approach hinders students' ability to pinpoint their weaknesses and impedes their performance progression and learning growth, limiting their potential in the quality enhancement of the interpreted output. Additionally, holistic feedback covers students' minor and major errors, which probably impacts the psychological factors associated with interpreting, leading to increased anxiety, stress, decreased motivation, and lowered confidence and self-esteem, which, again, affects the quality of the interpreting as well as the learning process. Thus, most teachers pursue methods to simplify this complex task for their students and break down the primary skill of interpreting into miniscule skills. But as Setton and Dawrant (2016) note that simplifying the job is often done implicitly according to instructors' internal experiences, instincts, and intuitions, rather than explicitly "chunking" the task into "a protocol for part-task training" (p. 61).

Gillies (2013) explains that through training each skill in isolation, students "can concentrate on achieving the necessary degree of internalization for it without the distraction of trying to complete the other tasks at the same time." (p. 3). In such a case, it is essential to emphasize that feedback should be focused only on this isolated skill during training. In addition, De Groot (2000) also proposes progressing gradually in teaching interpreting and mentions potential positive results "not by training this subskill in isolation, but in an 'emphasis change' (or integration) protocol in which trainees do the whole task but will focus on different components at different times." Also, according to Lambert (1992), "there are [...] so many ongoing

activities in SI that [...] any pedagogically sound approach should tease these ongoing activities apart, differentiate the component skills, and where possible, provide training experiences in each one" (p. 266).

The subskills approach helps students internalize and enhance interpreting micro-skills and aims to train them to anticipate potential problem areas throughout the speech while interpreting. By doing so, students are better equipped with the tools they need to tackle these issues on the spot; they are also more prepared to apply the knowledge of managing specific problems with many possibilities. This also minimizes other emotional or psychological factors that could negatively impact their performance, such as stress and anxiety caused by problematic areas while interpreting. This also helps with stress management and output control, which contribute significantly to the overall quality of the interpreting. Further, training students on several subskills can be an accumulative progression that comes together to form a more accurate rendition of details and a more polished performance. As Gillies (2013) states, "just going into a booth and interpreting simultaneously is not always the best, and never the only, way of practicing the skills required for simultaneous interpreting" (p. 197). Thus, the goal of breaking down the major skill of SI into smaller components, is to practice and activate subskills that, when performed in combination, make up a more successful interpreting. He also states that "complex skills can be broken down into parts, which can then be practiced in isolation. Interpreting is a complex skill. It involves doing several different things simultaneously, some of them relatively simple, some less so" (p. 3).

From a more cognitive perspective, Weber (1989) explains that the interpreter's brain needs systematic and targeted exercise; he states:

> Assuming Conference Interpreting is mainly a skill, much like one of the more difficult sports, performed mainly by the interpreter's brain, it becomes important to realize that the most difficult exercises can only be performed by the interpreter if he can draw upon a solid reserve of automatic reflexes which allow him to free his mind for those parts of the interpretative process which need his fullest attention. (p.162)

When it comes to implementing a subskills approach, it does not necessarily entail the training of particular skills in complete isolation of one another, but the emphasis on different component skills specifically targeted within a broader set of skills. The main goal of adopting a subskills approach in the teaching of interpreting is two-fold: progression and automaticity. Unlike the holistic approach, the subskills appraoch simplifies a task as complex as

simultaneous interpreting, which contributes to students' progression in interpreting. This could be achieved since the subskills approach focuses on particular skills, and students are given targeted feedback, giving them a clearer view of their strengths and weaknesses. Decomposition of the interpreting process into different phases also allows students to monitor their skill progression, promotes learner autonomy and self-assessment, facilitates peer feedback, and enables learners to have a better grasp and understanding of their level of performance. Such an approach also contributes to the automaticity of the targeted skills. This means these skills could be mastered to some extent and internalized to "free up attention for those components needing more conscious control" (Setton & Dawrant, 2016, p. 56).

Similarly, Gillies (2013) explains that "interpreting is a skill or, to be more exact, a combination of skills that one can explain and understand quickly, but which take far longer to master in practice" (p. 13). On this note, Proctor and Dutta (1995) maintain that:

> One benefit of part-task training is that it allows automaticity to develop for those task components that remain consistent across conditions. As a consequence, when the whole task is performed, the performer can devote more attention to those aspects of the task that cannot be automatized. (p. 291)

The subskills approach enable students to reach some level of automization before being immersed in the entire task of interpreting. As Gillies (2013) states:

> To learn to carry out a skill, we must practice repeatedly. Repeated practice of skill allows us to internalize it arrive, where some part of what we are doing becomes automatic, and we can complete the skill without giving it our full attention. This is important in interpreting because the mental capacity freed up in this way will not go to waste. It will be put towards the other skills that go to make up interpreting. (p. 3)

Interestingly, the subskills approach has also been discussed in translation pedagogy literature, although not in the same sense as in interpreting, given the different nature of both disciplines. Schäffner and Adab (2000) have explained that scholars usually "break translation competence down into a set of interrelated sub-competencies, which can be studied in isolation" (p. 9). Translation competencies can be separated into several categories and subcategories such as linguistic competence, cultural competence, linguistic-cultural competence, textual competence, pragmatic competence, textual competence, reading and analytical competence, writing competence, and many more. Although these competencies are not considered subskills in the same sense as those of interpreting, translation researchers advocate sub-competency training (Huang, 1997; Sin, 2000).

1.3.3 Conceptual Framework of the Subskills Approach

The subskills approach is not new; however, it has not been sufficiently proven, nor has its efficacy been thouroughly investigated in all interpreting subskills. And like this, with such experimentations, this approach can finally be based on research, not intuition, as it has been for some time. In this sense, many recommended exercises and practices to teach interpreting are valid instinctively but not yet proven experimentally. In several university interpreting programs, there seems to be some lack of awareness of interpreter training and the "how-to" of it. And sometimes, trainers are not capable of fulfilling the true mission of interpreter training and realizing the true purpose it aims to achieve. In addition, many trainers who are competent and successful in their training, cannot answer questions about their methodology and approach in the classroom. For instance, they are unaware of how they teach, what they teach, why they teach in this manner when they teach it, and whether they are confident that their methodology is successful. On this note, Mackintosh (1995) argues that it is sometimes difficult to know the extent to which interpreter trainers are aware of their training methods and whether these methods serve the purpose they aim to serve. Although it is crucial to develop efficient training approaches, it is even more vital to test the efficacy of the chosen strategies. In some cases, methods might not achieve the desired results, no matter how effective they may seem intuitively.

Li (2013) noted that students' strategies selected during interpretation were sometimes inconsistent with those taught by their trainers. Admittedly, this is not an easy task as the currently recognized frameworks on training strategies and approaches was limited. But an experimental study conducted by Dong and Zhao (2019) analysing acquisition strategies shows that students performed more positively and achieved more accurate rendering of information when they adopted the strategies suggested by their trainers compared to using the strategies that their trainers recommended them to refrain from.

The experimental studies of my research have been inspired by Gile's Effort Models (1995, 2011), which explain the four primary efforts during simultaneous interpreting. First, the Listening and Analysis Effort includes all conscious and subconscious comprehension-related operations from the moment the interpreter hears the utterance until the utterance is analyzed and meaning is formed. Second, the Memory Effort is a storage mechanism for incoming input temporarily retained before further processing resumes. The third is the Production Effort, where the interpreter renders the speaker's message into the target language. Fourth is the

Coordination Effort, where the interpreter manages the output through self-monitoring while balancing attention between all Efforts and distributing focus according to their needs at that specific time. The Effort Models are based on the notion that there is a limited capacity in which the mind can operate, and the challenges that occur during interpreting are due to the time restriction posed in SI and the need to distribute one's attention between many mental activities co-occurring simultaneously (Gile, 2011).

In this context, Gile (1995) defines effort as "some sort of mental energy only available in limited supply. Interpretation takes up most of this mental energy, and sometimes requires more than is available, at which times performance deteriorates" (p. 161). Thus, this model has been employed, as it is utilized as a pedagogical instrument to explain the subskills approach. The relevance of this model to my experimental studies is essential; students' interpreting skills selected and tested for this dissertation were not tested in complete isolation of the interpreting task; instead, students would be asked to shift their attention and focus on particular skills while performing a complete interpreting task. Thus, the main objective is for students to focus on specific aspects during their delivery in SI while integrating these skills within the whole interpreting.

Gile's Coordination Effort Model (2011) is essential in teaching simultaneous interpreting, as it allows students to manage and balance attention between listening, analysis, and self-monitoring that occurs in SI. As students learn how coordinate and balance these skills, they can interpret in the most optimal way, where they can avoid mental saturation, and, in turn, avoiding poor interpreting. This is why the Coordination Effort plays such a fundamental role in output management. As Kriston (2012) explains, the "art of smooth interpretation is based on the art of smooth coordination. Even if sometimes these Efforts overlap, coordination finds the balance between all the factors". (p. 81)

Moreover, taking into account Gile's Tightrope Hypothesis of the Effort Models (1999, 2008), he explains how added cognitive pressure results in more error for simultaneous interpreters. Gile (1999) states:

> … most of the time, total capacity consumption is close to the interpreter's total available capacity, so any increase in processing capacity requirements and any instance of mismanagement of cognitive resources by the interpreter can bring about overload or local attentional deficit (in one of the Efforts) and consequent deterioration of the interpreter's output. This 'tightrope hypothesis' is crucial in explaining the high frequency of errors and omissions that can be observed in

interpreting even when no particular technical or other difficulties can be identified in the source speech… (p. 159)

2. METHODOLOGY

This chapter presents a detailed description of the methodology employed in this dissertation's research. I will discuss the entire research process, from how the research came about to how the research was carried out. Hence, I will discuss (1) how the research has been conducted, (2) the methodological approach selected for this research and the reasons for its selection, (3) how the research has been designed, planned, and applied, and (4) the method used for data collection and analysis.

2.1 Research Methodologies in Interpreting

Interpreting is a multidimensional activity that encompasses several elements as it involves language and culture and social, psychological, emotional, cognitive, physical, and pragmatic aspects. Thus, it naturally incorporates many disciplines relevant to interpreting as a product and all the processes this activity goes through. Hence, it is expected that the methodologies adopted in interpreting research are varied and cover a broad selection of research methods and approaches. This could include applied research methodologies in which, for instance, the researcher adopts an experimental or simulative approach to investigate a specific phenomenon, and/or theoretical methods where, for example, the researcher employs an observational or derived approach to predict or explain a particular phenomenon, which is selected according to several factors that would help researchers reach the knowledge they seek.

Interpreting has undergone many changes and developments, affecting research methodologies. According to Pöchhacker (2004), interpreting processes have received much attention from researchers, and most of the research conducted in the earlier years of interpreting research involved cognitive and psycholinguistic approaches relying primarily on quantitative methodologies. Afterwards, interest shifted from interpreting to the situational element of interpreting, which gave more attention to research involving sociolinguistic and sociological approaches.

Gile et al. (2001) maintain that between the mid-70s to the mid-80s, the most prominent methodologies of interpreting research were exploratory research in essay articles rather than experimental studies since experimental studies were not viewed as the sole scientific approach to prove a theory. By the late 80s, experimental and empirical research in interpreting has been

more advocated as there was a tremendous shift towards interdisciplinary research, particularly in cognitive psychology, a field in which experimental research is regarded as the most potent means to verify or negate a theory or a hypothesis. Even then, experimental research has received little attention since, even in disciplines such as cognitive psychology, exploratory and observational research methodologies were enough to investigate a hypothesis. In this regard, Coolican (1999) explains that in cognitive psychology, an experimental study is not necessary to examine a hypothesis since a scientist can do so through observation and monitoring what people do and then asking them about their thoughts on that. And due to the multidisciplinary nature of interpreting, interpreting research has been dramatically influenced by the research of other disciplines such as linguistics, second language acquisition, and neurosciences, among many others. However, psychology seems to have had the most impact on interpreting research (Gile, 2001). This can also be attributed to researchers' interest in exploring what goes on in the interpreter's head while interpreting and explaining the mental processes.

As elaborated by Gile (2000), the evolution of interpreter research has witnessed noticeable growth over the past decades, not only in terms of the number of publications but also in terms of content diversity. He explains that during the 50s and up to the early 60s, although there was little research, there was some observational reflection on the interpreting process done by practicing interpreters rather than interpreting researchers; this period was called the "Pre-research Period." Further down the years, during the 60s and early 70s, in an era known as the "Experimental Psychology Period," some psychologists and psycholinguists showed interest in interpreting research by employing their models on previous observations on interpreting. The production of these psychologists and psycholinguists was primarily quantitative compared to their qualitative contribution. Moving on to the period from the early 70s to the mid-80s where most of the production was conducted by interpreter researchers rather than researchers from other disciplines, hence the name, "Practitioners' Period." The late 80s to the end of the 20th century was the era where the pursuit of more scientific conference interpreting research took place. After this period, interpreting research has gone through an interdisciplinary phase where interpreting research has received contribution from other disciplines, namely cognitive psychology, neurophysiology, text linguistics, and pragmatics Gile (2000).

Nevertheless, there has been much growth in empirical research in interpreting studies; much of it was conducted by graduate students as part of their theses. This is due to many university

degrees requiring research as part of the interpreting program, so students receive the support they need from their supervisors and have access to many resources; however, once they graduate and start their career as interpreters, most are no longer motivated to carry on further empirical research. Gile (2000) explains that the growth of empirical research in interpreting studies those years have witnessed what might be attributed to institutional graduation prerequisites instead of a true paradigm shift in interpreting research. While in the early years of interpreting research, much of it was exploratory and theoretical, Gile (1990) was amongst the first to have pointed out the significance of leaning towards more empirical approaches and embracing more scientifically based explorations and not only relying on theorizing.

On a similar note, Moser-Mercer (1994) has discussed the two most prominent methodological paradigms of interpreting, one of which relies mainly on quantitative methods strongly associated with natural sciences, while the second depends primarily on qualitative approaches and is related to liberal arts and humanities. In this context, the "positivistic" quantitative approach essentially aims to answer a research question from an objective perspective by collecting quantitative data processed through statistical analysis. In this respect, Hale & Napier (2013) explain:

> Positivistic approaches are founded on a belief that the study of human behavior should seek to identify, measure and evaluate any phenomenon and rationally explain it… for the most part, positivistic methodologies are quantitative. (p.14)

On the other hand, the qualitative methods, referred to as the "phenomenological approaches" in this context, involve a subjective perspective in analysing the data collected. They provide answers to research questions that are more in-depth regarding the participants and relevant surroundings, though not necessarily applicable to a more significant population than the one involved in that research, nor another researcher can always replicate it. As Hale & Napier (2013) explain it:

> Phenomenological approaches aim to understand behaviour from the participants' subjective frames of reference. Research methods are chosen, therefore, to describe, interpret and explain events from the perspectives of the people who are the subject of the research. Typically, phenomenological approaches are qualitative (p. 5)

The discipline of interpreting differs from the other disciplines in various ways. Specifically, interpreters can operate in many different professions and work settings. Based on this, there is a wide range of methodologies used in interpreting research. While applying specific methods, the nature of the profession, context, theoretical orientations, and epistemology of the discipline need to be considered. Interpreting studies have been changing gradually since their

inception, and this change also brought about the shift in research paradigms and the methodologies used in interpreting research. In the beginning, the focus of the discipline was on the cognitive and psycholinguistic domains. Hence, the researchers mainly used the quantitative methods of the analysis. When interpreting became more situated, localized, and followed the socio-linguistic and sociological approaches, research practices became qualitative. Another point noted by Gile (2001) was that the earlier systems faced limitations, as the researchers were not trained in conducting interpreting research. Either they belonged to another discipline or consisted of professional interpreters with little academic background. However, in recent years, the conditions changed as the approaches have become more multidisciplinary, and most interpreters have a sound educational background. Recently, the field of interpreting research has used many research methodologies, including qualitative, quantitative, or combining both in mixed-method research. With more attention and awareness of the discipline, the methods also borrow from different disciplines and constitute the approach that suits the research objectives as interpreting has both components of theoretical and empirical research.

Moreover, in his book *Translator and Interpreter Education Research*, Abdel Latif (2020) explains that the flexibility of research approaches allows interpreting research to adopt different philosophies. These philosophies of research are often recognized as positivist and phenomenological approaches. The positivist approach generally aims to study a question from a detached, objective perspective, mainly using quantitative methods to collect data that can be analysed using descriptive and inferential statistics. The phenomenological approach is generally associated with qualitative methods, which aim at interpreting data subjectively and in-depth. It does not seek to represent a whole population, nor is it replicable by other researchers.

Similarly, the research paradigms were also used for both the qualitative and quantitative approaches. The hypothetico-deductive paradigm is utilized in most quantitative studies in which hypotheses are deduced from the existing theories based on previous research studies. Qualitative studies operate in an inductive paradigm, where more general questions elicit more complex answers that provide descriptions and interpretations of problems. New findings or theories will be induced from the data, according to Abdel Latif (2020).

The main strategies in quantitative studies include survey, experimental, and corpus-based research. Survey research is the most common quantitative research. However, interpreting

studies employ this research under the goals and objectives of the research. Some researchers may use non-randomized samples, while others may choose a few subjects. Most quantitative survey research was used in sign language interpretation, conference interpreting, and legal proceedings; experimental research was utilized in psychological and psycholinguistic paradigms of interpreting. Research in simultaneous interpreting has been using experimental methods, but with flexible designs, for instance, they could be one-time case studies and often without involving a control group. Sometimes, quasi-experiments are also used. Corpus-based research is also becoming prominent in interpreting studies using corpus linguistic methods. Approaches include searching for patterns through quantitative methods and validating or refuting analytical findings through ethnographic methods (Abdel Latif, 2020).

Furthermore, qualitative research in interpreting is mainly utilized when the social and cultural aspects are involved, and subjective observation of people's behavior is necessary. As it was mentioned that the discipline of interpreting has a broad scope encompassing many professional areas, the qualitative methods are widely used and modified per the specific professional area, community, and context. The general techniques of qualitative research include interviews and focus groups. The areas that utilize the qualitative methods include healthcare interpreting, legal interpreting, and sign language interpreting. The discourse analytic approach is used explicitly in dialogue interpreting research. The eclectic approach further scrutinizes discourse analysis, and the elements could include politeness, discourse markers, co-construction of meaning, register, and discourse management. Finally, desktop research is also used in the qualitative domain. This refers to collecting and analyzing biographical, demographic, and historical information through archives, databases, and other, often electronic, sources of documents. An example of a desktop approach is bibliometric research, which relies on the collection of papers and publication analysis over a specific period of time (Abdel Latif, 2020). In addition, mixed-method research using qualitative and quantitative aspects is also used extensively in interpreting research. Implementing the combination of this approach fulfills the purpose of a mixed-method approach. The prominent research design is the triangulation of research data where different methods are combined to analyze the same phenomenon from different perspectives.

Those interpreting research models aim to elaborate the way in which a complex process occurs in terms of components, sub-processes, or relations. They are helpful thinking tools in an ongoing research process, a teaching aid, or a blueprint for operational technology.

Interpreting is a complex mental process in which cognitive, linguistic, and social constraints interact variably depending on the type and situation of the mediated event and the intentions, competence, and dispositions of participants. In addition to interpreting researchers' own experimental and observational explorations, they have adopted principles and theories from social and cognitive sciences to explain the mental processes of SI.

As I mentioned in the introduction that during my teaching, recurring and common errors by my students caught my attention. Students' most frequent errors revolve around the rendition of numerical data, proper names, and abbreviations. I have investigated pedagogic techniques to help them avoid or at least minimize the error rate of these speech components. I have found several helpful resources, some of which were online forums and platforms where interpreter trainers discuss their personal teaching experiences and techniques that have worked successfully with them. However, one of the most beneficial resources I have come across that specifically addressed the issue my students were facing is the book by Andrew Gillies, *Conference Interpreting: A Complete Study Guide* (2013). His book introduces exercises and strategies for interpreting names, numbers, and abbreviations.

Therefore, I have applied the techniques explained in his book, and I have found that it did help my students to minimize error rate and frequency. The initial idea of my experimental studies emerged from a specific statement in the introduction of his book. Speaking of the exercises he proposes, he states, "in most cases, I make no judgment on the effectiveness of the exercises, on some of which interpreter trainers have strong and differing views. Empirical evidence on the subject is, however, almost non-existent." (p. 5). This statement has intrigued me, and from this, I have been motivated to carry out this experimental research to investigate the efficacy of the proposed strategy, which is the subskills approach in interpreter training that targets specific micro-skills of interpreting.

Hence, the methodological approach adopted for this research is quantitative-based action research. The reason for which I have specifically chosen this methodological approach for the experimental studies is that, according to research done by interpreting researchers, action research is not only one of the most effective research methodologies to examine teaching strategies and their efficacy on the learning experience of interpreting students, but also one of the most appropriate methodologies where the researcher is also the trainer, which is the case for this experimental research. The stages of this research are:

1. The emergence of the idea after noting recurring and frequent errors by interpreting students.
2. Setting the objectives of the research and forming the research questions.
3. Selecting the appropriate research methodology.
4. Designing the study.
5. Collecting the data.
6. Analysing the data.
7. Answering research questions and discussing the results.

2.2 Action Research

2.2.1 Definition and Background

McDonough and McDonough (1997) define action research as pursuing facts based on an initial idea through implementing an action plan followed by monitoring and revision. Kemmis and McTaggart (1988) also identify the fundamental constituents of action research, which involve (1) creating a plan for enhancement, (2) employing the plan, (3) analyzing the outcomes of the plan, and (4) reflecting on the outcomes to implement action. Similarly, Hatim (2013) explains action research in research methodology terms stating "Action is understood in the sense of the intention to bring about positive change. Action research is practice-driven, seeking solutions to problems within a practice–theory–practice cycle" (p. 296). In interpreter training, action research is defined by Burns and Westmacott (2018) as "an empirical process through which the teacher systematically observes and assesses the outcome of introducing a novel instructional treatment to students" (p. 14).

Action research was founded in the 1940s by Kurt Lewin, a social psychologist. It originated as "philosophical explorations into the relationship between knowledge acquisition and experience and the interrelation between knowledge and action" (Kemmis & McTaggart 1988). It has mainly two components: reflective practice and critical theory. The reflective practice of action research aims to enhance professional practice, while critical theory seeks to improve a particular system.

2.2.2 Phases of Action Research

The founder of action research, Kurt Lewin (1947), explains the phases of action research; these phases are observation of a problem, identification of the problem, developing an intervention scheme, and finally, assessing the effectiveness of the intended intervention and whether or not it served its purpose and has resulted with the desired outcome and resolved the

problem. As action research aims to explore the relationship between knowledge and experience through action, it would be the most efficient method to investigate what interpreter instructors believe to be accurate and eventually confirm or negate it. Through experience, instructors pick up on frequent errors their students make, and how they deal with this difficulty. This leads to a hypothesis that needs to be examined to understand the reasons behind these errors and how to resolve them.

The framework applied to my research is adapted from the framework suggested by Mills (2003), based initially on Kemmis and McTaggart's constituents of action research (1988). The framework adopts a deductive approach as it involves the implementation of strategic intervention, analyzing the results of the implementation, and assessing the outcomes through the following stages:

1. Identifying the problems and focus area.
2. Research questions or hypotheses.
3. Planning and designing the intervention approach.
4. Determining the timeline.
5. Selecting the participants.
6. Developing a data collection strategy.
7. Selection of data collection tools.

2.2.3 Action research in interpreting pedagogy

Action research is not only a well-established research methodology in psychology, but it has also played a prominent role in interpreting research and in interpreting pedagogy research in particular. In this regrads, Pöchhacker (2010) speaks of the potential of action research in interpreter training, stating that "action research with and by students, in collaboration with teachers and even on their instructional practices, may therefore hold particular promise for research on teaching and assessment in interpreter education" (p. 8).

Action research is not only a research methodological approach for the teaching of certain fields, but can also be applied for interpreter training as well. As Scott (1999) elaborates on the characteristics that make action research one of the most efficient research methodologies, particularly for pedagogical improvement:

1. On-going identification and investigation of interpreting practices requiring improvement or enhancement;

2. Development of interpreter practitioners' skills in problem identification and problem-solving;

3. Ensuring that results of inquiry get translated into interpreting practice;

4. Greater collaboration among interpreting practitioners, educators, and students;

5. It is developing strategies for change or innovation that consider or seek to influence the local interpreter's educational context (p. 119).

Pöchhacker (2016) explains that action research in interpreting has been mainly explicitly employed in interpreting pedagogy, stating:

> In interpreting studies, action research has been applied primarily in interpreter education and training. Projects range from large-scale curriculum evaluations and more focused projects on designing and implementing curricular innovation to evaluations of an intervention in the interpreting classroom. (p. 5)

Napier (2005) maintains that action research has been conducted in interpreter training, including broad aspects of interpreter education such as curriculum design, assessment, and development. It has also been applied to more specific aspects of training, such as assessment of classroom intervention according to Gorm Hansen & Shlesinger (2010) and Pierce & Napier (2010). However, most action research up to that point was based on observational case studies and not experimental research, as Pöchhacker (2016) explains

> These projects are all observational case studies for which data were collected using one or more of these methods: pre-/post-intervention surveys and interviews, learning journals, focus groups, and collection and analysis of learning tasks and assessments (p. 5).

In addition, Pöchhacker (2016) also discusses the significance of action research for pedagogical strategies in interpreting classrooms not only to fulfill the needs of interpreting students but also to help decision-makers in curriculum design and development, stating:

> If policy-makers envisage a role for professional interpreters, new training needs would suggest an acute demand for research, mainly in 'action research' by teachers on such issues as student selection and assessment as well as effective methods of instruction. (p. 217)

In terms of its effectiveness, action research has been proposed by many scholars and researchers to be one of the most efficient research methodological approaches to interpreter

pedagogy and interpreting teaching strategies. For instance, Schön (1995) maintains that educational entities should encourage action research and explains how it can be an effective research method that contributes to educational change as it emphasizes reflection in and on the action. Kember (2002) in Hale & Napier (2013) elaborates the benefits of action research, not only in the enhancement of teaching strategies but also in its impact on learners' progress, stating the purpose of action research as:

> (1) lasting improvements in teaching in terms of more profound understanding of teaching and willingness to employ more innovative teaching strategies, (2) a shift towards more student-centered teaching approaches and a better understanding of students' needs, (3) teachers' development of action research abilities and recognition of action research as a natural framework for the educational change process, (4) improved capacity and competence to reflect upon, and monitor quality of own teaching, (5) development of teamwork skills and (6) changing attitudes and development of valuable skills. (p. 187)

2.2.4 Selecting action research for the present study

As I have discussed earlier, while teaching SI, I have observed that most of my students have difficulty interpreting numerical data, proper names, and abbreviations. Hence, according to my observations over the years, I felt it would be worthwhile to investigate the root cause of these difficulties and introduce an approach that would help my students. Besides my observations, I have also discussed these issues with the students, who have confirmed that they do indeed find these speech components challenging. The research methodology selcted for this doctoral thesis is action research for its dual objective of both action and research undertaken by the interpreting instructor, i.e., myself. It has been chosen as it is the most relevant methodological approach for investigating pedagogical strategies, specifically research conducted by the instructors themselves as Pöchhacker (2016) states that action research aims to "improve professional practice at the local, or perhaps the classroom or community of practice level, within the capacities of individuals and the situations in which they are working" (p. 221).

Additionaly, action research goes beyond reaching findings; it also establishes an action plan based on the outcome of these findings and the conclusion of the research. This can be used as a means of pedagogical reform and curricular design that allows interpreting instructors to look beyond the overall performance of students and deeper into the mini aspects of interpreting that altogether contribute to learners' overall performance. It functions as a cycle of identifying a problematic area, executing an action plan to resolve it, investigating the effectiveness of the

strategy implemented in the action plan, and so on. Hatim (2013) explains that "the cycle ensures that research is participant-driven, reflective, collaborative and of the type which leads to change." (p. 25). In this respect, Ferrance (2000) maintains:

> Action research is not a library project where we learn more about a topic that interests us. It is not problem-solving in the sense of trying to discover what is wrong but a quest for knowledge about how to improve. Action research is not about doing research on or about people, or finding all available information on a topic looking for the correct answers. It involves people working to improve their skills, techniques, and strategies. Action research is not about learning why we do certain things, but rather how we can do things better. (p. 3)

It is of importance to emphasize that action research was specifically selected for this doctoral research because it pertains to the fact that I, myself, am the instructor and the researcher of the teaching approach being investigated. In this regard, Hatim (2013) distinguishes between research undertaken by scholars for the interpreting instructors as opposed to research undertaken by the instructors themselves and what it involves, maintaining:

> From the perspective of practice-driven action research, it is advocated that an appreciation of the problem, why it needs to be solved, and how it may best be solved can reverse the trend of treating practitioners as mere consumers of research. (p. 25)

Hatim (2013) also explains how some research on interpreter training only involves observing certain phenomena in the classroom and elaborates on how things are done in a certain way or what effects they impose rather than seeking solutions to target issues that need to be addressed, whether in the teaching of interpreting or the learning process of it. He states that

> Research in translation or interpreting and practical pursuits such as teaching these skills have been pulling in somewhat different directions. Research has generally been a matter of 'reflection', whereas activities such as teaching, translating or interpreting are taken to be the 'real action. (p. 25)

On a similar note, Burns and Westmacott (2018) also explain how action research particularly interests teachers seeking change and improvement in their teaching strategies, stating that "action research offers a form of systematic inquiry usually appealing to teachers as it enables a focus on areas of their own practice they consider worth investigating" (p. 16). Such research focuses not only on the aspect of teaching from an instructional viewpoint, but also on students' learning experience from the receiving end of the instructional process. Burns and Westmacott (2018) maintain that "this kind of research aims to affect students' learning and to deepen teachers' understanding of issues in their classrooms that may puzzle, problematic, or

intriguing" (p. 16). Thus, action research particularly interests trainers, such as myself, as it offers a more in-depth understanding of what approach should be selected, why it should be selected, and how to implement it effectively. It also enables trainers to examine the efficacy of a new approach and evaluate the results to explore ways to enhance students' learning processes.

Pöchhacker (2016) points out the importance of action research to be conducted particularly by interpreter trainers themselves and continuingly seek to explore training methodologies due to the constantly and rapidly changing needs of interpreting. In this respect, he states, "pedagogical innovations ought to come with a concerted effort at action research by interpreting teachers to assess needs and effects ongoing" (p. 218). Many trainers propose methods to solve particular problem areas in training that seem to work perfectly even though the proposed solutions might have never been tested or examined. Yet, unless action research is undertaken, there would be no way to investigate the efficacy of the proposed solutions, as Hatim explains, "solutions can never be definitive, but once action research is underway, the research cycle of practice–research–practice would have been set in motion" (p. 25). Thus, action research involves the theory or knowledge regarding its method and scope, and it transforms a belief of successful teaching strategies into investigated and research-based practice.

2.3 Description of the experimental study

As explained above on the difficulties my SI students faced in interpreting numerical data, names, and abbreviations, I have decided to conduct experimental research as part of my doctoral thesis to investigate the subskills training approach's impact on the interpreting of numerical data, names, and abbreviations. The research took place at the University where I work, Princess Nora University (PNU), Faculty of Languages and Translation, in Riyadh, Saudi Arabia. The pedagogical approach and instructional methodology employed is described in detail in chapter three of this thesis which is the Pedagogical Approach chapter. Through this approach, particular speech components are targeted in each training session. The research was conducted with two groups: an experimental group where the proposed approach was tested and a control group. In this section, I will discuss (1) research design and plan, (2) phases of the research, (3) teaching material, (4) participants selection and recruitment, (5)

instructional steps, (6) evaluation, (7) tools, (8) data collection and treatment, and (9) methodological approach.

2.3.1 Research Design and Plan

The purpose of the experimental study is to investigate the efficacy of the subskills approach in the teaching of simultaneous interpreting regarding numerical data, names, and abbreviations. To do so, a training course was delivered to the participants that were divided into two groups: an experimental group and a control group. The training course was identical for both groups with the exception that the subskills training approach was introduced to the experimental group in the form of 20-minute additional subskill exercises in each class.

2.3.1.1 Assessment Tests

Before commencement, all students were given an interpreting exam T1 (pre-test) to evaluate their overall performance and the accuracy rate of interpreting numerical data, names, and abbreviations. After completing the course, students were given another test, T2 (post-test), to evaluate their progress. To ensure comparability and uniformity between T1 and T2, names, abbreviations, and numerical data were distributed almost identically throughout both speeches and were inserted within the same proximity; a transcription of T1 and T2 of both experimental studies can be found in Appendices 1, 2, 3 and 4. During the interpreting training, both groups received the same speeches in class, and the experimental group received extra exercises and drills denser in numerical data, and names and abbreviations. Some of the execises include these speech items in isolation in the form of drills with lists of numbers and, names and abbreviations, sentences including these speech components (see Appendix 7 for examples). On the other hand, the control group received none of these targeted exercises nor drills and were only given the same speeches as the experimental group to interpret in class. The Pedagogical Approach (Chapter three) of the thesis presents a detailed description of the instructional methodology and the instructional material used.

2.3.1.2 Participant Selection and Recruitment

Participants were carefully selected to be equal in terms of variables to eliminate any

possibility of other variables interfering with the results and outcomes of the experimental study. The participants consist of females ranging in age between 20-22 years old who have completed their fourth year of the 5-year undergraduate Translation and Interpretation Program at PNU. All participants have received and successfully passed a consecutive course, and/or a sight interpreting course; each course was a part of their undergraduate degree program and lasted for one semester, equal to 12 weeks of training, each week comprising of 4 hours of class time. The participants were randomly allocated to both the control and experimental group; however, the students were assigned to both groups according to their performance in the pre-diagnostic translation test (Appendices 5 and 6) to ensure that both groups had a similar distribution of levels, so each group included almost the same ratio of low, mid, and high performing participants. It should be mentioned that having an all-female participant group was not a deliberate selection, but was because PNU is an all-female university.

An announcement has been made on the official Twitter account of the Faculty of Languages and Translation regarding participant recruitment for an experimental study. The University normally makes official announcements through the University's official Twitter account, as most students and faculty members at PNU follow the account on Twitter for news, announcements and updates. All details of the experimental study including, type of course (SI), dates, duration, hours, and location were included in the announcement. The participants interested sent me an e-mail with their transcripts in order to verify that all participants have received at leats one interpreting course previously. The course taught for the purpose of this dissertation, was a non-credit course. The participants received certificates of attendance and achievement of a non-credit SI course, upon the condition of attending at least 90% of the course hours. Around 450 participants from the faculty applied to participate in the experimental study; 122 were qualified and fit the criteria for selection. Around 40 participants were selected randomly out of the 122 participants to enroll in the experimental study. The number of participants selcted was mainly due interpreting laboratory capacity, and because it seemed to have been a reasonable and manageable number of participants for one researcher. Also, it was a sufficient number of participants to be able to seek a pattern of the investigation points and draw conclusions. There were two main selection criteria; the first is that participants to have a high command of both Standard Arabic and English which was demonstrated by the diagnostic test (Appendices 5 and 6), and the second criterion is that they have successfully passed at least one interpreting course as part of their undergraduate program.

A full description of the undergraduate program courses and prerequisites is discussed in Chapter three which is the Pedagogical Approach chapter of this thesis. The participants were given a diagnostic exam to test their linguistic competence level and translation quality before the undertaking of the experimental study to ensure that they are suitable candidates for the experimental study. It was also done for the distribution of participants in both groups so that none of the groups would include more high-achieving participants than the other group, so each group had an equal range of levels. The test was in the translation of two short articles, one from English to Arabic and the other from Arabic to English. The articles are available in Appendix 5 and 6.

2.3.1.3 Phases of the Experimental Study

2.3.1.3.1 The Pre-test

Before the commencement of the training course and introduction of the subskills approach to the experimental group, all students in the experimental and control groups were given an SI exam, pre-test (T1), to evaluate the accuracy rate of interpreting the areas of investigation, i.e., numerals, names, and abbreviation. The results were then compared to the post-test (T2) results. To ensure comparability and uniformity between T1 and T2, names, abbreviations, and numerical data were distributed almost identically throughout both speeches and were inserted within the same proximity and density within the speeches; a transcription of T1 and T2 can be found in Appendcies 1,2,3 and 4.

2.3.1.3.2 Groups and Participant Distribution

Participants were divided into an experimental group and a control group. Both groups received the exact same length, content, and duration in their training. The subskills approach was introduced to the experimental group in an additional exercise in each interpreting class. These exercises include the subskill they are trained for, interpreting names, acronyms, abbreviations, and numerical data. These additional exercises come in two forms; first, in a small speech segmented into sentences dense in names, abbreviations, or numerical data. The other includes exercises of these speech components in isolation with no surrounding text. Samples of these exercises are available in Appendix 7.

2.3.1.3.3 Post-test

After the completion of the SI experimental course, participants were given the pot-test (T2)

to evaluate their progress and investigate the efficacy of the subskills approach in the rendition of numerals, names, and abbreviations. To ensure comparability and uniformity between T1 and T2, the items under investigation were distributed almost identically throughout both speeches and were inserted within the same proximity and lexical density.

2.3.1.3.4 Data Analysis

The analysis of the data was first conducted on an individual level. This means that each participant was scored individually in both T1 and T2; for each individual participant I carried out a comparative analysis of accuracy rate, error rate, and error category frequency. After that a statistical analysis of the performance of the whole group and the average score of the overall performance of each group was condicted. After that, a comparative analysis of both groups was carried out to draw the conclusions and outcomes of the statistical analysis. Details of the analysis are further discussed in more detail in the Data Treatment and Analysis section of this chapter (2.3.5), and a full analysis of each experimental study is detailed in its respective chapter (Chapter four for the numerical data experimental study, and Chapter five for the names and abbreviations experimental study).

2.3.2 Instructional Steps

At the beginning of each week, participants were provided with the topics of the speeches they will interpret during the week, so they would have the chance to prepare before class. Students interpret around four speeches each class; each speech is of an average of 3 to 5 minutes—two speeches from English to Arabic and two speeches from Arabic to English. The interpreting and discussion of each speech lasts around 20-25 minutes. Each training session was designed as follows for both groups:

Step 1: Students are given a brief about the speech they will interpret. This brief includes the length of speech, difficulty level, speed, speaker's accent/dialect, type of speech (for example, news, lecture, interview, part of a conference), and any specialized terminology.

Step 2: Students interpret the speech; once they are done, and before listening to some interpretations, they are asked these questions to further understand them and their thought process during interpreting:

1. How was the speech in terms of difficulty?

2. How did you feel while interpreting?
3. Do you think you performed well in this interpreting?
4. What were the challenges you faced while interpreting?
5. What could you have done differently to perform better?
6. What suggestions do you feel could help overcome these difficulties?

Step 3: Before listening to the interpretations, participants are divided into three groups to provide peer feedback. Group 1 focuses only on the accuracy and completeness of the information. Group 2 focuses only on cohesiveness, cohesion, and delivery. Group three acts as pure clients, giving feedback on interpretation in general and whether they are satisfied with the interpreting in terms of message and overall performance. Students are also asked to write down the interpreter's strong points of their performance as well as points that the student could work on to perform better. This division helps students focus more on specific aspects of the interpreting and makes them more aware of the different components of an interpretation; it also helps them to pay more attention to specific details and not only listen to the interpreting in general. This also allows students to be more alert and aware of different dimensions of the interpreting process and product.

Step 4: After listening to the interpretations, the student comments on their performance, and the other students provide their peer feedback; after that, I provide feedback of my own as well as comment on other students' feedback. Then a class discussion follows regarding recommendations on how to improve the student's weak points and to focus on them consciously in these interpreting exercises, besides possible solutions to the difficulties encountered.

Step 5: For the experimental group only
All aspects of the training were applied identically for both groups. Besides the speeches given to both groups (available in the instructional material section of Chapter three, the pedagogocal approach), the experimental group was assigned additional exercises that focus on the subskill they are trained on; i.e., numerical data for the first experimental study, and names and abbreviations for the second. These training exercises come in two forms. The first type of exercises is in the form of short speeches segmented into sentences with high density of names, abbreviations, or numerals. The other type of exercises is in the form of drills: lists of names,

abbreviations, or numerals in isolation, meaning they are listed in isolation of any surrounding text or context. Samples of these exercises are available in Appendix 7.

2.3.3 Context and Training Tools

The experimental training courses took place at Princess Nora University in Riyadh Saudi Arabia in the College of Translation and Interpreting, English Department. All sessions were in the Simultaneous Interpreting laboratory, where each booth is set with an individual interpreting system (images of labs available in chapter three, the pedagogical appraoch). This lab contains 25 booths equipped with a SANAKO interpreting system. Each booth contains a set of interpreting headphones and microphones for the students and the instructor. Resources for the trainer include a desktop computer with the SANAKO software interpreting system, an internet connection, a video projector, and a drop-down screen in the lab. A voice recording device is optional for students who wish to practice at home and listen to their own interpretings.

2.3.4 Data Collection Tools

The results of the experimental study are based on the data collected from the renditions of participants. The quantitative results were extracted from the data analysis of the pre-test and post-test. The material used for the data collection and analysis were participants' recorded interpreting exercises of the speeches provided. The participants' output was not transcribed; instead, the original speeches were transcribed and printed. Then, one transcribed copy was printed for each participant and was used to document the accurate and inaccurate renditions. This means that each copy had the transcription of the original speech. While listening to each interpreting, I documented the participants' performance on the sheet with a pen and highlighted the items investigated such as numerical data, names, and abbreviations. Each item was marked to specify whether the interpreting was rendered correctly, incorrectly, or omitted. Incorrect renditions were noted for the analysis of the categorizations of errors discussed in detail in each individual experimental study. Samples of the assessment sheets are found in Appendix 9.

2.3.5 Data Treatment and Analysis

2.3.5.1 Quantitative Approach

As experiments are the most powerful method of determining a causal relationship, the findings of this dissertation are based on experimental studies where intervention on pedagogical approach is introduced to an experimental group, and the results are analyzed. Hale and Napier (2013) state that one of the most efficient methods to test effective interpreting pedagogical approaches is through empirical evidence-based research involving experimental and control groups. Pöchhacker (2016) states that one of the fundamental elements that could significantly contribute to the research on interpreter training is "student selection and performance assessment as well as teaching methods for developing the skills that make up the interpreter's core competence" (p. 191).

A quantitative approach has been specifically selected for the experimental research study to concretely identify and quantify the progress rate of each participant and the overall progress rate of both the experimental and control groups. This approach was used to determine the efficacy of the training approach under investigation, which is the subskills approach to interpreting numerical data, proper names, and abbreviations in the teaching of simultaneous interpreting. Through the quantitative analysis, a systematic assessment would give clear-cut objective results to examine whether the subskills approach succeeds in increasing the accuracy rate and investigate its potential to be an effective teaching tool.

As Pöchhacker (2004) elaborates:

> The traditional model of science, which largely shapes scientific methods and has also inspired research on Interpreting, is based on a deductive movement from theory to data: a research problem is defined within a particular theoretical framework and formulated as a hypothesis; by defining all relevant variables and specifying measurable (quantitative) indicators, the hypothesis is operationalized; using an appropriate methodological procedure, the hypothesis is tested against the data and either upheld or rejected, thus lending empirical support to the underlying theory or necessitating its modification. (p. 62)

The data was first analyzed individually for each participant; the scores of the pre-test and post-tests of each individual participant have undergone a comparative analysis of overall accuracy rate, error rate, accuracy and error rate according to the type of error, and so on. This is followed by a comparative analysis of both groups. A thorough analysis for each of the experimental studies conducted for this doctoral thesis is detailed in the data analysis section

of each study (chapter four for the numerical data experimental study and chapter five for the names and abbreviations study).

2.3.6 Interpreting of Numerical Data: Scoring system

The evaluation of the results through a quantitative approach aims to conclude whether the proposed subskills training approach employed in the training is effective and to what extent. To derive a statistical analysis of the accuracy and error rates between T1 and T2 speeches, the following evaluation key was adopted.

1 point if the number was rendered correctly

0.5 point if the main number of a decimal was rendered correctly

0 point if the number was incorrect, approximated, or omitted

The categorization of errors below is adopted from Braun and Clarici's (1996) model. This model was specifically selected to serve the outcomes measurement and the purpose of the analysis of my own experimental study. It has been edited and adapted to accommodate my research more efficiently. I have added three additional categories of errors which recurred often enough to be categorized in the data analysis. The three categories that I have added are the final three categories (h, i, and j). Errors are classified as follow:

a. Omission: the numeral is left out all together.

b. Approximation: the interpreted numeral maintains the correct order of magnitude but rounded up or down (example: almost/around 4.500.000 instead of 4.531.667).

c. Transposition error: the digits of the numerals are correct, and the order of magnitude is maintained, but the numeral digits are in the wrong order (example 863 instead of 683).

d. Inversion error: the interpreted numerals contain the same two digits or decimal but are inverted (for example 3.4 instead of 4.3, or 48 instead of 84).

e. Magnitude error: the number is of a wrong order of magnitude but contains the correct figures (example 22.000 instead of 220,000).

f. Phonological error: Errors that could be attributed to phonemically wrong perception of similar sounding figures (example: 50 instead of 15)

g. Whole <> Decimal error: the figures are correct but interpreted as a whole number instead of a decimal or vice versa (example: 4.8 instead of 48, or 48 instead of 4.8)

The 3 additional categories I have included in the adaptation of Braun and Clarici's (1996) model model:

h. Incomplete: the participant started to render the number but has not completed rendition (example: rendering 2019 as 20…. Ummmmmm…. OR two thousand and Ummmmm…. and moving along to the net statement without completing the numeral).

i. Language transfer error: the number is rendered correctly but in the same language as the source text.

j. Other or non-categorized: includes all other errors that do not belong to the previous types and whose cause is not apparent and cannot be classified under a particular category. Most of these errors are numerals rendered incorrectly with no obvious explanation; for example, a completely different rendition such as 53 instead of 62, or an inaudible numeral.

The accuracy and error analysis conducted on interpreting T1 and T2 mainly focused on:

a. The accuracy rate of total correct renditions.

b. The average rate of different types of error.

c. Which types of errors were the most frequent.

d. Whether certain numerals were likely to result in a particular type of error.

e. The progress rate for each participant in the total amount of correct renditions.

f. The progress rate for each participant in the errors.

g. The average error and accuracy of the experimental group and the control group of total renditions.

h. The average progress rate between the experimental group and control group in the total amount of correct renditions.

i. The average progress rate between the experimental group and control group in the errors.

2.4 Interpreting of Names and Abbreviations: Scoring system

The assessment of the results aims to investigate whether the proposed subskills training approach adopted was effective in the rendition of names and abbreviations, and, if so, to what extent in terms of accuracy rate, achievement, the progress of each individual, and the overall performance of the group.

The following evaluation key was implemented to calculate the scores to derive a statistical analysis of the accuracy/error rate between T1 and T2 speeches.

1 point if the name/abbreviation was rendered correctly

0.5 point if a compound name was correctly rendered partially

0 points if the name or abbreviation was rendered incorrectly or omitted

I developed the model below to categorize the errors for the names and abbreviations experimental study based on anticipated types of errors. Initially, there were only three expected error categories: omissions, incorrect rendition, and language transfer. However, during the data analysis process, I came across a few more recurring errors amongst different participants in both groups; these errors did not fit in the three anticipated categories, thus, I have added more categories to achieve a more in-depth and accurate analysis. Errors are classified:

a. Omission: the name/abbreviation is left out altogether.

b. Phonological: the rendered name/abbreviation is rendered but incorrect due to a phonological error, for example Catalina instead of Catarina, or Indonesia instead of Andalusia.

c. Incorrect: a name/abbreviation is rendered but is incorrect and not phonologically similar.

d. Non-existent: a name is rendered but does not exist, for example Cuadalera instead of Guadalajara.

e. Language transfer: the name is rendered as it is pronounced in the source speech for example Mexico instead of Almaxique.

f. Incomplete: the participant started to render the name/abbreviation but has not completed rendition.

Proper nouns in T1 and T2 are classified into these categories:

1. Proper names: names of people consisting of first and last name.
2. Location names: countries and cities.
3. Other: names of organizations and other entities.
4. Abbreviations: organizations and other entities in their abbreviated form.

The accuracy and error analysis conducted on interpreting T1 and T2 covers these points:

1. The accuracy rate of total correct renditions.
2. The average rate of different types of error.
3. Which types of errors were the most frequent.
4. Whether certain names/abbreviations were likely to result in a particular type of error.
5. The progress rate for each participant in the total amount of correct renditions.
6. The progress rate for each participant in the errors.
7. A comparison between the average rate of error and accuracy of the experimental group and the control group.
8. A comparison between the average progress rate between the experimental group and control group.
9. A comparison between the average progress rate between the experimental group and control group in the errors.

2.5 Challenges

As I have taught simultaneous interpreting at PNU for several years, I anticipated possible obstacles and was prepared to deal with them to avoid any impact to the experimental study, its objectives, and outcomes. Some of these obstacles did come up, and some unexpected obstacles also occurred. The expected obstacles included technical difficulties that only

occurred during the first week of the experimental study. After that, everything went smoothly. Another obstacle was the withdrawal of participants. As the experimental studies were conducted during the summer vacation, some participants withdrew due to travel, enrolling in other summer courses, or looking for summer jobs. Also, as some participants were final year students who had graduated the same summer in which the experimental study took place. It was also expected that some participants would withdraw due to available job opportunities during the experimental study. Six participants withdrew for different reasons.

2.6 Ethical Considerations

As with any experimental study involving human participation, consent must be obtained from each individual participating in the study and the institutions involved. Here, the institutions involved are The Autonomous University of Barcelona UAB, the institution where I am doing this doctoral thesis, and Princess Nourah University PNU, the institution where I work and where the experimental study has been conducted. The approval of UAB's Ethics Committee on Animal and Human Experimentation (CEEAH) was received on June 26, 2018 for my request (File# 3411). It was then forwarded to the Faculty of Languages and Translation in PNU for approval from their side. The participants of the experimental study have been given informed consent documents to sign prior to the participation in the study (consent form is available in Appendix 8).

3. PEDAGOGICAL APPROACH

This chapter covers the details of the pedagogical approach that has been applied in the simultaneous interpreting (SI) class created for the purpose of the experimental studies of this thesis. It has been adopted from the pedagogical approach that is used to teach the SI undergraduate course at Princess Nourah University (PNU) in Riyadh Saudi Arabia. As the experimental studies were conducted in the same SI labs of the actual course, the experiments can be considered to be a very close simulation of the SI course that is offered at the undergraduate level. This chapter covers a description of the course, objectives, prerequisites, framework within the undergraduate program, tools, expected learning outcomes, teaching material, assessment, and student and instructor profiles.

Table 1: SI Course information

Course Title:	Simultaneous Interpreting
Languages	Arabic <> English
Duration:	4 weeks - 3 days/week, 2 hours/day
Prerequisite	Consecutive Interpreting, Bilateral and Sight interpreting
College:	College of Languages, English Translation Department
Institution:	Princess Nourah University, Riyadh, Saudi Arabia

3.1 Course Description and Prerequisites

Simultaneous interpreting gives rigorous training to translation and interpreting students to develop and improve the necessary skills to perform SI tasks from English into Arabic and vice-versa. It requires exhaustive training that allows aquire, lear, and enhance the SI skills required to transform the speaker's ideas into the target language with the appropriate speed and accuracy. The trainees will learn essential skills and techniques of SI such as ear-voice-span control, output management, dealing with cultural differences, managing cognitive load, and compensation strategies. Students will be introduced to the terminology required for the fields in which they will be interpreting. The speeches they interpret in class are of varied topics and areas.

The students enrolled in this class are expected to have high command of spoken English and Standard Arabic and must have successfully passed Consecutive Interpreting and Sight and Bilateral Interpreting courses in addition to all translation courses

3.2 The Course's Framework in the Bachelor Program

Simultaneous interpreting is delivered in the first semester of the of the final year of the Bachelor program of Translation and Interpreting as shown in the diagram below. Students must have successfully completed one Consecutive Interpreting course and one Bilateral and Sight Interpreting course and all previous translation courses as a prerequisite to this course. For students to take this course, they must have acquired the skills relevant to interpreting such as those taught in the previous interpreting courses, and they must exhibit high linguistics competence in both English and Standard Arabic.

Table 2: Courses offered in semesters; 1,2,3 and 4 in the BA program of Translation and Interpreting in PNU

Semester 1	Semester 2	Semester 3	Semester 4
Course Name	Course Name	Course Name	Course Name
Listening and Speaking	Dictionary Skills	Translation Technology	Islamic Culture (2)
Reading and Writing	Advanced Listening and speaking	Specialized Translation En– Ar (1)	Language Skills
Introduction to Translation	Advanced Writing	Professional Writing	Introduction to Interpreting
Introduction à la langue Française	Grammar	Grammar in Use	Specialized Translation Ar – En (1)
Introduction to Literature	Principles of Mathematics	Principles of Information and Technology Systems	Morphology and Syntax
Arabic Composition	Islamic Culture (1)	College Elective Course (1)	College Elective Course (2)

Table 3: Courses offered in semesters; 5,6,7 and 1 in the BA program of Translation and Interpreting in PNU

Semester 1	Semester 2	Semester 3	Semester 4
Course Name	Course Name	Course Name	Course Name
Listening and Speaking	Dictionary Skills	Translation Technology	Islamic Culture (2)
Reading and Writing	Advanced Listening and speaking	Specialized Translation En– Ar (1)	Language Skills
Introduction to Translation	Advanced Writing	Professional Writing	Introduction to Interpreting
Introduction à la langue Française	Grammar	Grammar in Use	Specialized Translation Ar – En (1)
Introduction to Literature	Principles of Mathematics	Principles of Information and Technology Systems	Morphology and Syntax
Arabic Composition	Islamic Culture (1)	College Elective Course (1)	College Elective Course (2)

3.3 Tools

The teaching tools used in this course are of two types: tools used exclusively within the classroom and tools used outside the classroom. The tools used only within the classroom are as follows:

- SANAKO interpreting system
- A desktop computer for the teacher with internet connection
- A video projector and a drop-down screen
- Interpreting booths
- Interpreting headphones and microphones for students

Other tools required for students' use is a voice recording device to record, practice and listen to their own interpreting outside the classroom if they wish to do so.

Image 2: Interpreting Lab in PNU

Image 3: Trainer's Station in the Interpreting Lab

Image 4: Students' Interpreting System, Headset, and Microphone

3.4 Objectives and Learning Outcomes

The general objective and expected outcome of the course is to develop the students' communicative and interpreting skills in English and Standard Arabic. The course provides the students with the necessary and basic simultaneous interpreting skills/strategies that allow them to later develop their skills on their own.

As for the specific objectives of this course, by the end of the course, students are expected to achieve theoretical, linguistic, extralinguistic, interpreting, and cognitive objectives.

3.4.1 Theoretical Objectives

- Distinguish between the different types and modes of interpreting.
- Understand interpreting techniques required to develop in the course.

- Understand the struggles and difficulties faced during simultaneous interpreting.

3.4.2 Linguistic Objectives

- Improve listening comprehension of English speeches of medium difficulty.
- Enhance competence and fluency in English and Standard Arabic.
- Expand the oral expression in English and Standard Arabic.
- Expand the lexical knowledge in English and their translation in Arabic.

3.4.3 Extralinguistic Objectives

- Learn to identify the style features of different speeches and speakers.
- Identify the linguistic and extra-linguistic differences between Arabic and English Languages.
- Understand the importance of paralinguistic features (e.g., body language, fluency, voice and intonation) when delivering interpretations.
- Demonstrate critical thinking and interpersonal skills (public speaking skills, voice control, etc.)

3.4.4 Interpreting Objectives

- Improve interpreting skills with higher accuracy and speed.
- Acquire skills relevant to interpreting (e.g., anticipation, attentive listening, paraphrasing; working memory, chunking).
- Understand the methodological principles governing interpreting from and into English and Standard Arabic
- Acquire and integrate the skills and strategies of the interpreting process.
- Produce linguistically and para-linguistically accurate interpretations.
- Apply interpreting strategies to overcome interpreting problems.
- Use interpretation strategies effectively.

3.4.5 Cognitive Objectives

- Develop crisis management skills, input/output management.
- Demonstrate spontaneity in speech delivery.
- Ability to analyze texts professionally for interpretation purposes.
- Spot and approach interpretation problems professionally.
- Develop quick decision making during moments of stress, and use of compensation strategies.
- Demonstrate speech-analysis skills.

3.5 Teaching and Assessment

3.5.1 Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

The following table presents the expected outcomes of the course, teaching modes, and how these outcomes are assessed. In addition, it illustrates the skills and competences students are expected to gain from the course and how they are measured.

Table 4: Expected Learning Outcomes of the Course

<table>
<tr><th>Course Learning Outcomes</th><th>Teaching Mode</th><th>Assessment Methods</th></tr>
<tr><td colspan="3">Knowledge</td></tr>
<tr><td>Identify interpreting modes</td><td rowspan="2">Lectures
Individual, pair and group work
Class discussion</td><td rowspan="2">Discussion to determine if students can define interpreting modes. Ask students whether or not they could recognize and solve problems while interpreting.</td></tr>
<tr><td>Recognize interpreting problems</td></tr>
<tr><td colspan="3">Skills</td></tr>
<tr><td>Differentiate between interpreting genres, lexical, grammatical, syntactic, and cultural difficulties in interpretation due to differences between Arabic and English.</td><td rowspan="2">Lectures
Individual and pair work
Group work and discussion
Use of video assignments</td><td rowspan="2">Assessment through listening to students' interpretations, and providing peer-feedback and teacher feedback.
Most students can differentiate between</td></tr>
<tr><td>Discuss peer interpretations, justify their criticism, and suggest a better interpretation.</td></tr>
</table>

Course Learning Outcomes	Teaching Mode	Assessment Methods
		lexical, grammatical, syntactical and cultural differences in the business and medical fields. However, there are individual differences.
Competence		
Demonstrate the ability to interact in public speaking discourse and show responsibility in carrying out interpreting sessions.	Class assignments and recorded conferences.	Class participation and discussion.
Demonstrate their skills in making use of interpreting devices in this course (e.g. translation booth, relay machines).		

3.5.3 Course Plan, instructional material and alignment of learning objectives

This table explains the content of the classes, what topics are presented in each class, the types of activities and exercises given to the students.

Table 5: Course Syllabus

Session	Topic(s)	Activity	Alignment of Learning Objectives
1	**A.** Theoretical Background: ● Introduction to Simultaneous Interpreting. ● Principles of Simultaneous Interpreting and its historical background. ● Interpreting as a mental process. ● Simultaneous interpreting: definition & setting. **B.** Intra-lingual activities (same language): ● Paraphrasing ● Shadowing	- Lecture and class discussions - Paraphrasing & Shadowing exercises	Differentiating between the different types and modes of interpreting. 2- Understanding the theoretical components of SI. 3- Learning SI techniques and strategies.

2	Simultaneous interpreting Topics: Ethics and Professionalism in the Workplace	Students listen to different videos and interpret them simultaneously ▪ Professionalism, 1:12 mins https://www.youtube.com/watch?v=JcHFQHwPYHM ▪ The Do's & Don'ts in a Professional Workplace, 4:11 mins https://www.youtube.com/watch?v=Zex9hKT2XZI ▪ Ethics in the Workplace, 3:25 mins https://www.youtube.com/watch?v=0mUxMpMTT28 ▪ Professionalism at the Workplace, 1:36 mins https://www.youtube.com/watch?v=qkxQAnb_LNQ ▪ **الاحترافية الشخصية في العمل، ٣:١٩ دقيقة** https://www.youtube.com/watch?v=DhdQLC8frAQ ▪ **أخلاقيات العمل والمهنة، ٦:٥٠ دقيقة** https://www.youtube.com/watch?v=sFFvzXTGnjg * The experimental group is given one extra interpreting exercise each class. The exercise is around 15 minutes and focuses on names, acronyms and abbreviations. Sample exercises are found in Appendix 7.	1-Recognizing the challenges faced by simultaneous interpreting. 2- Improving interpreting skills 3- Learning new terminology.

3	Simultaneous interpreting: Topics: Professionalism and Codes of Conduct in the Workplace	Students listen to different videos and interpret them simultaneously ▪ Sample Code of Conduct Training Video, 2:38 mins https://www.youtube.com/watch?v=Bo5TXYaIeUM ▪ Professionalism in a Healthcare Organization, 5:20 mins https://www.youtube.com/watch?v=zegrMSEMFJo ▪ **فن التعامل في بيئة العمل، ٩:٤٥ دقيقة** https://www.youtube.com/watch?v=SzIHGXtGet8&feature=youtu.be	-Enhance competence and fluency in English and Standard Arabic. -Identify the linguistic and extra-linguistic differences between Arabic and English Languages. -Improve listening comprehension of English speeches of medium difficulty. -Produce linguistically and para-linguistically accurate interpretations.

4	Simultaneous interpreting: Topics: Entrepreneurship & Freelancing	Students listen to different videos and interpret them simultaneously ▪ How to be self-employed, 3:36 mins https://www.youtube.com/watch?v=fTSIB6np01M ▪ How to become an entrepreneur with no money, 6 mins https://www.youtube.com/watch?v=jg3-5e8OHCs&list=WL&index=231&t=77s ▪ **يسعد صباحك ـ ثقافة العمل الحر ـ أ. عبدالله الشلاحي، ١٢:٢٥ دقيقة** https://www.youtube.com/watch?v=nUdDQiSbIy0	-Application of skills learned in the first three sessions of the course. -Learning terminology and style associated with the field. -Expand the oral expression in English and Standard Arabic.
5	Simultaneous interpreting: Topics: Professionalism and Work Ethics	Students listen to different videos and interpret them simultaneously ▪ Why does professionalism matter? (medical professionalism), 3:28 mins https://www.youtube.com/watch?v=2PIplMOIINg ▪ Work Ethic Motivation - How to develop an insane work ethic, 5:49 mins https://www.youtube.com/watch?v=SzBj0CNP3pA ▪ **مفاهيم أخلاقيات العمل، ٩:١٧ دقيقة** https://www.youtube.com/watch?v=mmcThqMl-1A	-Expand the lexical knowledge in English and their translation in Arabic. -Learn to identify the style features of different speeches and speakers. -Use interpretation strategies effectively.

6	Simultaneous interpreting: Topics: Business management, Ethics, Entrepreneurship, & Freelancing	Students listen to different videos and interpret them simultaneously ▪ What is Entrepreneurship? 7:05 mins https://www.youtube.com/watch?v=Gs-xNwGzMvA&feature=youtu.be ▪ Ethics in the Workplace, 3:25 mins https://www.youtube.com/watch?v=0mUxMpMTT28 ▪ **الاستقلالية في احتراف الأعمال التجارية: ٦:١٤ دقيقة** https://www.youtube.com/watch?v=mjjAFZGAaH4&app=desktop ▪ **أيهما افضل، الوظيفة أم العمل الحر؟ ٣:٠٦ دقيقة** https://www.youtube.com/watch?v=LD1XZVUXdas&feature=youtu.be	-Improve interpreting skills with higher accuracy and speed. -Demonstrate spontaneity in speech delivery.
7	Simultaneous interpreting: Topics: Entrepreneurship, & Freelancing	Students listen to different videos and interpret them simultaneously ▪ The difference between freelancers and entrepreneurs, 3:20 mins https://www.youtube.com/watch?v=U41OdUXtZF8 ▪ How to be a successful entrepreneur, 6:54 mins https://www.youtube.com/watch?v=IhgEHTaVLiI&feature=youtu.be	-Understand the importance of paralinguistic features (e.g., body language, fluency, voice and intonation) when delivering interpretations. -Apply appropriate interpreting strategies to

		▪ هل انت جاهز للعمل الحر كمستقل؟ ٤:٠١ دقيقة https://www.youtube.com/watch?v=gXamlCHmUUk&feature=youtu.be ▪ ماهو العمل الحر، ٥:٢١ دقيقة https://www.youtube.com/watch?v=eVKjce3t7VY&feature=youtu.be	overcome interpreting problems.
8	Simultaneous interpreting Topics: Medical Errors	Students listen to different videos and interpret them simultaneously ▪ Tips for preventing medical errors and medication mistakes, 5:03 mins https://www.youtube.com/watch?v=i0Py5ifPMzE&t=26s ▪ Where Medical Errors Occur and How to Avoid Them, 2:40 mins https://www.youtube.com/watch?v=WkmfYZg4bnk&t=23s ▪ الاخطاء الطبية – د. وليد فتيحي، ١٦:٤٩ دقيقة https://www.youtube.com/watch?v=i3PN8V4-slU ▪ الأخطاء الطبية والمحاسبة، ٢:٢١ دقيقة https://www.youtube.com/watch?v=4J5XNpFIgbA&t=28s	- Learning terminology, register, and style of speeches and speech delivery of the fields covered in the course. - Understanding how to evaluate and give constructive criticism to peer interpreters in class. -Demonstrate critical thinking and interpersonal skills (public speaking skills, voice control, etc.) -Acquire and integrate the necessary skills and strategies of the interpreting process.
9	Organ Donation	Students listen to different videos and interpret them simultaneously	-To master the methodological principles

		▪ Myths About Organ Donation, 5:17 mins https://www.youtube.com/watch?v=Wiy7cUU24UI&t=176s ▪ What Kidney Donors Need to Know: Before, During and After Donation | Q&A with Dr. Fawaz Al Ammary, 4:54 mins https://www.youtube.com/watch?v=D0RxVf_AkMM ▪ اسباب للتبرع بالأعضاء بعد الوفاة، ٢:٥٨ دقيقة ٥ https://www.youtube.com/watch?v=rH320cipZV4	governing interpreting from and into English and Standard Arabic -Acquire skills relevant to interpreting (e.g., anticipation, attentive listening, paraphrasing, working memory, chunking).
10	Euthanasia	Students listen to different videos and interpret them simultaneously ▪ Do You Have The Right To Die? 3:16 mins https://www.youtube.com/watch?v=Y99J7fhSnnY&t=21s ▪ Euthanasia: Life In The Hands Of Others, 6:28 mins https://www.youtube.com/watch?v=ZEFRKYY_C7k&t=25s ▪ Euthanasia, Physician-assisted Suicide and Advance Care Directive – differences, 3:39 mins https://www.youtube.com/watch?v=1LNVzfJuQh0	-10 Develop crisis management skills, input/output management. -Ability to analyze texts professionally for interpretation purposes.
11	Abortion	Students listen to different videos and interpret them simultaneously	-Spot and approach interpretation problems professionally.

		▪ The Complications of Abortion, 1:49 mins https://www.youtube.com/watch?v=TCKP88Yzqvk ▪ How Dangerous Are Abortions For Women?, 4:06 https://www.youtube.com/watch?v=_IvGlAXa0wY ▪ What are the major side effects of Medical Abortion? 1:32 mins https://www.youtube.com/watch?v=TqU8nPLL3o0 ▪ Abortion or Baby: Before You Decide, 7:10 mins https://www.youtube.com/watch?v=xIJWnomS560&app=desktop	-Develop quick decision making during moments of stress, and use of compensation strategies. -Demonstrate speech-analysis skills.
12	Final Exam Topics Child Labor Unemployment	Students listen to different videos and interpret them simultaneously	

3.7 Other tasks

After each class, the students are asked to make a glossary of new or specialized terminology they learned either in class or during preparation. It is recommended that some individual effort takes place including memorizing new vocabulary and derivations of different parts of the speech, and how the new terminology is used within syntax. This allows the students to have a stronger internal resource of terminology when interpreting a new speech within the same field. Different techniques are suggested for the retention of new terminology to help students with the memorization and internalization processes such as the re-listening to the speeches interpreted in class by paying attention to the lexical aspect of the text and writing down terminology, writing sentences in both languages to understand them in context, and creating glossaries. Even though memorization of new vocabulary might be a daunting task for students, they seem to eventually appreciate it, as they see its benefits when interpreting other speeches of the same field.

3.8 Instructional Methodology

Students are provided with the topics of the speeches they will interpret during the week ahead of time so they have the chance to prepare before class. Students interpret two to four speeches during each class; each speech has a duration of three to five minutes. The interpreting and discussion of each speech lasts around 20-25 minutes as explained in the following steps:

Step 1: The students are given an oral description of the speech they will interpret. This description includes the length of the speech, the difficulty level, the speed, the speaker's accent/dialect, the type of speech (for example, news, lecture, interview, part of conference), and any difficult or specialized terminology.

Step 2: All the students interpret the speech at the same time, each student has her own set of headphones and microphone, and, once they are done, and before listening to some interpretations, the teacher asks these questions:

1. How was the speech in terms of difficulty?
2. How did you feel while interpreting?
3. Do you think you performed well in this interpreting?
4. What were the difficulties you faced while interpreting?

5. What could you have done differently to perform better?
6. What suggestions do you feel could help overcome these difficulties?

Step 3: Before listening to the speech, the students are divided into three groups to provide peer-feedback. Group one focuses only on accuracy and completeness of information. Group two focuses only on cohesiveness, cohesion, and delivery. Group three acts as a group of pure clients, giving feedback on the entire interpretation and whether they are satisfied with the interpreting in terms of the message and overall performance. Students are also asked to write down the what they believe are the student's strengths and weaknesses. This division helps student focus more on specific aspects and particular points to avoid providing general feedback.

Step 4: The teacher asks students willing to volunteer for the group to listen to their interpretations; if no student volunteers, the selection is made randomly, and we listen to the interpreting. This is done so students do not feel anxious while interpreting. This seems to make students comfortable in class, yet not too comfortable, as they know that they might be selected at random.

Step 5: The teacher asks the student whose recording is selected to write down her strong skills and weak skills, and how she believes she could improve.

Step 6: After listening to the speech, the student comments on their own performance, and the other students provide their peer-feedback; after that, the teacher provides feedback. Then, a class discussion follows regarding recommendations on how to improve the weak points of the student and to focus on them consciously in these interpreting exercises and possible solutions to the difficulties encountered.

3.9 Points of Discussion

The points of discussion enable students to anticipate what will happen in the interpreting phase and learn how to identify and verbalize interpreting problems, while applying problem-solving strategies and decision-making skills.

3.9.1 Discussion Aspects

- Understand students' difficulties

- Discuss problematic areas
- Help students manage and deal with difficulties while interpreting
- Help students learn effective interpreting strategies to overcome problematic areas
- Provide feedback and suggestions to help improve these problematic areas
- Help students to get over any fear of interpreting or hesitation during interpreting
- Help students gain more confidence during interpreting
- Help students be aware of problematic areas through teacher's feedback and peer-feedback
- For students to build a strong foundation of vocabulary is specific fields mainly business management and medical terminology.
- For students to learn how to build their own glossaries in the respective fields chosen for the interpreted speeches.
- Help students overcome the challenges they face through presenting possible solutions that they can experiment with as in the following table:

Table 6: Interpreting Difficulties and Proposed Solution

Difficulties	Possible solutions
Lack of textual cohesion	Add connectors, rearrange ideas
Speaker seems improvising, distracted, or goes out of topic	Keep message concise
Speaker keeps repeating the same idea over and over again	Paraphrasing the same idea
Speaker speaks in an unfamiliar accent	Prepare by listening to the same speaker, and other speakers of the same accent
Speaker is too fast	Deliver main idea and keep message concise, be conscious selective with what to leave out, control output

Speaker is too slow	Fill in pauses with synonyms, control intonation of delivery, manage output
New or unfamiliar terminology	Replace with a generic term instead of omission, guessing meaning from context, create glossaries, preparing before the speech
Complexity in expressing ideas	Listen to parallel speeches
Comprehension difficulties	Anticipation strategies, preparing before the speech through extensive reading on the subject.

3.10 Selection of Teaching Material (speeches):

- All speeches used in the classroom are videos available on YouTube.
- Speeches selected initially are relatively easy in terms of content, speed, and syntactic complexity. Speeches, then, gradually increase in difficulty according to students' performance level.
- Speeches selected are within the same subject area for students to focus on their interpreting skills rather than the content and information, which also helps with memorizing new lexical items and specialized terminology, giving the students the chance to build specialized glossaries.

3.11 Evaluation

In this course, the evaluation process is primarily based on the continuous assessment of the learners' outcomes and their acquisition of the interpreting skills and subskills.

First, an initial analytical diagnostic evaluation is carried out in the form of an interpreting exam from English into Arabic and vice versa. This is to determine the students' interpreting skills and linguistic competence before the commencement of the course. This is an important

step to measure the students' progress throughout and at the end of the course through a comparative analysis of the outcomes in the interpreting exams at the beginning and end of the course.

Then, the teacher performs an assessment of the student's performance in interpreting the speeches in class. The continuous assessment is a formative tool that aims to reveal the skills students have achieved up to that point. This enables the teacher to identify the students' learning needs and adjust the pace of the course according to the students' performance. In addition, other students provide peer feedback during the class discussion. This allows both the peer feedback provider and the recipient to reflect on their own performance, learning process, and outcome. Reflection also helps the students realize their responsibility in their learning process and progress.

Finally, a summative evaluation is carried out at the end of the course in the form of an interpreting exam from and into both English and Arabic. This is implemented to examine whether the students' have successfully acquired the skills and expected outcomes that the course targets.

3.11.1 Evaluation Process

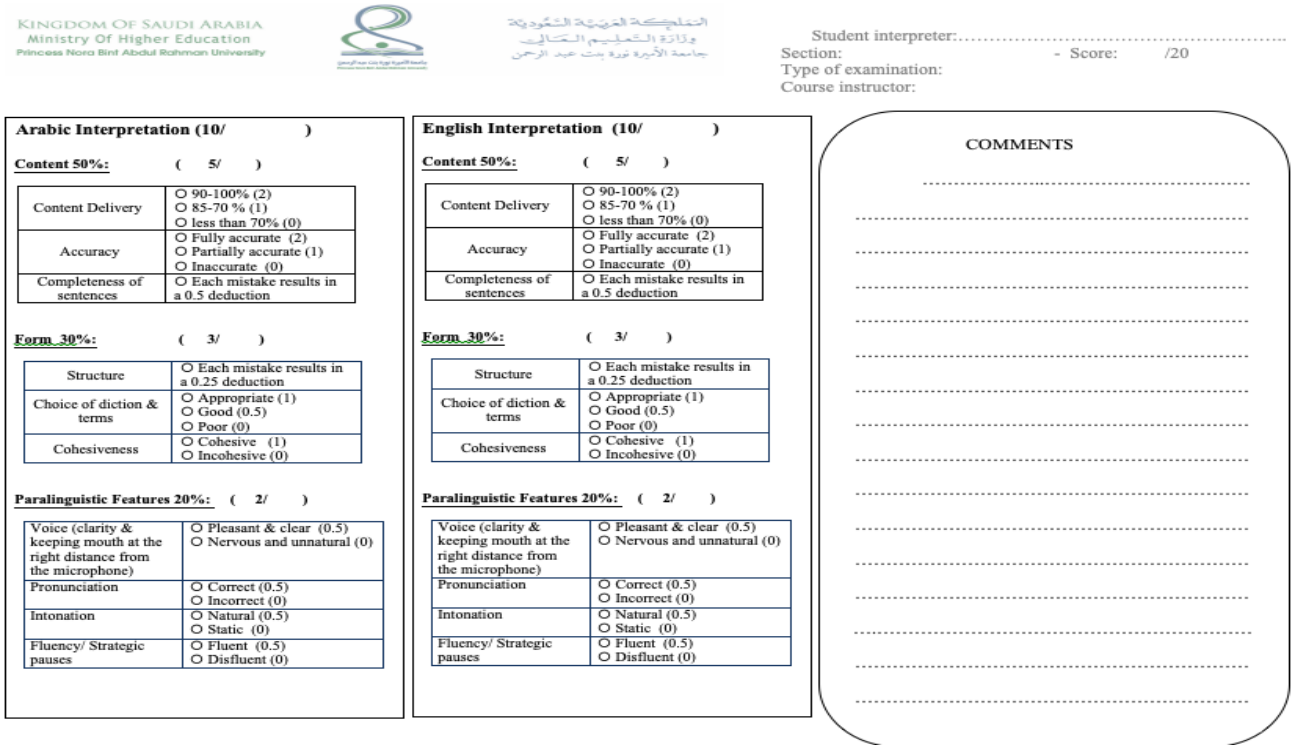
The table below demonstrates the evaluation process adapted for this course, which starts with the analytical diagnostic exam on the first day of the course, then the formative evaluation, and finally the summative evaluation exam at the end of the course.

Table 7: Evaluation Process

Session	Instrument of Assessment	Description
Session 1 (Diagnostic Evaluation)	Analytic diagnostic interpreting exam	This exam aims to determine students interpreting skills and linguistic competence relevant to interpreting. The exam includes two 3-minute speeches one in English and one in Arabic.
Sessions 2-11 (Summative Evaluation)	Evaluation of students' performance in interpreting speeches given in class	After students interpret speeches in class, the teacher listens to different interpretations of students (2-3 students per speech) The selected students analyze their performance as a part of the self-reflection process, then feedback is provided by the teacher, and other students. This is followed by a class discussion that points out difficulties students face and possible ways and suggestions to overcome them in future interpreting.
Session 12 (Summative Evaluation)	Final interpreting exam	The exam includes two 5-minute speeches one in English and one in Arabic. The exam resembles that of the analytical diagnostic exam given initially.

3.11.2 Evaluation Rubric

This is the evaluation rubric used in the assessment of SI mid-term and final interpreting exams for undergraduate students in the Translation and Interpreting Program at PNU. The rubric was designed by the course coordinator collectively with the instructors of the course.



KINGDOM OF SAUDI ARABIA
Ministry Of Higher Education
Princess Nora Bint Abdul Rahman University

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الأميرة نورة بنت عبد الرحمن

Student interpreter:.....
Section: - Score: /20
Type of examination:
Course instructor:

Arabic Interpretation (10/)

Content 50%: (5/)

Content Delivery	O 90-100% (2) O 85-70 % (1) O less than 70% (0)
Accuracy	O Fully accurate (2) O Partially accurate (1) O Inaccurate (0)
Completeness of sentences	O Each mistake results in a 0.5 deduction

Form 30%: (3/)

Structure	O Each mistake results in a 0.25 deduction
Choice of diction & terms	O Appropriate (1) O Good (0.5) O Poor (0)
Cohesiveness	O Cohesive (1) O Incohesive (0)

Paralinguistic Features 20%: (2/)

Voice (clarity & keeping mouth at the right distance from the microphone)	O Pleasant & clear (0.5) O Nervous and unnatural (0)
Pronunciation	O Correct (0.5) O Incorrect (0)
Intonation	O Natural (0.5) O Static (0)
Fluency/ Strategic pauses	O Fluent (0.5) O Disfluent (0)

English Interpretation (10/)

Content 50%: (5/)

Content Delivery	O 90-100% (2) O 85-70 % (1) O less than 70% (0)
Accuracy	O Fully accurate (2) O Partially accurate (1) O Inaccurate (0)
Completeness of sentences	O Each mistake results in a 0.5 deduction

Form 30%: (3/)

Structure	O Each mistake results in a 0.25 deduction
Choice of diction & terms	O Appropriate (1) O Good (0.5) O Poor (0)
Cohesiveness	O Cohesive (1) O Incohesive (0)

Paralinguistic Features 20%: (2/)

Voice (clarity & keeping mouth at the right distance from the microphone)	O Pleasant & clear (0.5) O Nervous and unnatural (0)
Pronunciation	O Correct (0.5) O Incorrect (0)
Intonation	O Natural (0.5) O Static (0)
Fluency/ Strategic pauses	O Fluent (0.5) O Disfluent (0)

COMMENTS

Image 1: Evaluation Rubric of SI Exams in PNU

3.12 Interpersonal and Environmental Factors

3.12.1 Student Profile

Even though it is assumed that the students in this course have acquired relevant interpreting skills such as those taught in Consecutive and Sight Interpreting, since these two courses are a prerequisite to this course, students have varied profiles. This occurs because some students may have passed the previous interpreting courses with low grades, meaning the student may have only retained 60% of the information. This can result in many pedagogical challenges for the teacher. The variation in student profiles can be evident in different aspects.

First, student profiles can vary from a linguistic perspective; this can be seen in both their B language (i.e., English) or even their mother tongue (i.e., Arabic), since interpreting into Arabic requires students to use Standard Arabic, which is significantly different and much more complex than colloquial Arabic used in day-to-day life. Regardless of whether the students have completed and passed all their English language and the prerequisite interpreting and translation courses, the fact remains there are always several students who passed the previous courses with low grades. This results in an imbalance of linguistic competence and interpreting skills in the group of students in the same class.

3.12.2 Instructor Profile

The teacher of this course must have a high command of linguistic competence in both English and Standard Arabic and can teach, correct, and evaluate the interpreting from and to English and Arabic. It is also a requirement that the teacher has a graduate degree in interpreting.

3.12.3 Classroom Environment

The classroom environment should be a place where both teachers and students feel physically and emotionally comfortable. Since simultaneous interpreting involves a high degree of psychological aspects such as stress and anxiety, it is important to consider that students need to feel they are learning in a comfortable zone. Thus, how the teacher deals with the emotional strain that comes with learning simultaneous interpreting can sometimes be more important than structured teaching methodology. In this regard, it is important to emphasize that creating this safe classroom environment is not generated spontaneously; it requires much effort and active involvement from the teacher. Thus, it is recommended to establish good

communication between teachers and students. It is also important to emphasize the teacher's role to stimulate students' interest in simultaneous interpreting through encouraging them to openly discuss their thoughts and thought processes during interpreting and allowing them to express themselves and feel at ease to freely participate in class discussion.

3.13 The Experimental Group

As explained previously, this course was delivered to both the experimental and control group. All aspects of this course were precisely applied to the experimental group with all its details. Besides the exercises given to the control group in the course plan above, the experimental group was also given additional exercises that focuses on interpreting names, acronyms, and abbreviations in a speech dense in names, acronyms, and abbreviations. Sample speech exercises are available in Appendix 7.

3.13.1 Objectives Specific for the Experimental Group

- To interpret numerical data, names, and abbreviations more rapidly and with higher accuracy, precision, and minimal error.
- To achieve a level of internalization when interpreting numerical data, names, and abbreviations.
- To manage the interpreting of abbreviations that are non-existent in Arabic, and that are used in their full form.

3.13.2 Instructional Methodology

The experimental group is given one extra exercise in each class. The exercise lasts around 15 minutes and focuses only on numerical data, names, and abbreviations.

Step 1: The students are given a description of the speech they will interpret. This description includes the length of the speech, difficulty level, speed, the speaker's accent/dialect, type of speech (for example, news, lecture, interview, part of conference), and any difficult or specialized terminology.

Step 2: The students are specifically instructed to pay extra attention to interpreting names, acronyms, and abbreviations.

Step 3: The students interpret a speech that includes several names, numbers, and abbreviations.

Step 4: After the students' interpreting, the teacher reads the names, acronyms, and abbreviations to the students again and asks the students to write down the items they remember (or think) they interpreted correctly.

Step 5: Each student exchanges their recording with another student and they listen to each other's interpreting while checking the accuracy of items interpreted by the other student and comparing it to what that student has written in the previous step.

Step 6: The teacher asks students to share their results, i.e. accuracy, error rate, and what they believe/remember they interpret compared to what they actually interpreted.

Step 7: The teacher addresses specific difficulties encountered by the students and in a class discussion and attempts to understand the reasons for the errors and possible ways to solve them.

3.13.3 Instructional Material

The material used for the subskills training of the experimental group were in the form of drills including only the targeted subskill in isolation, for instance drills of only names or numerical data, the targeted subskill in context, i.e., sentences dense in the targeted subskill, and full speeches dense in the targeted subskill. All exercises were read to the students by myself as it was difficult to find recorded material that includes the subskill to be trained. The speeches selected are originally articles that were edited to be suitable for the purpose of testing the subskill to be trained. All speeches are available in Appendices 1, 2, 3, and 4.

4. EXPERIMENTAL STUDY 1: THE EFFECTIVENESS OF THE SUBSKILLS TRAINING APPROACH IN THE INTERPRETING OF NUMERICAL DATA

In this chapter, I present the first experimental study which examines the efficacy of the subskills approach in the teaching of numerals in SI from English into Arabic. First, I review the literature relevent to numerical data as problem triggers for interpreters. Then, I explain numerical cognition in the human mind and how numbers are processed differently than words and ideas. After that, I elaborate on the differences between the Arabic and Englisg numerical system. And finally, I present the details of the experimental study and the statistical analysis of the results in terms of error and accuracy rates as well ass error categorization.

4.1 Introduction

This chapter is divided into two main sections: A theoretical part and an experimental study.

4.1.1 Objectives of the Theoretical Background

The theoretical part aims to explain and clarify

1. how numerical data is represented and processed in the human mind.
2. how the representation of numerical data in the mind differs from the representation of words and ideas.
3. how the perception of numerical data in the mind differs from one languages to another
4. the reasons for which numerical data is considered one of the speech components prone to a high rate of error and inaccuracy.

4.1.2 Objectives of this Experimental Study

The experimental study aims to

1. investigate the efficacy of number training through a targeted subskills training approach in simultaneous interpreting.
2. examine the most common errors.
3. analyse why certain types of errors are attributed to particular languages.
4. recommend potential solutions to help improve students' performance when interpreting with numbers.

Several studies involving the simultaneous interpreting (SI) of numerical data -also referred to in this thesis as numerals or numbers- emphasized the difficulties that numbers pose on

interpreting and how they could affect the quality of the output (Moser-Mercer, 1985; Lederer, 1982; Gile, 1985). Experimental studies that have investigated the interpretation of numerals show that "numbers and their context are reproduced with limited accuracy in simultaneous interpreting" (Pöchhacker, 2015, p.287). Similarly, Mead (2005) maintains that numbers in speeches are particularly subject to inaccuracy, errors, omission, and incompleteness in SI. Jones (2002, p.117) explains that numbers in SI are complex due to their distinct elements that need to be transferred accurately by the interpreter. These elements include

a. The arithmetic value.
b. The order of magnitude (e.g. million vs. billion).
c. The unit (e.g. currency).
d. the extralinguistic element that the number refers to
and (e) the relative value of a number (e.g. increase vs. decrease).

From a psycholinguistic perspective, such difficulty interpreters face could also be attributed to numbers being speech components characterized by low predictability (Braun & Clarici, 1996); this entails that interpreters cannot infer the meaning of numerical data from the context, which does not give interpreters the chance to apply certain coping strategies such as reconstruction of ideas from the context. Numbers are also considered low-redundancy units of speech (Gile, 1995), so speakers usually utter each numeral once during the speech, which does not allow interpreters to apply the anticipation strategy or compensate loss of information through reformulation later in the interpreting. Numbers are also regarded as high informative content, as they convey specific meanings essential to the comprehension of the speech (Alessandrini, 1990; Mazza, 2001). In this regards, Jones (2002) states that numbers "can be crucial pieces of information where no error is permissible. Numbers have an objective meaning and are not open to linguistic interpretation" (p. 117). Because a numeric value refers to its corresponding number, it is, therefore, "neither intrinsically associated with other extra linguistic referents, nor predictable from context" (Pöchhacker, 2015, p.286). Numbers are characterized by the lack of semantic content (Pinochi, 2009), which requires a shift between intelligent hearing modality to literal hearing modality. This shift between the two hearing modalities also requires the shift from sense-to-sense interpreting to word-for-word interpreting.

4.2 Conceptual Framework: Gile's Effort Models and Gile's Tightrope Hypothesis

Gile's Effort Models (Gile, 1995, p.169) have been adopted as the conceptual framework for this study. Gile's Models were selected as they represent and explain the relationship between the cause (of difficulty in interpreting numbers) and the effect (high error rate). The models refer to the following four main cognitive efforts that take place during simultaneous interpreting:

1. The Listening and Analysis Effort which includes all conscious and subconscious comprehension-related operations from the moment the utterance is heard by the interpreter until the utterance is analysed and the meaning is formed.
2. The Memory Effort which is a storage mechanism for incoming input temporarily retained before further processing resumes.
3. The Production Effort where the interpreter renders the speaker's message into the target language.
4. The Coordination Effort where the interpreter manages the output through self-monitoring while balancing the attention between all efforts and distributing focus according to her or his needs at that specific time.

The Effort Model is based on the notion that there is a limited capacity in which the mind can operate, and the challenges that occur during interpreting are due to the time restriction posed in SI and the need to distribute one's attention between many mental activities occurring simultaneously (Gile, 1995, p.91). Thus, this model can be a pedagogical instrument to explain the reasons for which interpreting numerical data could be a challenging task and why there is high rate and frequency of errors with numbers.

According to the Efforts Model, errors occur due to a cognitive overload triggered by an "increase in processing capacity requirements and any instance of mismanagement of cognitive resources by the interpreter" (Gile, 1999, p.159). In such case, some efforts are not receiving the required volume of mental activities, which could eventually result in errors. Since numerical data is a prominent area of error in SI due to their low redundancy (Gile, 1984, 1995, 1999), listening and memory efforts are increased, as it is important not to miss or forget the uttered numbers, since they cannot be inferred or anticipated from the text. Furthermore, Petite states that, while observing interpreters' performance, some have observed that "figures and dates appear to lead to capacity overload" (2005, p.38).

Considering Gile's Tightrope Hypothesis of the Effort Models (1999, 2008), numeric values are considered major speech components that increase cognitive pressure, resulting in error for simultaneous interpreters and interpreters in general. In this regard, Gile (2008) states:

> Simultaneous interpreters are vulnerable to conditions where total processing capacity requirements are high, be it for a whole speech or for a speech segment. Such conditions may occur when speeches are dense, fast, spoken with an accent or a type of logic with which the interpreter is not familiar, when they contain multi-word names or unfamiliar names, numbers, enumerations etc. When such conditions occur, they may cause overall saturation or saturation in one of the Efforts; this may result in errors, omissions or losing linguistic and/or delivery quality in the target speech. Simultaneous interpreters are also vulnerable to errors in processing capacity management, i.e. sub-optimal distribution of attention between the Listening Effort, the Memory Effort and the Production Effort. Such errors can also produce loss of interpreting quality. (p. 60)

Low-redundancy speech components, such as numbers, are problem triggers for interpreters. In this respect, Gile (1999) states:

> Based on the Effort Models, some further theoretization was possible. First, the existence of 'problem triggers' was hypothesized, in particular speech segments or tasks requiring heightened attentional resources. The assumption was that if interpreters work near saturation level, even limited additional attentional requirements could lead to failure. Another hypothesis was that speech segments with low redundancy were also problem triggers, since they had low tolerance of attentional lapses such as might occur because of attentional mismanagement. In a simple interpretation task, Gile (1984) found there was a high rate of failure in rendering proper names. (p.157)

According to Gile's Effort Models and Tightrope Hypothesis, interpreters must devote much of their processing capacity to deliver accurate components. This causes an overload in the cognitive resources required for managing the output while interpreting, which might disrupt the production of numeric values and other speech elements. Since numbers are non-predictable elements (Mead, 2005; Pöchhacker, 2015), it is almost impossible for interpreters to anticipate them or use top-down analytical processing where context gives little indication to the numbers in the speech.

4.3 Working Memory in Simultaneous Interpreting

Short-term memory (STM) involves highly complex cognitive activities: encoding, storage, and retrieval of speech items within 15 to 30 seconds (Atkinson, 1999). According to Hopper (2010), unlike our long-term memory (LTM), STM does not create neural mechanisms for information needed for longer periods of time, and therefore, can only retain and recall information for a short period, whereas the LTM creates neural routes for information that

could be stored from a few minutes to many years. In simultaneous interpreting, STM carries out many more cognitive activities such as reasoning, analysis, and calculation, which makes it act as a working memory (WM). According to Baddeley, the working memory is "the temporary storage of information being processed" (1987, p.34). In SI, WM retains incoming information and keeps it active while it is being processed and monitors the outgoing information as it is transferred into another language. WM is the part of the cognitive process mainly responsible for the complex linguistic tasks and the planning and organization of ideas (Baddeley, 1987; Miller 1958). Nonetheless, research on memory has proven that WM has a limited memory span, so the capacity of the WM is limited when it comes to the number of items it can store at one given time, and exceeding the memory's threshold may result in incorrect recall or loss of data. Moreover, Ellis (1992) explains that the memory span for digits differs from one language to another; this occurs due to differences in the length of the expression of the same numeral between languages. The longer the expression of a numeral, the more time it requires to be mentally processed, and the more the memory span is reduced. As elaborated by Brown and Hulme (1992), a reduced memory span for digits has been noticed in bilingual individuals who have learned a foreign language at a later age.

As elaborated by Setton and Dawrant (2016), according to the Interpretive Theory or *théorie du sens*, there are two types of memory: conceptual memory is responsible for interpretation of meaningful ideas within a context, and immediate memory is responsible for the process of transcoding items such as names and numbers. According to the theory, the interpreter must switch from interpretation to transcoding as necessary, while the interpretive process should remain dominant. Otherwise, the output could be literal, resulting in awkward expressions and incoherent or inaccurate renditions.

Numeral data are a particular area of error in SI due to their low redundancy. Mead (2005, p.69) states that "these sources of difficulty in processing spoken (or signed) numerals are compounded by their lack of redundancy, because of which their accurate comprehension and storage in memory requires much attention".This means that the listening and memory efforts are increased, as it is important not to miss or forget the uttered numbers since they cannot be inferred from the text (Gile, 1995, p.108). An increase in listening and memory efforts causes a reduced production effort resulting in an imbalance of efforts. Information retention in the short memory and extracting this information correctly and accurately is a crucial phase of interpreting. Gile (1992) explains that the Effort Models help interpreters understand the

sources of difficulty in interpreting to select the appropriate strategies to deal with them. It is worthwhile to consider the impact of memory training for the improvement of SI in general and SI of numbers. There are many memory improvement exercises available online developed by psychologists and linguists. In his book, Conference Interpreting: A Student's Practice Book (2013), Gillies suggests several memory/recall exercises that aim to improve interpreters' memory, which can be used by interpreters themselves to train their memory by trainers in the classroom to train students.

4.4 Numerical Cognition

As defined by Sella et. Al (2018, p.2), "Numerical Cognition describes the processes that one uses to assimilate, ascribe and manipulate numerical information". It is important to point out the distinction between the two terms "numbers" and "numerals." According to Hurford (1987), numbers are arithmetical units, while numerals are the names that refer to the numbers. Neuroscience research suggests that how numbers are represented in our brains differs from their lexical expression (Miceli, 1990). Sella et al (2018, p.40) states that "Numerical information is compartmentalized, and distinct domains exist at the neurocognitive level". In addition, numbers are processed as mathematical units rather than linguistic entities (Gran, 1989). According to McCloskey et al. (1986), during number comprehension, digits or number-words are processed, allowing the production of a mental representation of the number. During number production, the process starts with this mental representation then is transformed into the corresponding series of number-words or digits. Therefore, such inconsistencies between the neural representation of numbers and their lexical expression can create a challenge for interpreters.

According to Gelman & Butterworth (2005), numbers and ideas are processed by different parts of the brain. The brain's parietal lobes are responsible for humans' numerical cognition, whereas our conceptual knowledge is supported by the inferolateral temporal lobes. Cohen et al. (1994) explain that numbers are dissociated from other categories of concepts at the surface level and the semantic level, so the representation of numbers differs from that of other concepts and ideas in the human mind. "Research on numbers as a type of proposition suggests that numerical data can be treated as a distinct form of representation of the world in the human mind" (Nęcka, 2006, p.84). Words and numbers enter our mind through different cognitive routes (Cohen et al., 1994). After entering these routes, words remain in the semantic memory,

whereas numbers remain in the operational memory. Thus, when numbers are presented in a speech, an interpreter may need to exert more effort to process the numbers through a numeric route different from that of words, which could lead to cognitive overload, resulting in error. During interpreting, the semantic memory is activated, as it is responsible for the verbal processing of ideas, and when numbers are uttered, a sudden shift of attention takes place where the operational memory is activated for the transcoding of the numeric data. According to Sella et al. "Functional brain mapping of numerical cognition has been used to highlight differences in cognitive processing that are not apparent at the behavioural level, for example, to illustrate systematic differences in passive visual processing of numerical versus non-numerical information." (2018, p.39).

In a neuropsychological case study by Cipolotti et al. (1995) on parts of the brain responsible for numerical cognition, a patient who has suffered from several strokes in the left parietal lobe could not read aloud number codes (such as 8), but could read aloud the number word (eight) and other non-number words. This study suggests that numeric data are independent categories whose representation in the mind is detached from other forms of knowledge. Thus, it is expected that different categories of discourse are supported by different interacting neural systems (Cipolotti et al., 1991; Thioux et al., 1998; Butterworth et al., 2001).

Brain mapping of numerical cognition has been adopted to elaborate how cognitive processing is not identical when it comes to visual processing of numerical data as opposed to non-numerical information. Interestingly, a study conducted by Braun and Clarici (1996) investigating difficulties in number interpreting shows that students performed better in interpreting numerical data when they were listening to the speech with their right ear (left hemisphere) than they did when they were listening with their left ear (right hemisphere). According to Hécan (1976) and Deloche and Seron (1982), the left hemisphere of the brain is more dominant in cognitive functions related to numerals.

4.4.1 Numerical Cognition in Different Languages

In many languages, the oral expressions of numerals undergo specific syntactic rules that differ from one language to another. The challenge of interpreting numbers is especially magnified when interpreting between two languages of which the numeral systems are distinct. According to neurocognitive research on the neurocognitive bases of numerical cognition, different individuals' brains react differently when identifying numerals based on the

directionality of their language. As elaborated by Sella et al (2018), the SNARC Effect, The Spatial Numerical Association Response Code, explains the relation between space and numbers. This results from the spatial order of numbers and the reading direction of the language. According to this theory, small numbers are associated with the left side of space, whereas larger numbers are associated with the right side. To explain this, neuropsychologists maintain that the human brain subconsciously aligns numbers from 1 to 10 in a line from left to right (Sella et al., 2018). "According to the Mental Number Line (MNL) account, numbers are represented on a putative horizontal line whose orientation (left-to-right or right-to-left) is heavily influenced by cultural features and experience" Sella et al. (2018, p.24).

Extensive experimental studies have been conducted to test this theory. Participants were asked to press a button when they heard a number; participants responded faster with their left hand when presented with numbers less than five and faster with their right hand when they heard numbers higher than five. Interestingly, the SNARC Effect was reversed when the same study was conducted with speakers of the Arabic language. Another interesting observation is the flexibility of the SNARC Effect with bilingual individuals of different language directionality. A study of Russian and Hebrew speakers found the SNARC Effect was immediately reversed once the individuals read Hebrew text (Shaki & Fischer, 2008).

Taking this cross-disciplinary view could help interpreting researchers understand why certain speech elements cause problems. It could also give some perspective on the mental and cognitive aspects of interpreting one of the most sophisticated areas to examine and investigate due the difficulty to access mental activities during interpreting. Researchers and trainers could also potentially use this to create strategies and methodologies to overcome such challenges.

It is essential to investigate the reasons behind the difficulties and inaccuracy in the simultaneous interpreting of numbers. The hearing modality of numbers (literal hearing) compared to other semantic segments of the speech (intelligent hearing) could be one cause that leads to a high error rate when interpreting numbers. From the perspective of the Interpretive Theory or *théorie du sens*, the interpreter deverbalizes the ideas of the speaker during the listening phase, then the ideas are reconstructed and formed into the target language. Therefore, even if an interpreter misses a semantic element of the speech, the sense of the message can still be grasped and correctly rendered from the context, unlike numerals, where the interpreter must shift from interpreting meaning (which is the essence of the Interpretive Theory) to literal interpreting. Lederer (1982) distinguishes between two types of hearing;

intelligent hearing and literal hearing. She explains that intelligent hearing is necessary for an interpreter to listen for a length of time long enough to comprehend the meaning. This attention, however, is broken when numerals occur in the speech, because the interpreter immediately shifts to literal hearing. Seleskovitch (1975) also explains this action, maintaining that numerals interfere with reasoning and bring attention to the auditory perception of the discourse. After shifting from intelligent hearing to literal hearing, the interpreter must, again, shift back to intelligent hearing so as not to miss the incoming information after the numerals are uttered. This ongoing shifting between these two hearing modalities might be one reason behind the high rate of errors in interpreting numbers.

Other reasons that lead to low accuracy of interpreting numbers can be language specific. Some features of languages (or specific language combinations) result in number interpreting errors. In Chinese, for example, Cheung (2009) explains that the Chinese numerals require the grouping of large numbers into multiples of ten thousand rather than thousands. The numerals also require the speaker to pronounce "zero" before the last digit in certain numbers such as "1001," which is not the case in other languages such as English. Cheung (2008) states:

> One significant difference between the two number systems is the lack of direct equivalents in numeric units beyond a thousand. A hundred is bai in Chinese, and a thousand is qian. However, for ten thousand, there is a Chinese character, wan, which the English language lacks. The unit wan goes on from one wan (ten thousand), ten wan (a hundred thousand), and a hundred wan, (one million), to a thousand wan (ten million). For one hundred million, another character, yi, is used. One billion is ten yi. Therefore, syntax conversion of number words would be required when an interpreter hears such words as million, billion, etc. (p. 24)

Another example is the German expressions of numeric values, which are much longer compared to other languages such as English and Italian. Such linguistic characteristics for numbers strain interpreters' working memory and cause an overload on their processing capacity. An experimental study by Braun & Clarici (1996) between German and Italian proves that the average short-term memory span is shorter in numerals uttered in one language "in which the verbal codification is comparatively longer than in other languages". This indicates that errors in interpreting numbers are likely to occur in instances where one language requires more time in the word articulation of the numbers. "In transcoding a German number, i.e. switching from one code to another – from the Arabic to the verbal code or vice-versa – the processing of the number is not linear and requires one the performance of non-linear, energy-consuming operations" Pinochi (2009, p. 36). Similar to the Arabic language, some German numerals, for example, numbers from 13 to 99, are inverted (except for tens). This has been

problematic to the extent that, in 2004, The Department of Mathematics and Psychology of Bochum University in Germany created the Verein Zwanzigeins Association, which has proposed the reformation of German numerals to correspond to the linearity of the coding of numbers (Verein Zwanzigeins, 2004). It proposed to maintain the current numerals and add the new one, which is the case with the Czech language where both numerals are used (Pinochi 2009).

This was proposed to eliminate difficulties in learning mathematics for children, foreign trade communication, and to adhere to EU and international standards (Pinochi, 2009).

4.5 The Arabic Numeral System

To avoid confusion, the Arabic numeral system here refers to the Arabic language numeral system and not the Arabic code of numerals used universally (1,2,3 etc.). The Arabic numeral system is complex because numbers are grammatically inflected according to the noun they refer to and because numbers are grammatically declined according to both the noun and the syntactic structure of the phrase. This means that numbers have multiple forms that can be used constantly throughout the speech. Numeral declension and inflection change the form of the number according to its grammatical position in a sentence and whether the noun it corresponds to is singular masculine or feminine, plural masculine or feminine, or dual masculine or feminine. Each of these have different grammatical formats based on how and where numbers are used within the sentence. Number and noun agreement is not always the case in Arabic. Numbers that proceed the noun will take the opposite gender of the noun and are declined according to their grammatical function in the sentence. The noun must be in the genitive case because this form creates a modifying phrase.

Example:

I teach seven students (f.) **أدرّس سبع طالبات**

I teach seven students (m.) **أدرّس سبعة طلّاب**

In the above examples, the number “seven” proceeds the noun “students,” so it is declined as masculine referring to the female students but feminine when referring to the male students.

4.5.1 The Plural in Arabic

There are three forms of plural in Arabic. Masculine plural has two forms suffixed to the noun and are used according to whether the noun is in its nominative, genitive, or accusative form.

Example: Teachers (m.) **مدرِّسون – مدرِّسين - مدرِّسين**

Feminine plural is suffixed by one written form but two diacritical marks used according to whether the noun is in its nominative, genitive, or accusative form.

Example: Teachers (f.) **مدرِّساتٌ – مدرّساتٍ – مدرّسات**

Broken plural is the irregular plural form and has two formats, one of which is used with numbers from 3-10 and the other is used with 11 and over.

4.6 Examples of Broken Plurals

Books **كتب** – Hearts **قلوب** - Pens **أقلام**

I saw eleven men **رأيتُ أحدَ عشرَ رجلًا**

With numbers from 3 to 10, the noun must always be declined as singular and must be in its accusative form.

Example: I saw three men **رأيتُ ثلاثة رجال**

With the number 10, the number will take the opposite gender of the noun. However, with compound numbers from 11 to 19, the 10 in the compound number will take the same gender as the noun, and the number 10 is declined with different diacritical marks. However, the other number compounded with the 10 will take the opposite gender of the noun (for instance the 4 in 14).

Examples:

There are 14 men in the room **في الغرفة أربعة عَشَرَ رجُلًا**

There are 14 women in the room **في الغرفة أربعَ عَشْرَة إمرأة**

In the first example where the noun is masculine, the 4 is in the feminine form, but the 10 is in the masculine form. In the second example where the noun is feminine, the 4 takes the masculine form but the 10 takes the feminine form.

With multipliers of 10, the number is only declined according to its position in the sentence but becomes gender neutral.

Examples:

I read 30 books (m.) **قرأتُ عشرينَ كتابًا**

I read 30 letters (f.) **ًقرأتُ عشرين رسالة**

These are examples of the Arabic grammatical rules when using numbers, but the declension and inflection system is much more complex. This elaboration of the Arabic numerical system is important to explain the extent to which the two languages (Arabic and English) are distinct and to explain why interpreting numbers is a major issue that requires a pedagogical approach.

The expression of numbers also follows a particular structure which creates more challenge in simultaneous interpreting.

4.7 Examples of Differences between English and Arabic Expression of Numerals

- The inversion rule applies to double digits from 21 to 99 except for tens, so they are written from left to right but are pronounced from right to left, so units are placed before tens in expression, unlike English. So, for instance, “85” is pronounced as “five and eighty”, instead of “eighty-five”. This error is seen in many errors made by students of interpreting. These errors could occur if interpreters subconsciously follow the phonological mapping of numerals.
- Thousands in English, when expressing years for example, are pronounced as 2 double digits instead of one whole number that comprises of the thousand, the hundred, the ten, and the unit. For instance, “1985” in English is “Nineteen eighty-five,” whereas, in Arabic, it is expressed as “One thousand and nine hundred and five and eighty”. In terms of expression, the English expression of the number code uses only three number-words, whereas, in Arabic, it requires 7 words to express the number. As elaborated above, the difference in length to express numerals causes some delay while interpreting that could lead to cognitive overload, resulting in error or loss of information.
- Other thousand numerals in English are expressed in hundreds. For example, the number “1200” in English can be pronounced “twelve hundred,” whereas, in Arabic, it is pronounced “one thousand and two hundred”.

- Some numbers in English are pronounced in single number codes, for instance, “101” can be expressed as “one-oh-one”, whereas, in Arabic it’s pronounced as “one hundred and one”.
- The difference between the number of lexical elements used in the expression of the same number between English and Arabic. For example, the number “1985” requires only three lexical units when expressed in English “nineteen eighty-five” whereas Arabic requires seven, it would be literally back translated into (thousand and nine-hundred, and five and eighty). In such case, two difficulties are presented: first, the difference in the phonological order of the expression of the number with the inversion of the last two digits, and second, the length of the expression in Arabic compared to English.
- Differences in units and measurements. Realistically, transferring units and measurements is an almost-impossible task to do while interpreting as it requires pure mathematical problem solving which would require the interpreter’s full attention and could result in error, omission, or loss of information. Setton & Dawrant (2016), however, do shed light on the additional challenge if an interpreter must convert between units used in the courtiers where the two languages are spoken. Arab countries use, for instance, Centigrade, kilometre, kilograms, and litres as opposed to English-speaking countries where Fahrenheit, miles/feet, pound, and ounce are used instead.

Another challenge for interpreters regarding the Arabic numerals is the grammatical differences between the spoken Standard Arabic language and the spoken dialects of Arabic, which is the colloquial form used in day-to-day spoken language. There are several dialects of Arabic across all Arabic speaking countries and within the same country. In most cases, the spoken dialect disregards the grammatical features of numbers due to their complexity and are pronounced in a fixed neutral way with no inflection, declension, or conjugation. This is the norm in spoken daily language in almost all Arabic-speaking nations. Speakers are not used to declining or inflecting numbers in their daily conversations, which causes an extra load on interpreters’ cognitive processing because, during interpreting, interpreters are required to speak the Standard Arabic in formal settings rather than the colloquial or local dialect. It has been noticed that many interpreting students detach the numerals from their declension due its difficulty and fear of loss of information. They resort to using the informal colloquial numeral system fully comprehensible by all Arabic speakers but is not grammatically correct. They usually do so due to the overwhelming cognitive effort it requires for the Arabic numbers to be

declined and inflected or expressed in an accurately grammatical manner. Of course, when Arabic is their first language, this is not acceptable when interpreting in a formal setting where they would be highly scrutinized for their mother tongue and might give a negative impression to the listeners.

4.8 Results of Previous Experimental Studies on Interpreting of Numerical Data

Several experimental studies on the challenges posed by interpreting of numerals. In this section, a critical analysis of the available studies is presented.

4.8.1 Cheung's Experimental Study 2008

In his experimental study on simultaneous interpreting of numbers, Cheung (2008) investigated the effectiveness of two methods of number training: The first is "number-in-isolation" in which trainees interpret a series of numbers in isolation. The second is "number-with-referent" in which trainees interpret a series of numbers along with their referents. In his study, 42 language-major undergraduate final-year students with a language combination of Chinese (A) and English (B) who received 7 weeks of SI training participated in the study. Participants were divided into two groups: the first group received a 15-minute number-in-isolation training, while the second group received a 15-minute number-with-referent drill in addition to the 15-minute number-in-isolation training that the first group received. The results of the study reveal that participants who received the number-with-referent drill in addition to the number-in-isolation training had higher accuracy rates in number interpreting compared to the group who only received the number-in-isolation training. However, the positive results of the number-with-referent training can be attributed to the fact that the participants involved had received an additional 15-minute training with numbers compared to those who participated in the number-in-isolation method. Nonetheless, the results do reveal that training with numbers is effective.

4.8.2 Cheung's Experimental Study 2009

In 2009, Cheung conducted another experimental study on number training. This time his experiment included three groups: the first group received 30-minute training on number-in-isolation; the second group received a 30-minute training on number-with-referent, and the third group received no training, but received a theoretical lecture on the importance of balancing accurately interpreted numbers and fluency of delivery. There were a total of 54

undergraduate students who have taken a SI course as an elective subject for 9 weeks with the language combination Cantonese (A) and English (B). All of the students have taken the course with the same instructor using the same material. The results (elaborated in the table below) reveal that the first group had a total error percentage of 47.4% and an omission percentage of 17.9%. The second group had a total error percentage of 11.8%, but an omission percentage of 25%. The third group had a total error percentage of 40.8% and omission of 57.1%.

Table 8: Error and Omission Percentage of Cheung's Experimental Study (2009)

Group	Error %	Omission %
Group 1	47.4%	17.9%
Group 2	11.8%	25%
Group 3	40.8%	57.1%

These results show that number training is effective since the group that did not receive any number training had the highest percentage of omissions and high percentage of errors. The fact that the first group, which received number-in-isolation training, had the least percentage of omissions can explain that participants were trained to focus more on numbers and quickly respond to them; while the fact that they had the highest percentage of errors could explain that they were not sufficiently trained to interpret numbers in context resulting in less management capability during attention-shifting between numbers and ideas leading to errors in interpreting numbers. Finally, the second group, which received number-with-referent training, had the least percentage of errors. This could explain that participants were prepared to interpret numbers within the context which enabled them to effectively manage shift of attention between speech and numbers. Additionally, receiving higher percentage of omissions, compared to the first group, could be a result of decision-making where resorting to omission seemed to be a more effective strategy for them while interpreting numbers within a speech.

4.8.3 Mazza's Experimental Study 2001

In an experimental study by Mazza (2001), she aims to investigate the extent to which numbers cause problems during SI and the reasons behind this. She also investigates what type of numbers are most problematic, and whether numbers impact the interpretation of the message where numbers occur. Finally, she examines the effectiveness of note taking on the accuracy rate of numbers. A total of 15 students of interpretation participated in the study whose language combination is Italian (A) and English (B), and received interpreting courses

for at least 3 years in the University of Bologna. The experiment composed of two speeches: the first speech (T1) where students were allowed to write down notes during their SI, and a second speech (T2) where students were not allowed to write down notes while interpreting. Both speeches included parts that did not include any numbers and parts that included several numbers. The results revealed that 81.8% of ideas were correctly interpreted from the parts that did not include numbers, while only 53.9% of ideas were correctly interpreted from the parts that included numbers. This suggests that the existence of numbers pose difficulties while interpreting resulting in less accurate interpretations. As far as number accuracy is concerned, the results show that the average error rate in T1 (with notes) was nearly 50% (ranging between 20.9% and 74.6%, mean: 45.1%). Similarly, the average error rate in T2 (without notes) was also around 50% (ranging between 18.3% and 76.7%, mean: 49.9%). The results reveal that the participants' performance in T1 was overall better compared to T2 which suggests that note-taking of numbers during SI could increase accuracy rate. This could be attributed to the less effort imposed on the working memory due to writing numbers down instead of depending on storing and retaining them in the working memory. The results also show that most of the errors in numbers occur in large whole numbers with 4 or more digits, followed by decimals, followed by ranges; whereas small whole numbers with less than 4 digits, and dates contained the least errors. Furthermore, the results conclude that the most common type of error is omission. It is also noted that a high proportion of omissions included both the number and its referent or the segment of the speech where numbers took place; 27% of numbers had incorrect referents or lacked the source speech context. Approximations were significantly higher in T2 which might explain that when notes were not allowed during SI in T2, participants could not rely on any help to store the numbers other than their WM which increased its effort and forced them to resort to approximation. Notes taken in T1 included an average of 39.4% of the numbers in the speech, 25.9% of which were correct and rendered correctly in the interpretation; this means that correct noting of numbers contributed to 66% of correct rendition. On the other hand, correct notes that were not interpreted correctly were 6.2% of notes and 2.5% of numbers. Errors in notes resulting in errors in interpreting were 26.6% of all items noted, accounting for 10.5% of the total amount of numbers in the text. In conclusion, the study shows that the difficulty caused by numeral data does not only effect the interpretation of the numbers, but also the parts of the speech in which they occur. Note-taking increases the accuracy of number interpreting. Note-taking of numbers proves to be a useful strategy to decrease the burden of WM during interpreting, except in the case of large whole digit number

consisting of 4 or more figures where the decreased burden on WM is shifted to note-taking causing an increase in the processing capacity.

4.8.4 Braun and Clarici's Experimental Study (1996)

Braun and Clarici (1996) conducted a study on the neurolinguistic processing of numerical data in simultaneous interpreting. The study involved 12 students who attended at least 2 years of simultaneous and consecutive interpretation courses at the Scuola Superiore di Lingue Moderne per interpreti e Traduttori at the University of Trieste with the language combination of Italian (A or B) and German (A or B). The participants were given three different speeches, the first comprised of texts and numbers for interpretation, the second contains only a list of numbers for interpretation, and the third also contains only a list of numbers to be shadowed. The students were allowed to use notes in some of the tests only. The aim of the study is to compare error rate of the interpretation of numbers only compared to numbers within texts and to investigate the effect of note-taking. Results of this study show that a total error score of 28.69% when interpreting lists of numbers, whereas a total error score of 69.49% for numbers within texts. In the shadowing part, there was a total error score of 3.51%. Furthermore, the study also shows that numbers in German are longer than numbers in Italian in terms of the time requires to articulate them which causes a word-length effect that influenced that participants' accuracy in recalling the numbers being interpreted. Moreover, the study reveals that the participants made more errors when interpreting numbers from German into Italian even though Italian was the native language of the majority of the participants. This could suggest that the process of comprehension is more significant in such cases. As for note-taking, the study shows that taking notes while interpreting from Italian into German did not show significant effect on performance; while from German into Italian, notes reveal to have decreased the error rate of interpreting numerals. Finally, students interpreting from German into Italian made less errors when listening to the speech with their right ear. On the other hand, no significance difference between listening with the left or right ear was shown when interpreting from Italian to German.

4.9 Pinochi's Experimental Study (2009)

An experimental study by Pinochi (2009) examines whether or not the challenge arising during interpreting numbers is language-independent and whether language-specific features of numerals such as the structural differences in the numerical systems of the language

combination of the interpreter causes difficulties. The study also aims to investigate which category of numbers causes the most difficulty and what type of error is the most common. Also, it examines whether or not note-taking of numbers reduces errors. The study included 16 interpreting students in the University of Trieste who attended at least two years of interpretation courses. Students were divided into two groups; 8 students with a language combination of Italian (A) and German (B), and 8 students with a language combination of Italian (A) and English (B). Both groups interpreted the same speech, an English version and a German version into Italian. Taking notes was optional for all students. The results show that the total error score of all numbers was 40.6% in the German to Italian Speech and 41.2% in the English speech. This means that the difficulty arising during number interpreting is not language-specific, at least for these language combinations. Of course, this does not refute the notion that the difficulty is, in fact, language-specific, albeit for certain language pairs. The most common type of error was omission (50% of total errors in German and 51.7% in English). Also, it has been noted that 40.6% of numbers were written down by students of interpreting into German and 34.3% into English. This difference could be attributed to the inversion rule of numbers in German, which does not exist in neither English nor Italian. This might have helped students with visualization of the number since it takes so much cognitive effort to do the inversion mentally. The study also shows that 71.2% of all notes taken when interpreting into German was correct leading to correct interpreting, 8.1% of correct notes but wrong interpreting, and 19.7% wrong notes leading to wrong interpreting, and 1% wrong notes with correct interpreting. In the English interpretation, 56.9% were correct notes and correct interpretations, 3% correct notes but wrong interpreting, 39.5% wrong notes and wrong interpretations, and 0.06% wrong notes but correct interpreting. This can conclude that correct notes do actually help during interpreting of numbers. Notes were more prevalent and more accurate with students from Italian into German which could mean that they are more used to note taking than those interpreting from Italian into English.

4.10 The Importance of Training with the Subskills Approach For The Accuracy of Numerical Data Rendition

From the discussion above, it is evident that numerals can be a problem trigger for all interpreters of all language combinations in general and languages of different numerical systems in particular. Thus, it is of importance to discuss the potential of enhancing the training of interpreting students through a subskills approach that targets numerical data. Interpreting

trainers and researchers agree that interpreting is a complex process that includes several inter-dependent subskills (Christoffels et al., 2003; Gile, 2005; Kurz, 1992; Moser-Mercer et al., 1997). This process requires several cognitive efforts to coordinate with one another. Darò (1997) argues that, with such complex mental activities, "divided attention improves with training and task-specific practice" (1997, p. 626). This means that subskills for interpreting can be learned, developed, and trained until "a trainee arrives at the autonomous stage where procedures become more and more automated and rapid and require fewer processing resources" (Moser-Mercer, 1997, p. 260). Simultaneous interpreting is a complex mental task that requires "the integration and orchestration of several cognitive mechanisms, and each of these is driven by simple choices" (Fu & Anderson, 2006, p. 203).

Gillies (2013) explains that through training each skill in isolation, students "can concentrate on achieving necessary internalization for it without the distraction of trying to complete the other tasks simultaneously." (p. 3). He states that "complex skills can be broken down into their components, which can then be practiced in isolation. Interpreting is a complex skill. It involves doing several things, some relatively simple, some less so." (Gillies, 2013, p. 3).

Also, according to Lambert (1992) "there are [...] so many ongoing activities in SI that [...] any pedagogically sound approach should tease these ongoing activities apart, differentiate the component skills, and where possible, provide training experiences in each one". The interpreting teaching process can be decomposed into different smaller phases, focusing on certain skills each time. The goal of breaking down the practice of the major skill of simultaneous interpreting into smaller exercises is to practice and activate subskills that, when performed in combination, make up a more successful simultaneous interpreting.

Therefore, the purpose of number drills and exercises is to train learners' brains to quickly and accurately convert numerical data into the target language to reduce the possible risk of a cognitive overload and to increase the attention capacity of the other interpreting subskills.

There are two main methods of training interpreters to achieve higher accuracy rates when interpreting numbers. The first method consists on training number-in-isolation. With this method, trainees interpret numbers without text or context. The second is number-with-referent, in which trainees interpret numbers along with referents within a text and context. Xu (2007) suggests that it is important for numbers to be trained in isolation to enable interpreters to process numbers more quickly to decrease the mental processing load while interpreting. But Her (1995) suggests that training numbers in isolation might be counter-productive and

explains that “the number training may defeat its own purpose if number-in-isolation is emphasized out of proportion” (1995, p. 87). The number-with-referent method requires attention management, so the assumption is that the number-with-referent method contributes to students’ decision-making strategies and analytical processing.

Furthermore, interpreting is a skill that can only be mastered if interpreters internalize the subskills of interpreting and learn how to manage them strategically. To reduce the error rate, one must train the mind to perform particular tasks and practice micro skills such as number interpreting to inhibit faster processing. When performing an SI task, one is confronted with several sub-tasks, as detailed by Gile’s Effort Model (Gile, 1995, p. 169). These tasks, as noted by Gran, quoted in Riccardi (2005), are “too complex to be carried out at the conscious level and all nevertheless, they may become automatic through practice and will then be assimilated as procedural knowledge” (2005, p. 759).

Several solutions have been proposed by researchers that could help reduce the cognitive load for interpreters during the interpreting of numerals. For example, writing down numbers in SI is of help sometimes and works better in some languages. On the one hand, this could help interpreters with the visualization of numbers; Baddeley (1999) explains that the short-term memory receives acoustic, semantic, and visual coding. Therefore, the noting of numbers could be helpful in the visual coding of the STM. But it might be counter-effective if it causes a distraction or requires interpreters to shift their attention to noting, which will reduce the cognitive effort of other overlapping mental activities such as comprehension, speaking, and output management. It would also be worthwhile to consider the issues that could arise with language combinations of different numeral coding. For instance, some number codes of the English language look similar to other number codes in the Arabic language. For example, zero in English “0” is similar to five in Arabic “٥”, and ten “10” in English looks similar to fifteen in Arabic “١٥”, or one hundred in English “100” would look like one hundred fifty-five in Arabic “١٥٥”. Another example is that the number seven “7” in English looks similar to six in Arabic “٦”. Since some interpreters tend to subconsciously write down notes in both languages, visualization or noting of numbers might cause confusion and result in errors. Another issue might arise during the notetaking of languages with different numerical systems where the order of expressed numerals does not correspond in linearity with the written code, for example, in German and Arabic, where the inversion rule applies and expression of numerals is lengthier than that of other languages such as English for instance.

Moreover, Mazza (2001) suggests the reduction of décalage time; this includes a shorter retention of numerical data in the working memory, which results in faster processing and restoration of the data. Approximation is also suggested by Kalina (1992) and explains that the approximation of numerical data is a strategy that interpreters could use to provide at least partial information while they can find a more accurate interpreting. But perhaps, this strategy might not be effective because to use a strategy requires an increase in the working memory, which is the core of the difficulty in number interpreting. Also, early access to the material used in the speech to be interpreted could be helpful, but this is not always available.

4.11 The Present Study

In order to investigate the impact of a subskills training approach on the accuracy rates of numeral renditions in SI, an experimental study has been conducted at Princess Nora University (PNU) in Riyadh, Saudi Arabia. The study was conducted over the period of six weeks from July 2nd, 2018 to August 14th, 2018 with two groups: the experimental group, which included 16 participants and the control group, which included 17 participants. The participants were divided into two groups based on their linguistic competence and overall performance in interpreting. This makes both groups balanced in terms of students' linguistic and interpreting levels.

4.11.1 Participants

There were 33 participants in the study. All participants were female students aged between 21 and 23 years of age and were in their last year of the 5-year undergraduate Translation Program in PNU or recent graduates who graduated less than 2 years ago from the undergraduate Translation Program in PNU. All students have received one 3-month consecutive interpreting course and one 3-month simultaneous interpreting course. All students had a language combination of Arabic (A) and English (B). The students were divided into two groups: the experimental group, including 16 participants and the control group, including 17 participants. The participants were divided into two groups according to their linguistic competence and overall performance in interpreting based on a translation test and an oral class discussion that were held on the first day of the course.

4.11.2 Research Tools

Before the study began, all students were given an interpreting exam, T1 (pre-test), to evaluate their overall performance and the accuracy rate of interpreting of numerals. After the program was completed, students were given another test, T2 (post-test), to evaluate their progress. To ensure comparability and uniformity between T1 and T2, numerical data were distributed almost identically throughout both speeches and were inserted within the same proximity and lexical density. A transcription of T1 and T2 speeches are available below in Appendices 1, 2, 3 and 4. During the training, the experimental group received several speeches of different topics to interpret and extra exercises and drills including series and lists of numbers, some of which are in isolation and some within texts in sentences. A transcription of a sample of exercises is available in Appendix 7. On the other hand, the control group received none of the numeral's exercises or drills and were only given the same speeches as the experimental group to interpret in class.

4.11.3 Procedure

The SI course was delivered by the researcher (myself) as a complimentary non-credit interpreting training course for free for all attendees. It was offered at the College of Languages and Translation in PNU, Saudi Arabia over a period of six weeks. Classes were held three days per week, three hours per day per group. During classes, both groups received SI training in different fields such as medical, administrative, social, self-development, etc. The speeches given were not dense in numerals, and most did not include numerals. The class comprised of three or four speeches ranging from two and a half to four minutes, approximately, and were in English>Arabic and vice versa. The experimental group received both the speeches given to the control group and 10-minute numeral drilling exercises each class.

The drilling exercises included (1) number-in-isolation drills, where series and lists of numbers were delivered in isolation of any text or ideas, and (2) number-with-referent drills, where numbers were delivered within text in a form of sentences. All sentences were within the same context and field to form one short speech decomposed into sentences, each of which including a numeral whether it was a date, a percentage, a range, a decimal, or whole numbers.

T1 and T2 tests were similar in terms of their length and the distribution of numerical data and density. Some numbers were repeated such as years to examine whether a number causes fewer problems if uttered for the second time during the same speech. Other numerical data

was in a cluster, where a paragraph was dense in numbers to examine whether such clusters might increase the difficulty of interpreting. Some numbers were inserted in the speech in proximity to examine the possibility of an echo effect.

4.11.4 Assessment

The assessment of the results aims to conclude whether the proposed subskills training approach adopted in the course was effective and to what extent. To draw such conclusions, effectiveness should be defined in this context. Is the approach effective in helping learners achieve higher accuracy rates in interpreting numerals or achieve higher accuracy in correctly interpreting both numerals and their immediate context and referents? Interpreting a numeral correctly while omitting or misinterpreting its referent is illogical. So, how would the researcher in this study grade a sentence that, although lacks meaning, the digit is accurately rendered? This issue can be addressed from two viewpoints. The first is from the operational perspective of the research, i.e., the quantitative analytical result of accurate digits interpreted, and the second is from the ultimate objective of simultaneous interpreting, or the transfer of the message/idea correctly and accurately into the other language rather than just the number. For this study, numbers and their immediate context were scored as separate items, and as for research operation, only numerals were included in the statistical analysis. Determining the effectiveness of the subskills approach according to the calculation of accurately-interpreted numerals is the most reliable and straightforward method. To ensure the validity of research results, this experimental study will only score numerals in isolation; it is crucial to emphasize that, ultimately, this study investigates whether the subskills approach in numerical data interpreting would more positively affect the accuracy rate of numerical data.

To calculate the scores to derive a statistical analysis of the rate of error between T1 and T2 speeches, the following evaluation key was adopted.

1 point if the number was rendered correctly
0.5 points if the main number of a decimal was rendered correctly
0 if the number was incorrect, approximated, or omitted.

The categorization of errors is adopted from Braun and Clarici's (1996) model. It has been edited and adapted to accommodate the aims of the current study. The final three categories of errors have been added, as they were noticed to recur during the data analysis of the current study. Errors are classified:

1. Omission: the numeral is left out all together.
2. Approximation: the interpreted numeral maintains the correct order of magnitude but rounded up or down (example: almost/around 4.500.000 instead of 4.531.667).
3. Transposition error: the digits of the numerals are correct, and the order of magnitude is maintained, but the numeral digits are in the wrong order (example 863 instead of 683).
4. Inversion error: the interpreted numerals contain the same two digits or decimal but are inverted (for example 3.4 instead of 4.3, or 48 instead of 84).
5. Magnitude error: the number is of a wrong order of magnitude but contains the correct figures (example 22.000 instead of 220,000).
6. Phonological error: Errors that could be attributed to phonemically wrong perception of similar sounding figures (example: 50 instead of 15)
7. Whole <> Decimal error: the figures are correct but interpreted as a whole number instead of a decimal or vice versa (example: 4.8 instead of 48, or 48 instead of 4.8)
8. Incomplete: the participant started to render the number but has not completed rendition (example: rendering 2019 as 20…. Ummmmmm…. OR two thousand and Ummmmm…. and moving along to the net statement without completing the numeral).
9. Language transfer error: the number is rendered correctly but in the same language as the source text.
10. Other: includes all other errors that do not belong to the previous types and whose cause is not apparent and cannot be classified under a particular category. Most of these errors are numerals rendered incorrectly with no obvious explanation (example: 53 instead of 62).

4.11.5 Results and Statistical Analysis

The accuracy and error analysis conducted on interpreting T1 and T2 mainly focused on:

1. The accuracy rate of total correct renditions
2. The average rate of different types of error
3. Which types of errors were the most frequent
4. Whether certain numerals were likely to result in a particular type of error
5. The progress rate for each participant in the total amount of correct renditions.
6. The progress rate for each participant in the errors.
7. The average error and accuracy of the experimental group and the control group of total renditions.

8. The average progress rate between the experimental group and control group in the total amount of correct renditions.
9. The average progress rate between the experimental group and control group in the errors.

4.11.6 Accuracy Rate

In the tables and charts below, the results show that both the experimental group and the control group had improved their numerical data interpreting performance after being examined and statistically analysed in the pre-test (T1) and post-test (T2). However, the accuracy rates of the experimental group progressed more significantly as compared to the control group.

The average progress rate of the experimental group is 28%, while the average progress rate of the control group is 14%. All participants in the experimental group have improved in terms of accuracy rate except for one participant (out of 16 participants). The progress rate of the experimental group ranged from 4% to 43% with a mode value of 43% and a median value of 30%. But in the control group, four participants (out of 17) scored lower in T2, and one participant had the exact same score, making the total percentage of students who have improved in the experimental group 100% and 70.5% in the control group.

The single participant in the experimental group who had a lower accuracy rate scored a -25% progress rate. Since it has been proven this value is less than the extreme low outlier valued at -18.5% according to the outlier statistical calculation, the value has been excluded from the statistical analysis.

Q1 - 1.5 (Interquartile Range) = Extreme Low Outlier
16 – 1.5 (23) = -18.5

But it is worthwhile to mention that, even where the value is included in the statistical analysis, the experimental group would still have received a significant average accuracy progress rate of 25% and 93.75% of participants have improved.

4.11.7 Error Analysis

Several error types in interpreting numerical data have been observed in both groups and in both T1 and T2. However, results of the study reveal that “omission” and “other”, respectively, are the most frequent and recurrent errors (other refers to non-categorized errors that do not

fall under the classifications discussed above). The omission frequency of both groups did improve. Yet, again, the experimental group has shown more progress. In the experimental group, the average omission rate in T1 was 46%, which decreased to 18% in T2. In the control group, the average omission rate in T1 was 36%, which decreased to 27% in T2. Out of the 16 participants in the experimental group, 13 participants improved achieving lower omission rates, two participants received higher omission rates, and one participant received the exact same score. On the other hand, out of the 17 participants in the control group, 11 participants improved achieving lower omission rates, four participants received higher omission rates, and two participants received the exact same score. This means that 81.25% in the experimental group have improved in terms of omission error rate, and 64.70% in the control group have improved in terms of omission error rate.

As for other errors, non-categorized errors were the second most frequent error. The experimental group had an average of 11% of total non-categorized errors in T1, but this decreased to an average of 6% in T2. The control group had an average of 11% in both T1 and T2. Phonological errors counted for an average of 4% in T1 but increased to 6% in T2 for the experimental group. As for the control group, phonological errors counted for 11% in T1 and decreased to 7% in T2. Decimal errors counted for an average of 4% in T1 but increased to 9% in T2 for the experimental group. As for the control group decimal errors counted for 4% in T1 and decreased to 3% in T2.

4.11.8 Discussion

Many categories of error in interpreting numerical data have been observed in both groups and in both T1 and T2. However, even though some of these errors were not significant in the statistical analysis, it might be worthwhile to target and investigate them further in future experimental studies.

One interesting error that was noticed was the language transfer error, which is when the numeral was “shadowed” rather than interpreted. Two participants in the experimental group, one in T1 and another in T2, rendered the number, although accurately, in the same language as the source speech. Interviewing the students would have been interesting to find out if they were aware of doing so and whether they felt shadowing as a coping strategy was a better compromise than omission.

Another interesting error was number inversion. Although the expectation was that this error would receive a higher error rate due to some numerals not being in parallel in English and Arabic, only three participants from each group made a conversion error. However, it should be mentioned that only two numerals (out of 14) were subject to the inversion rule and were of only double digits and not large numbers. Since the aim of this experimental study was to investigate the subskills approach regardless or error type, the numerals inserted in the speeches were not designed to focus on a particular type of error. Further research on this would be very interesting.

Another error observed was magnitude, although only four participants have made a magnitude error. However, in the speeches, there was only one numeral with a large magnitude. Also, whole-to-decimal and vice versa was also noticed, where participants have interpreted a decimal number as a whole number but maintained both digits correctly and vice versa. Incomplete rendition was also noticed where the participant interprets the numeral correctly, but then stops. It would be interesting to interview the participants and explore whether they have stopped due to a shift of attention to the message linked to the numeral or whether the numeral itself was the cause.

Phonological errors were intriguing to investigate, as they have received a higher error rate than expected counting for an average of 4% in T1 and 6% in T2 for the experimental group and 11% in T1 and 7% in T2. Most phonological errors were made on years. This could be easily explained since, for instance, 2013 in English is pronounced “Twenty Thirteen”, but this form does not exist in Arabic, and interpreters must express it as “Two thousand and thirteen”. Thus, all those who have made a phonological error in dates have interpreted “November 2013 > November 23” and so on. It is also interesting to point out that, until last year, 2018, this form has never existed in Arabic, but has recently been used after the Saudi Government’s Development Vision of 2030, in which the numeral in Arabic is pronounced in linearity to English as “Twenty Thirty”. It is unusual and incorrect grammatically but has been repeated too many times that people’s ears have gotten used to it. One could wonder if this would change with other years and not just 2030.

As for the most frequent error, omission was on the top of the list, with a significant average omission rate for the experimental group of 46% in T1 and 18% in T2 and, for the control group, 36% in T1 and 27% in T2. The experimental group’s improvement could explain that the subskills approach in number training helped train students’ minds to process numerals

more quickly, leading not only to significantly fewer omissions, but higher overall accuracy rates. The average progress rate of the experimental group is 28%, while the average progress rate of the control group is 14%. This could mean that the subskills approach could improve students' ability to interpret numerals more accurately and lead to a deeply internalized skill they can master.

4.11.9 Conclusion

The results of this experimental study indicate that the subskills approach does indeed have the potential to help students optimize their performance in interpreting of numerals as well as to foster the internalization of this subskill. Experimental and control groups have both improved their accuracy rates in interpreting numerical data. As both groups have undergone intensive SI training for several weeks, it was expected that both would improve to some extent. Comparatively to the control group, the experimental group has made more significant improvements.

Additionally, among all of the participants of the experimental group, only one participant had not improved on the accuracy rate of numerical dates. This individual achieved a much lower accuracy rate than the one she achieved on the pre-test. The result of her test was -25%, so she fell below the extreme low outlier (ELO), which is -18.5%, which means her result was excluded from the statistical analysis of the experimental group as a whole. After excluding the ELO result from the experimental group, all participants of the group achieved a 100% accuracy rate, compared to a 70.5% accuracy rate for participants of the control group after excluding the ELO result. There were five participants in the control group who did not improve as a result of the ELO, of which four scored lower on the post-test than those who did not improve. A participant in this study did not see any improvement in the accuracy rate, and both the pre-test and post-test results were the same in the case of that participant.

A number of errors have been found in both groups, however omission has decreased from 46% in T1 to 18% in T2 in the experimental group and from 36% to 27% in the control group. Although the omission rates have improved, I still believe that these rates are alarming.

The second most frequent type of error was other/non-categorized errors. During T1, the experimental group had an average of 11% of total other/non-categorized errors, which decreased to 6% in T2. During T1 and T2, the control group had an average of 11%. According to the experimental group, phonological errors accounted for 4% of the total number of errors

in T1 and increased to 6% in T2. In comparison, phonological errors accounted for 11% of total errors in T1 and decreased to 7% in T2. Experimental groups' decimal errors averaged 4% in T1 and increased to 9% in T2. Control groups' decimal errors averaged 4% in T1 and decreased to 3% in T2.

There was one interesting error that was detected, the language transfer error, which is when a numeral is pronounced as it is in the source language. It is interesting that two participants in the experimental group, one in T1 and the other in T2, were able to pronounce the number accurately, but in the same language as the source speech. The students would have been interesting to interview if they were aware of shadowing as a coping strategy and if they felt shadowing was a better compromise than omission as a coping mechanism.

Interestingly enough, there was also an error involving the inversion of numbers. In spite of the expectation that this error would have a high error rate because some numbers in English and Arabic were not parallel in both languages, only three participants in each group made a conversion error. Despite this, it is important to note that only two of the fourteen numerals were subjected to the inversion rule, and they were all of double digits and not large numbers.

Despite only four participants making magnitude errors, there was only one numeral with a large magnitude in the speeches. It was also observed that participants interpreted decimal numbers as whole numbers and maintained both digits correctly in both cases, and vice versa. Additionally, incomplete rendition was observed when participants interpreted the numeral correctly, but then stopped.

It was intriguing to examine phonological errors as the error rate was higher than I had expected. For the experimental group, phonological errors accounted for an average of 4% in T1 and 6% in T2; whereas the error rate for the control group was 11% in T1 and 7% in T2. The majority of phonological errors were related to years. The reason for this could possibly be explained by the difference between English and Arabic in the pronunciation of the numeral expression of years. For example, in English, the year 2013 is pronounced "Twenty thirteen", but that form does not exist in Arabic, so interpreters must say "Two thousand and thirteen". It follows that all those who have made phonological errors in dates have interpreted “November 2013 > November 23”. This form, which was never available in Arabic until the year 2018, has now recently been used in Saudi Arabia since the Saudi Government released its Development Vision of 2030, where the Arabic numeral is pronounced in linearity to English

as “Twenty thirty”. Even though it is ungrammatical and incorrect, it has been repeated so often that people have become accustomed to it. One wonders if it will change with other years, not just 2030.

In terms of the most frequent error, omission ranked highest, with a significant average error rate for the experimental group of 46% in T1 and 18% in T2, and for the control group of 36% in T1 and 27% in T2. As a result of the subskills approach in number training, the experimental group was able to train their minds to process numerals more quickly, which resulted in significantly fewer omissions and a higher level of accuracy. In the experimental group, the average progress rate was 28%, whereas the average progress rate in the control group was 14%. The subskills approach may improve students' ability to interpret numerals more accurately and may lead to a deeply internalized skill that they can master as a result.

Based on the findings of this experimental study, it is clear that the subskills approach can indeed be a useful tool to help teachers engage students with the interpretation of numerals to optimize their performance as well as to help them internalize this subskill.

Table 9: Experimental Group: Accuracy Rate

Participant	Pre-test %	Post-test %	Progress %
PB3	39%	82%	43%
PBS18	14%	57%	43%
PB19	11%	54%	43%
PB8	39%	79%	39%
PB10	14%	54%	39%
PB11	29%	64%	36%
PB22	7%	43%	36%
PB1	54%	86%	32%
PB21	11%	39%	29%
PB4	31%	50%	19%
PB2	61%	79%	18%
PB15	21%	39%	18%
PB13	29%	43%	14%
PB7	29%	39%	11%
PB6	75%	79%	4%
PB12	39%	14%	-25%
Mean	31%	56%	25%
Median	29%	54%	30%
Mode	39%	79%	43%
Mean excluding outlier			28%

Table 10: Control Group: Accuracy Rate

Participant	Pre-test %	Post-test %	Progress %
PA8	11%	64%	54%
PA14	18%	57%	39%
PA2	21%	46%	25%
PA17	50%	75%	25%
PA3	75%	96%	21%
PA10	57%	79%	21%
PA16	29%	50%	21%
PA13	36%	50%	14%
PA20	39%	54%	14%
PA12	32%	43%	11%
PA22	14%	21%	7%
PA1	79%	86%	7%
PA5	14%	14%	0%
PA6	75%	71%	-4%
PA11	36%	32%	-4%
PA15	14%	7%	-7%
PA23	54%	43%	-11%
Mean	38%	52%	14%
Median	36%	50%	14%
Mode	14%	50%	21%

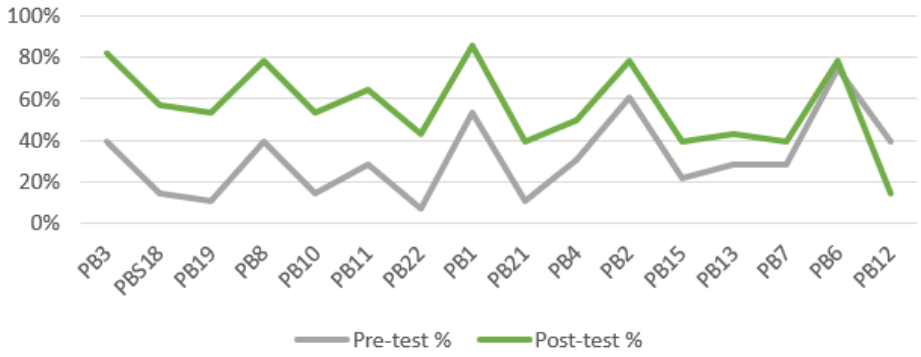


Figure 1: Numerical Data - Experimental Group: Accuracy Rate Pre-test & Post-test

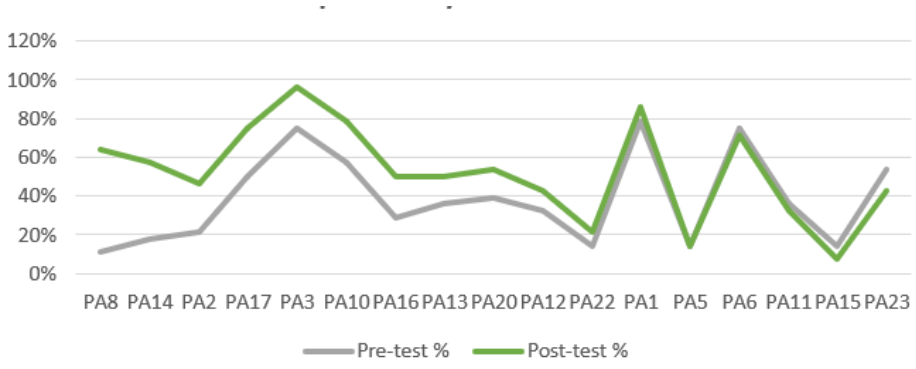


Figure 2: Numerical Data - Control Group: Accuracy Rate Pre-test & Post-test

Table 11: Experimental Group: Omission Rate and Progress Rate

Participant	Pre-test	Post-test	Progress
PB21	86%	14%	-71%
PBS18	79%	21%	-57%
PB19	79%	21%	-57%
PB22	71%	14%	-57%
PB10	64%	21%	-43%
PB11	43%	0%	-43%
PB4	38%	0%	-38%
PB15	64%	29%	-36%
PB8	21%	0%	-21%
PB1	29%	7%	-21%
PB3	29%	14%	-14%
PB2	21%	14%	-7%
PB6	7%	0%	-7%
PB13	29%	29%	0%
PB7	21%	29%	7%
PB12	57%	71%	14%
Mean	46%	18%	-28%
Median	41%	14%	-29%
Mode	29%	14%	-57%

Table 12: Control Group: Omission Rate and Progress Rate

Participant	Pre-test	Post-test	Progress
PA2	57%	21%	-36%
PA8	50%	21%	-29%
PA20	43%	14%	-29%
PA14	43%	21%	-21%
PA16	50%	29%	-21%
PA5	64%	43%	-21%
PA10	14%	0%	-14%
PA3	14%	7%	-7%
PA22	64%	57%	-7%
PA1	14%	7%	-7%
PA15	79%	71%	-7%
PA13	31%	31%	0%
PA6	14%	14%	0%
PA23	21%	29%	7%
PA17	7%	21%	14%
PA12	29%	43%	14%
PA11	14%	36%	21%
Mean	36%	27%	-8%
Median	31%	21%	-7%
Mode	14%	21%	-29%

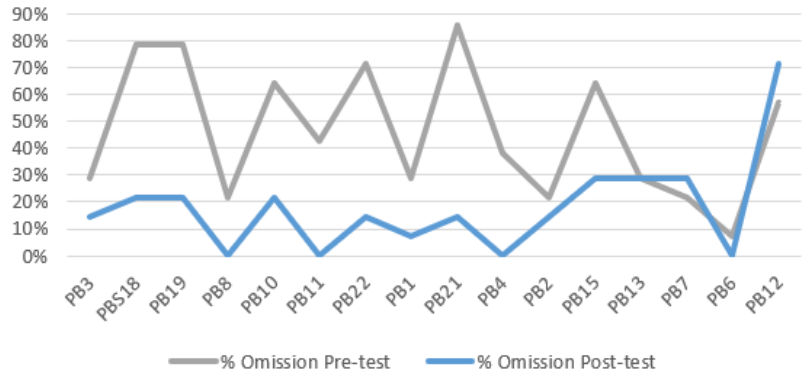


Figure 3: Numerical Data - Experimental Group: Omission Rate Pre-test & Post-test

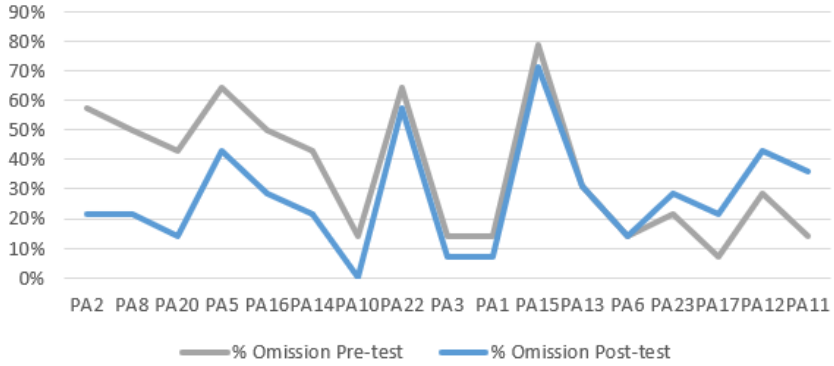


Figure 4: Numerical Data - Control Group: Omission Rate Pre-test & Post-test

5. EXPERIMENTAL STUDY 2: THE EFFECTIVENESS OF THE SUBSKILLS TRAINING APPROACH IN THE INTERPRETING OF NAMES AND ABBREVIATIONS

In this chapter I present the second experimental study which investigates the impact of the subskills approach in the training of names and abbreviations in SI. First, I go over the relevent literature to explain the reasons for which names and abbreviations are considered problem triggers for interpreters and particularly between distinct language combinations such as from Emglish into Arabic. After that, I will present the details of the experimental. Then I will discuss the results and outcomes of the the study in terms of accuracy rates, progress rates, most frequent and recurring errors, and most difficult categories encountered by the participants.

5.1 Introduction

As in the previous experiment, there are two main sections in this chapter: a theoretical section and an experimental study.

5.1.1 Objectives of the Theoretical Background

The theoretical section aims to

1. explain why proper names and abbreviations are speech elements prone to a high rate of error and inaccuracy in SI.

2. elaborate why the differences between English and Arabic names and abbreviations make these speech components problem triggers for interpreters.

3. present coping strategies proposed by scholars and researches concerning the rendition of names and abbreviations in SI.

5.1.2. Objectives of the Experimental Study

The experimental study aims to

1. investigate the efficacy of the subskills approach on the accuracy rate of interpreting abbreviations and proper names from English into Arabic.

2. analyze the frequency of different types and categories of errors.

3. recommend potential solutions to help improve students' performance when encountering names and abbreviations in SI.

Many researchers agree that a significant challenge for simultaneous interpreters is posed when interpreting names and abbreviations due to the extra cognitive load they add during the simultaneous interpreting process (Gile, 1985; Gile, 2009; Peraza et all, 2013; Pöchhacker, 2007). As explained earlier in the thesis, according to Gile's Effort Models (Gile, 1995), four main efforts take place during simultaneous interpreting. First is the Listening and Analysis Effort, which includes every conscious or subconscious action related to the comprehension process, starting from the moment the speaker speaks until the speech is analyzed by the interpreting. The second is the Memory Effort, which is a temporary storage mechanism for received information. The third is the Production Effort, where the interpreter transforms the speaker's message into the target language. The fourth is the Coordination Effort, where the interpreter monitors output while managing all other efforts and allocating more or less attention to whichever effort necessary at a specific time during the whole interpreting process. The Effort Models are based on the notion that there is a limited capacity in which the mind can operate and that the challenges that occur during interpreting are due to the time restriction posed in simultaneous interpreting and the need to distribute one's attention between many mental activities occurring simultaneously (Gile, 1995). Thus, this model can be a pedagogical instrument to explain the reasons for which interpreting names and abbreviations could be a challenging task, and why there is high rate and frequency of errors.

According to the Effort Models, errors occur due to cognitive overload triggered by an "increase in processing capacity requirements and any instance of mismanagement of cognitive resources by the interpreter" (Gile, 1999, p. 159). In such case, other efforts are not receiving the appropriate volume of mental activities, which could eventually result in errors. Since the low redundancy in names and abbreviations makes them prone to error in interpreting (Gile 1984, 1995, 1999), listening and memory efforts are increased.

If we consider Gile's Tightrope Hypothesis of the Effort Models (1999, 2008), names are considered one of the speech components that increase cognitive pressure, resulting in higher frequency of error. In this regards Gile (1999) states:

> … most of the time, total capacity consumption is close to the interpreter's total capacity, so any increase in processing capacity requirements and any instance of mismanagement of cognitive resources by the interpreter can bring about overload or local attentional deficit (in one of the Efforts) and consequent deterioration of the interpreter's output. This 'tightrope hypothesis' is crucial in explaining the high frequency of errors and omissions that can be observed in interpreting even when no particular technical or other difficulties can be identified in the source speech… (p. 159)

Gile (2008) also states:

> Simultaneous interpreters are vulnerable to conditions where total processing capacity requirements are high, be it for a whole speech or for a speech segment. Such conditions may occur when speeches are dense, fast, spoken with an accent or a type of logic with which the interpreter is not familiar, when they contain multi-word names or unfamiliar names, numbers, enumerations etc. When such conditions occur, they may cause overall saturation or saturation in one of the Efforts; this may result in errors, omissions or losing linguistic and/or delivery quality in the target speech. Simultaneous interpreters are also vulnerable to errors in processing capacity management, i.e. sub-optimal distribution of attention between the Listening Effort, the Memory Effort and the Production Effort. Such errors can also produce loss of interpreting quality. (p. 60)

5.2 Abbreviations

As defined by Merriam Webster dictionary (2020), an abbreviation "is a shortened form of a written word or phrase. Abbreviations may be used to save space and time, to avoid repetition of long words and phrases, or simply to conform to conventional usage". There are various forms of abbreviations (Brumeister 2008) such as pseudo-acronyms, anacronyms, acronyms, alphabetisms, and others, but the two main forms relevant to this paper are initialisms and acronyms. An initialism is a short form of a phrase or compound noun where each letter of the abbreviation is pronounced separately as an individual letter such as USA, EU, and IMF. Acronyms are usually formed by using the initial letters of a phrase or compound noun and is pronounced as a word such as "NASA", "LASER", and "NATO". Some abbreviations could also include numbers such as "COVID-19". There are some acronyms that do not include all initial letters of the complete form of the phrase to simplify the pronunciation of the acronym, such as the case in "UNICRI" which stands for United Nations Interregional Crime and Justice Research Institute; in such case the acronym "UNICRI" is much easier to pronounce than "UNICJRI" if written using all initials. In some acronyms, vowels are added between two initial consonants; this is usually done to create a word that adapts to the phonetic system of the language such as UNIDIR which stands for United Nations Institute for Disarmament and

Research, in which an "i" is added between the last two consonants for smoother pronunciation. This could also be done in order to create an acronym word that holds a meaning that would correspond to the nature of the entity it refers to such as the case in "Navy SEALs" which stands for Navy Sea Air and Land Forces where the "E" was added to create the acronym "SEAL". Thus, how abbreviations are created can be arbitrary, inconsistent, and have many variations.

According to Giraldo (2008), the correspondence of abbreviations to the full form of the phrase can be classified into three categories. The first is *total correspondence*, where the abbreviation includes each initial letter of each word in the full form such as "CIA", Central Intelligence Agency. The second is *partial correspondence* where the abbreviation lacks one or more of the initial letters of the words in the full form. For example, the acronym ADEX stands for Advanced Antisubmarine Warfare Exercises, where the initials of the main words are not used for the acronym to be more pronunciation friendly. The third is *nil correspondence*, where the initial letter of the first word of the phrase is omitted, for instance, the abbreviation PPD that stands for "Tuberculin Purified Protein Derivative" (from CAMC - Charleston Area Medical Center list of abbreviations).

According to Fandrych (2008), there are other classifications for abbreviations such as blends and clippings. Blends are words that form by using the first sounds or syllabi of the words of the phrase such as "modem" for "modulator/demodulator". Clippings are formed through omitting a part of a single word such as "ad" for "advertisement" and "exam" for "examination". In addition, some abbreviations are pronounced partly as initialisms and partly as acronyms such as the "LSAT" which is the Law School Admission Test. The first letter is pronounced as the letter L, and then the rest of the abbreviation is pronounced as one word. The same applies to "MCAT" which is the Medical College Admission Test.

5.2.1 Abbreviations as Problem Triggers in Simultaneous Interpreting

Many agree that abbreviations are quite a challenge for translators, as they are inconsistent units of language that lack meaning on their own (Gile, 2009; Peraza et all, 2013; Pöchhacker, 2007) and are an even greater challenge for interpreters due to the limited time they have for processing, analyzing, and reproducing the information into the other language. Even though abbreviations are linguistic items that might not be given much thought and might generally seem insignificant, they could be an obstacle to a smooth and efficient interpreting. This could

occur between any combination of two languages, even between languages of the same family, and cause an even greater issue when interpreting between languages of different origins. It is even a greater challenge when interpreting into a language where abbreviations are almost non-existent, such as the case in Arabic. For this reason, interpreting abbreviations have been chosen as part of this experimental research study.

According to Gile (2009), names and acronyms are speech items that consume more processing capacity due to their low redundancy and short duration. He explains that the briefest slip of attention may cause information to be lost. He also maintains that the errors in interpreting names and abbreviations result from deficiency in interpreters' processing capacity. In this respect, he states:

> problem triggers are associated with increased processing capacity requirements which may exceed capacity or cause attention management problems, or with vulnerability to a momentary lapse of attention of speech segments with certain features. (p.187)

According to Benavent (2003) and Giraldo (2008), one reason for which abbreviations pose a challenge to interpreters is that, sometimes, they are used without further explanation, and this could lead to confusion or misunderstanding, and the interpreter can end up with an inaccurate translation. This specifically occurs when the abbreviation is borrowed from a language that comes from neither the source nor target language.

Bankole (2006) explains that one difficulty caused by abbreviations is that some languages have the same abbreviations, but the order of initials changes because of a variation in the grammatical structure of these languages such as the position of nouns and adjectives in the phrase or the use of prepositions. For example, due to the variation in syntactic structure between English and French, abbreviations are formed differently to correspond to each language structure, such as AIDS (SIDA) and NATO (OTAN). Such differences, especially if the abbreviation is not used often, could cause hesitation during the interpreting process, leading to errors or transliteration. Other abbreviations contain different initials, for example WHO (World Health Organization) becomes OMS (L'Organisation Mondale de la Santé). It would be less complicated when the abbreviation is already known to the interpreter in both languages and is readily available in the interpreter's working memory. However, when the abbreviation is not readily available in the interpreter's mind but can be figured out from their own knowledge of the field, they would have to deconstruct the abbreviation to reformulate it

into the other language. This process takes much cognitive effort, which would overload the interpreter's working memory and could cause shortage in listening and comprehension of the incoming information, which might lead to loss of information or errors in interpreting.

In addition, some abbreviations have several meanings, i.e., they could stand for different phrases, some of which are difficult to distinguish, even from the context. For instance, the abbreviation "IMF" in physics could mean Intermolecular Force, Intermolecular Friction, Interplanetary Magnetic Field, Initial Mass Function, or Interference Mitigation Filter. And even where the specialists of this field might know what "IMF" would stand for in that context, the interpreter might not, since interpreters are generally not experts in the field in which they are interpreting. In this regards, Setton and Dawrant (2016) state that speakers should not assume that all listeners know the abbreviations they use and, thus, might be incomprehensible if the full form is not used along with the abbreviation. Even if the interpreter does know the abbreviated equivalent in the target language, listeners might not be familiar with it or might not use it often. Also, not all listeners speak the target language natively, so they might not comprehend the abbreviation.

Peraza et al. (2013) argue that, within the field in which they are used by its experts and specialists, some abbreviations are considered cultural elements. This means that only those within a community, of a particular profession, for instance, would know the meaning of that abbreviation. They also argue that there is an excessive use of abbreviations within many fields such as medicine, and this can impede communication due to the lack of equivalents or inaccurate translation. Peraza et al. (2013) state that, in the medical field, for instance, using abbreviations "is not only language-determined, but also culture-bound" (Peraza et al., 2013, p. 96). In this respect, Pöchhacker (2007) also maintains that many abbreviations are cultural units and not exclusively language dependent. He states that:

> …metaphorically speaking, acronyms are the 'tip of the tip' of the cultural iceberg. As the linguistic expressions used to refer to the realia in question are extremely non-redundant and non-transparent, they leave little room for inferencing and are grasped and understood or not. Acronyms are therefore highly vulnerable in the interpreting process and constitute a great translational challenge, presumably requiring explicitation for the target-cultural audience. (p.134)

Similarly, Gile (2009) states that:

> …linguistically/culturally induced information between the source language and the target language force the interpreter to find roundabout ways to construct a

> meaningful, faithful and acceptable utterance in the target language when it requires information not provided in the source speech, spend time and processing capacity deciding it is acceptable to leave out some of the source-language information, or weigh the risks and decide based on an educated guess. (p.213)

5.2.2 Abbreviations in Arabic

The interpreting of abbreviations can be especially challenging between language combinations of different origins such as English and Arabic, primarily since abbreviations are almost nonexistent in Arabic morphology. Therefore, they pose an issue for translators in general, and for interpreters in particular where decisions are made in a split of a second. There is no time to consult external resources and no time to think of possible alternatives or potential equivalences. There are times when abbreviations are used in Arabic written texts, but they are raraly used in Arabic spoken speech, and in both cases. Additionally, Arabic writers or speakers do not commonly use abbreviations without their full form immediately preceding them. Thus, the core issue of interpreting abbreviations from English into Arabic is essentially threefold; nonequivalence, unpredictability, and de/reconstruction.

Al-Qinai (2007) states that "Despite the rarity of acronyms in ancient and modern Arabic texts, these abbreviations represent no small challenge to the Arabic-English translator concerned with issues of equivalence and similarity." (Al-Qinai 2007, p.368). In general, when interpreting into Arabic, acronyms are easier to deal with compared to initialisms. This is because an acronym sounds like a word when pronounced, and sometimes, foreign acronyms are officially used and recognized in Arabic, so it is acceptable for interpreters to use many acronyms as they are in English. For instance, NASA, UNESCO and UNICEF are formally and officially recognized as proper names, so they are treated as such. In these examples, interpreting is simple, as the pronunciation of these acronyms aligns with the natural phonetic and morphological systems of the Arabic language. However, this is not the case with initialisms because they are pronounced by the utterance of each letter on its own, and such phenomena does not abide by the Arabic morphological system. In addition to that, abbreviations could consist of phonemes that do not exist in Arabic such as P, which is usually adapted into a B, as it is the closest existing phoneme to it in Arabic. For instance, the abbreviation CPT which stands for Cognitive Processing Therapy can be mistaken by CBT, which is Cognitive Behavioral Therapy. In such case, the interpreter has absolutely no option but to render the full form of the abbreviation to fully and accurately convey the message. The interpreter can render the full abbreviation when mentioned in the original discourse but cannot

render it if the abbreviation does not appear in the discourse. This adds more load to the cognitive effort and processing capacity.

Another issue with transliteration of acronyms is that some acronyms in English are a homonym of a word in Arabic. For example, the acronym "MENA", which stands for Middle East and North Africa, is a homonym for the Arabic word that means "harbor". In addition to that, "MENA" is also an abbreviation for Middle East News Agency. Another instance is the acronym "GATT", The General Agreement of Tariffs and Trade, which coincides with be the same pronunciation of the Arabic word "Khat" or "Qat", which is a drug derived from the "Catha" plant that is native to the Arab Peninsula. Although legal in some countries, it is an illicit drug in many others and is classified by the WHO as a drug of abuse that can produce psychological dependence (Nutt, et al, 2008). In such case, if the interpreter transliterates the abbreviation "GATT", and the listener is not familiar with it in the source language, the listener might be confused or feel that some information is missing, and this could also jeopardize the interpreter's credibility. Another issue is that some acronyms could have several pronunciations if they were to be transliterated into Arabic. For instance, the acronym of the International Organization for Standardization "ISO" can be pronounced in Arabic in several different ways such as -**آيسو آيزو – إيزو – إيسو**, and this could lead to inconsistency, which might cause confusion to the listeners.

It is also interesting to note that sometimes, the foreign acronym is adopted and naturalized into the Arabic language to the extent that other derivations of the acronym are created (Al-Qinai, 2007). For example, "LASER" is used with other derivatives in Arabic that align perfectly to Arabic morphology such as:

To be exposed to laser = **مليزر** (Mulayzar)
A laser appliance = **ملزار** (Melzar)

It should be explained that most Arabic acronyms can only be created and used if they align with the Arabic morphological system or if the acronym created signifies an already-existing word. Al-Qinai (2007) explains that some acronyms are constructed in reverse so they give favorable meaning to the organization or entity to which the acronym refers. For instance, The Palestinian National Liberation Movement **حركة التحرير الوطني الفلسطيني** where initials are written in reverse to transform the acronym from "Hatf" "**حتف**" which means "death" to "Fat'h" "**فتح**" which means "to open or to set free". It is also interesting to note that the initial of the word

"National" in the Arabic acronym has been eliminated in order for the acronym to preserve the meaning desired by the political party. Also, in all these examples the definitive article "the" in Arabic is eliminated from the formation of abbreviations to create more appealing or pleasant acronyms. Another important example is The Palestinian Democratic Union **الاتحاد الديمقراطي الفلسطيني**, which is also written in reverse to make the acronym "Fida" "**فدا**", which means "sacrifice" instead of "Adef" "**ادف**", which means "to push" in colloquial Arabic. In other cases, the initials are not reversed but are reorganized to create a meaningful word that represents the entity, such as The Palestinian News Agency; initials are placed in an order to create the word "Wafa" "**وفا**" which means "loyalty" instead of "Waf" "**واف**" which is meaningless (Al-Qinai, 2007).

Another major issue with abbreviations that interpreters face is when speakers use abbreviations of chemical compounds during scientific conferences or seminars. This can severely affect the whole interpreting process, as some abbreviated compounds represent lengthy names, where in English, they would take only a few seconds to pronounce, while it would take several seconds to be pronounced in Arabic, and where the interpreter is not familiar with a specific chemical compound, it would take even more time to retrieve the equivalent. For example, if a speaker used the abbreviated chemical formula of "CO_2", instead of Carbon Dioxide, the interpreter must interpret it into its full form "**ثاني أكسيد الكربون**" which is three words as opposed to the three-letter abbreviation. It is also worthwhile to point out that some abbreviated chemical formulas are actually longer to pronounce in English than the full Arabic version of it. For instance, "K_2CrO_4", which is Potassium Chromate, is only translated in two words in Arabic, "**كرومات البوتاسيوم**". However, several other chemical formulas of the same family are similar in pronunciation with major differences in meaning such "$K_2Cr_2O_7$" "Potassium Dichromate"; thus, the Listening and Analysis Effort is overloaded because the time it will take the interpreter to analyze which of the chemical compounds the speaker is referring to and retrieving the Arabic translation to it, the translator might miss other parts of the discourse.

5.3 Proper Names in Arabic

Besides the difficulties proper names pose on interpreting elaborated above, there is extra difficulty specifically when interpreting between English and Arabic. One major issue when translating proper names from English into Arabic is inconsistency in translation. This can be

seen in names such as David, John, and Joseph. These names are originally names of prophets but are popular names of people. Thus, such names are translated differently depending on weather the name refers to the prophet or to another person. For instance, if the name David refers to the prophet, then the Arabic translation would be "Dawood"; however, if the name refers to another person, then the name is transliterated and remains unchanged neither in pronunciation nor in writing, although it could be slightly altered for naturalization. And the same goes for all other names such as "Jesus > Eissa", "Jacob > Yaqub", "Joseph > Yusuf", "John" > "Yahya", etc.

Inconsistency can also be seen in geographical names. For instance, a city named "Saint Catharines" (such as that in Ontario, Canada), would be transliterated; however, if the same name is referring to a cathedral, for instance, the word "Saint" would be translated and not transliterated. Another example of translation inconsistency can be seen in the names of countries, provinces, or cities; for instance, the word "South" in South Korea is translated into Arabic, unlike South Dakota where the word "South" is transliterated. Inconsistency has also been evident in politically or culturally sensitive geographical names. For instance, when interpreting cities Such as "Al-Quds", should the translator transliterate it or translate it as "Jerusalem"? This is something could cause problems for translators even though they have the time to decide or research the best option; interpreters would have a harder time dealing with it, as it increases the decision-making load during interpreting even if it would cost them only split seconds to think about the most proper interpreting for the name due to the lack of unified or standardized translation. In this regard, Pour (2009) states:

> There is no doubt that translating personal names should not be assumed to be an easy issue because it can be very troublesome in practice and needs very sensitive decision making by the translator within the translation process. (p. 1)

Vermes (2003) also states:

> The translation of proper names has often been a simple automatic process of transference from one language into another, due to the view that proper names are mere labels used to identify a person or a thing. Contrary to popular views, the translation of proper names is a non-trivial issue, closely related to the problem of the meaning of the proper name. (p. 92)

Another issue involved in interpreting names is the difference in word order between languages. This can be seen where adjectives in English precede the noun, whereas in Arabic, the noun precedes the adjective. Generally, this is easier to tackle with short compound names;

however, if the interpreter encounters a long organization name such as “The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States”, the interpreter would need some extra time to process the name and reorder nouns and adjective. This causes an overload of the interpreter’s working memory, which could lead to a higher probability of error. In addition to the syntactic structure variation in the position of the adjectives between English and Arabic, there is also noun-adjective gender agreement in Arabic between the plural and singular forms of the noun. For instance, the noun “office” in its singular form in Arabic is masculine, and any adjective added to it would be in masculine form as well; yet, any adjective added to the plural form, “offices”, would transform into feminine and not masculine. This could also lead to further errors such as using the incorrect gender of the abbreviated term since, unlike Arabic, gender identifiers do not apply in English when referring to entities, countries, cities, etc.

5.4 Proposed Coping Strategies During Training

Several procedures involve interpreting proper names. Dweik and Al-Sayyed (2016) suggest:

1- Transliteration: Using the SL noun as it is pronounced in the SL.
2- Naturalization: Adapting the pronunciation of the SL noun to TL pronunciation of words.
3- Cultural adaptation: Replacing ST cultural word with an equivalent in the TL culture.
4- Functional equivalent: Using a culturally neutral word that conveys the intended meaning.
5- Descriptive equivalent: Providing description in different words to clarify meaning.
6- Paraphrasing: Adding explanation that is more detailed than the SL to clarify the meaning of the word.

Van Coillie (2006) also designed a model suggested for the translation of proper names that comprises of 10 strategies, some of which can also be applied in interpreting:

1- Reproduction where foreign names are unchanged.
2- Nontranslation plus additional explanation: by adding extra information in a footnote or in the body of the text.
3- Replacement of the personal names by a common name that characterizes the person. For example, using “The President” in which it is clear from the context and situation

who is the president referred to.

4- Phonetic or morphological adaptation to the target language.
5- Exonym: by replacing a name by its counterpart in the target language.
6- Replacement by a more well-known names from the source culture or an international known name with the same function.
7- Substituting a name by another name from the target language.
8- Translating names with particular connotation.
9- Replacement by a name with additional connotation.
10- Omission.

Interpreters often use subconscious methods to recover from a problem trigger. However, with training and mindfulness, students can learn to be aware of the recovery method, even if used subconsciously. Thus, Gile (2009) suggests that "in line with the process-oriented approach, during practical exercises, students should be encouraged to *explain* tactics they have chosen." (Gile, 2009, p. 207).

Transliteration is probably the simplest strategy, as it requires little effort. If the speaker utters a proper name or noun that the interpreter is not familiar with, they can replicate the sound as it is. This is efficient in that it requires little cognitive effort and the interpreting output retains its flow. The listeners might not notice that the interpreter does not know the equivalent in the target language, especially if the listeners themselves are familiar with the name. But if the listeners do notice that the interpreter reproduced the name in the target language as it is in the source speech, their credibility might be questioned. Gile (2009) explains that "the approximation may also be detected and perceived as a distortion of the information, which may discredit the interpreter, especially if the name or term is well-known to the audience." (Gile, 2009, p. 207). Interpreters could also transliterate and adapt the name to fit the phonological system of the target-language so it becomes smoother within the rendition. Listeners might understand the name reproduced or naturalized from the source language if they have encountered or used that name during their practice in the field to which the name belongs since many names are borrowed from one language to another. Gile (2009) explains that "the instant naturalization tactic may also prove very effective when in their daily life, delegates read much written material in the source language. In such a case, they often recognize the 'naturalized' terms, which are likely to sound similar to the way they pronounce the words in the source language when reading." (Gile, 2009, pp. 207-208).

Another method that could help interpreters deal with proper names in an enumeration is to interpret the ones that appear last in the list. This is done to take the load off the working memory soon and then retreive the remaining names in the list. Gile (2009) explains that "this tactic may work best with names, which can be reproduced from *echoic* memory (memory of the sound), or with terms easily transcoded; it may not be effective if they cannot be transcoded or reproduced phonetically and require more processing capacity anyway." (Gile, 2009, pp. 205-206).

5.5 The Present Study

To investigate the effectiveness of the subskills approach in the training of abbreviations and proper names, an experimental study has been conducted at Princess Nourah University (PNU) in Riyadh, Saudi Arabia from July 4th, 2019 to August 14th, 2019. The study was conducted in a simultaneous interpreting course with two groups: an experimental group with 21 participants and a control group with 21 participants as well.

5.5.1 Participants

There were 42 student participants in the study. All students were females aged between 20-22 and have completed their third year of the 5-year undergraduate Translation Program in PNU. All students have received at least one interpreting course of consecutive interpreting course and/or a sight interpreting course. All students have a language combination of Arabic (A) and English (B). Students who are enrolled in this class are expected to have a high command of spoken English and Standard Arabic and must have successfully passed at least one of the previous interpreting courses.

The students were divided into two groups: the experimental group and the control group. Both groups consisted of 21 participants, The participants were separated into the two groups according to their linguistic competence as measured by diagnostic translation test given to them before the study (Appendices 5 and 6). As a result, both groups have almost the same ratio of low, mid, and high performing participants.

5.5.2 Instructional Material

Before the study began, all students were given an interpreting exam, T1 (pre-test), to evaluate their overall performance and their accuracy rate when interpreting names and

abbreviations. After the course was completed, students were given another test, T2 (post-test), to evaluate their progress. To ensure comparability and uniformity between T1 and T2, the names and abbreviations were distributed almost identically throughout both speeches and were inserted within the same proximity; a transcription of T1 and T2 are available in Appendices 3 and 4. During the interpreting training, both groups received the same speeches, but the experimental group received extra exercises and drills that were denser in names and abbreviations, some of which were in a form of a short speech decomposed into separate sentences including names and abbreviations, in addition to drills that include only a list of names and abbreviations with no surrounding text or message. The control group, however, received none of these targeted exercises or drills and were only given the same speeches as the experimental group to interpret in class. A detailed description of the instructional methodology and the videos used is available in chapter three, the pedagogical approach chapter of the thesis.

5.5.3 Procedure and Method

The Simultaneous Interpreting course was delivered by the researcher (myself) as a complimentary non-credit interpreting training course for free for all attendees in a duration of four weeks from July 4th, 2019 to August 14th, 2019. It was offered at the College of Languages, English Translation Department in PNU, Riyadh, Saudi Arabia. The classes were held three days per week, two hours per day per group. During the classes, both groups received simultaneous interpreting training, covering a range of speeches in business and medicine. These two fields were selected because they were covered by the participants in previous interpreting courses. Thus, it seemed more effective to select topics with which the participants are already familiar to avoid the extra difficulty new subject fields would pose on students. The speeches given to both groups were not dense in names or abbreviations and some included none. The class comprised of three or four speeches ranging between two and six minutes, approximately, and were in English>Arabic and vice versa. In addition to the speeches given to the control group, the experimental group received one extra 15-minute exercise each class.

The subskill targeted exercises included (1) semi-isolated drills, where students interpret separate sentences that include names and/or abbreviations, all sentences were within the same context to form one short speech decomposed into sentences each of which include a name and/or abbreviation; and (2) full-speech exercises, where students interpret a full speech that includes more names and abbreviations than other speeches.

The T1 and T2 tests were similar in terms of length, speed, level of difficulty, distribution of names and abbreviations, and lexical density. A full description of the procedure and methodology is detailed in the Pedagogical Approach chapter.

5.5.4 Assessment

The assessment of the results aims to investigate whether the proposed subskills training approach adopted in the course was effective and, if it was, to what extent. To draw such conclusions, effectiveness should be defined in this context. The chapter "Pedagogical Approach" is dedicated to describing the process of the whole pedagogical approach employed in this study. Effectiveness is measured by whether the approach helped learners achieve higher accuracy rates in interpreting names and abbreviations. It is necessary to point out the importance of accuracy in correctly interpreting both names and abbreviations and their immediate message. It goes without saying it is not acceptable to interpret a name or abbreviation correctly but omit the immediate message or interpret it incorrectly.

With that in mind, how would the researcher in this study asses interpreting a segment that lacks meaning but the name or abbreviation is accurately rendered? This issue can be addressed from two viewpoints. The first is from the operational perspective of the research, i.e., the quantitative analytical result of accurately interpreted names and abbreviations, and the second from the perspective of the ultimate objective of simultaneous interpreting, i.e., correctly and accurately transferring the message/idea into the other language and not just the name or abbreviation. Thus, for this study, names and abbreviations and their immediate message were scored as separate items, and only names and abbreviations were included in the statistical analysis. This has been decided because, as for research operation, the most reliable and straightforward method is to determine the effectiveness of the subskills approach according to the calculation of accurately interpreted names and abbreviations.

To calculate the scores to derive a statistical analysis of the accuracy/error rate between T1 and T2 speeches, the following evaluation key was adopted.

1 point if the name/abbreviation was rendered correctly
0.5 point if a compound name was correctly rendered partially
0 if the name or abbreviation was rendered incorrectly or omitted

5.5.5 Categorization of Errors

1. Omission: the name/abbreviation is left out all together.
2. Phonological: the rendered name/abbreviation is rendered but incorrect due to phonological error, for example Catalina instead of Catarina, or Indonesia instead of Andalusia.
3. Incorrect: a name/abbreviation is rendered but is incorrect and not phonologically similar.
4. Non-existent: a name/abbreviation is rendered but does not exist for example Cuadalera instead of Guadalajara.
5. Language transfer: the name is rendered as it is pronounced in the source speech for example Mexico instead of Almaxique.
6. Incomplete: the participant rendered the name/abbreviation but has not completed rendition.

Proper names in T1 and T2 are classified into these categories:

1. Proper names: names of people consisting of first and last name.
2. Location names: countries and cities.
3. Other: names of organizations and other entities.
4. Abbreviations: organizations and other entities in their abbreviated form

5.5.6 Results

In this section I will discuss the accuracy and error rate of renditions of each participant, the average accuracy and error rate of the control and experimental groups as a whole, the types of errors that occurred and the most frequent ones, and how the experimental group performance compares to that of the control group. After that, I will discuss how the results of my study compares to the results of other previous studies similar to mine.

5.5.7 Statistical Analysis: Quantitative Approach

The accuracy and error analysis conducted on interpreting T1 and T2 covers these points:

a. The accuracy rate of total correct renditions.
b. The average rate of different types of error.
c. Which types of errors were the most frequent.
d. Whether certain names/abbreviations were likely to result in a particular type of error.

e. The progress rate for each participant in the total amount of correct renditions.
f. The progress rate for each participant in the errors.
g. A comparison between the average rate of error and accuracy of the experimental group and the control group.
h. A comparison between the average progress rate between the experimental group and control group.
i. A comparison between the average progress rate between the experimental group and control group in the errors.

5.5.8 Accuracy Rate

After the examination and statistical analysis of the participants' progress in the correct rendering of names and abbreviations in the pre-test (T1) and post-test (T2), the results, illustrated in the charts below, show that both the experimental and control groups have improved in terms of names and abbreviations accuracy rate. However, the experimental group has shown much more significant progress in accuracy rates compared to the control group.

5.5.9 Total Results

The average progress rate of the experimental group is 18% while the average progress rate of the control group is 7%. All participants in the experimental group have improved in terms of accuracy rate except for one participant (out of 21 participants) who showed no improvement, and one participant whose improvement was -1%. Progress rate of the experimental group ranged from -1% to 36% with a mode value of 23% and a median value of 20%. But in the control group, six participants (out of 21) scored lower in T2 and one participant had the exact same score. Although it is not clear from the statistical analysis why those students have scored lower in T2, personal factors might have affected these participants' low performance such as emotional and psychological factors. Progress rate of the control group ranged from -20% to 24% with a mode value of 6% and a median value of 20%. The total percentage of students who have improved in the experimental group 85.7% and 66.6% in the control group.

Table 13: Experimental Group Accuracy and Progress

Participant	Pre-test %	Post-test %	Progress %
PEX17	33%	69%	36%
PEX18	18%	53%	35%
PEX14	18%	53%	35%
PEX11	16%	45%	29%
PEX20	31%	59%	28%
PEX01	50%	78%	28%
PEX06	54%	77%	24%
PEX07	36%	59%	23%
PEX16	35%	58%	23%
PEX08	28%	47%	20%
PEX09	27%	46%	19%
PEX23	13%	29%	17%
PEX05	25%	41%	16%
PEX15	22%	34%	12%
PEX02	57%	68%	11%
PEX10	32%	42%	10%
PEX19	47%	56%	9%
PEX13	49%	57%	8%
PEX12	41%	46%	5%
PEX04	59%	59%	0%
PEX03	41%	40%	-1%
Average	35%	53%	18%

Table 14: Control Group Accuracy and Progress

Participant	Pre-test %	Post-test %	Progress %
PCT19	21%	46%	24%
PCT10	29%	54%	24%
PCT22	21%	44%	23%
PCT15	32%	52%	20%
PCT03	29%	47%	18%
PCT18	23%	41%	18%
PCT14	19%	34%	15%
PCT11	58%	70%	12%
PCT01	37%	46%	9%
PCT23	31%	38%	7%
PCT12	38%	44%	6%
PCT13	29%	35%	5%
PCT16	44%	49%	5%
PCT17	49%	50%	1%
PCT07	40%	40%	0%
PCT05	29%	28%	-1%
PCT06	70%	69%	-1%
PCT04	53%	47%	-5%
PCT02	37%	31%	-6%
PCT08	38%	22%	-16%
PCT09	76%	56%	-20%
Average	38%	45%	7%

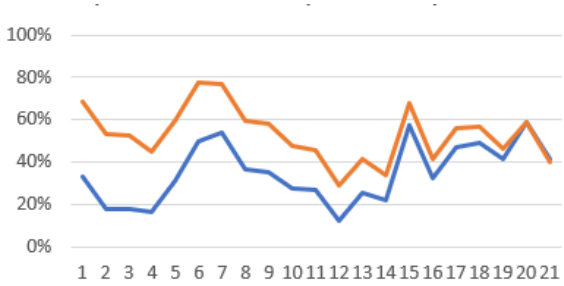


Figure 5: Names and Abbreviations - Experimental Group: Accuracy Rate

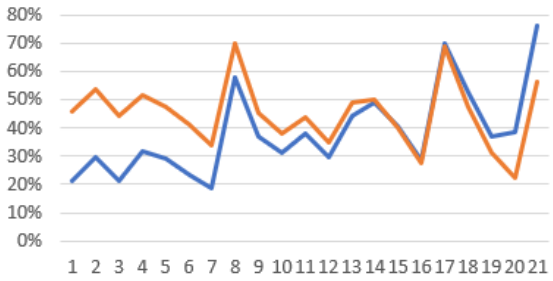


Figure 6: Names and Abbreviations - Control Group: Accuracy Rate

POST-TEST %
PRE-TEST %

5.5.10 Results Breakdown Per Category

Abbreviations proved to be the most problematic area for both groups, with an average progress rate of 5% for the experimental group and 2% for the control group. But the most significant progress is seen in names, with an average progress rate of 24% in proper names for the experimental group, and 8% for the control group. For location names, the experimental group showed an average progress rate of 26% and the control group 17%. The final category is other names (names of organizations) with a progress rate of 16% for the experimental group and 1% for the control group.

Table 15: Progress Rate of the Experimental and Control Group Per Category

Category	Experimental Group			Control Group		
Average accuracy rate	Pre-test	Post-test	Progress	Pre-test	Post-test	Progress
Total	35%	53%	18%	38%	45%	7%
Abbreviations	39%	44%	5%	35%	37%	2%
Proper names	22%	46%	24%	31%	39%	8%
Location names	45%	71%	26%	48%	65%	17%
Other names	17%	33%	16%	18%	19%	1%

5.5.11 Error Analysis

Several error types in interpreting names and abbreviations have been observed in both groups and in both T1 and T2. The results of the study reveal that the most frequent and recurrent error is “omission”. Yet, the omission frequency and rate improved for both groups. Yet, again, the experimental group has shown more progress. In the experimental group, the average omission rate in T1 was 59%, which decreased to 34% in T2. In the control group, the average omission rate in T1 was 55%, which decreased to 47% in T2. This demonstrates that the average omission rate in the experimental group decreased by 25%, whereas, in the control group, the omission rate decreased by only 7%. Out of the 21 participants in the experimental group, all participants improved achieving lower omission rates, except for one participant. Four of the 21 participants in the control group had higher omission rates in T2.

Although omission was the most frequent error, other types of errors were spotted, although, they exhibited a low percentage and minimal progress rate across both groups. The second highest error is “incorrect”, in which a name was rendered in the interpretation but was rendered as a different name and one not even phonologically similar to the original; incorrect names consisted of 5% of errors in both groups and with marginal progress of 1%. Other errors contributing to less than 3% were phonological errors, non-existent names, language transfer and incomplete rendition. Examples of these errors are analyzed from a qualitative perspective in the descriptive analysis section below.

5.5.12 Language-specific Errors in Interpreting Proper Names

The proper names selected for T1 and T2 came from four languages: English, French, Spanish and German. For the analysis to be comparable for this study, all languages were selected from the Indo-European language family, and each was selected for a distinctive feature specific for the participants. English was selected, as it is the students' second language. French was selected to investigate students' performance in a language of more difficulty (compared to English), yet with some exposure and knowledge of the language because all students have taken an elective French course during their BA program. Spanish was selected as a language with little difficulty (compared to French) but less exposure and knowledge, as none of the students have received any Spanish courses in or out of their BA program. German was selected as a language of substantial difficulty and little exposure or previous knowledge. The degree of difficulty and familiarity was set according to the participants' rating of each language difficulty according to their own perception of the language and previous knowledge and exposure to it. Thus, according to participants' rating, the languages were rated: English (easy and much exposure), French (difficult but with previous knowledge and some exposure), Spanish (easy but with no previous knowledge or exposure), and German (difficult and no previous knowledge or exposure). Further explanation of this rating is discussed in the descriptive analysis below.

As for the language-specific progress rate of interpreting proper names, the tables and charts below demonstrate that both groups improved in rendering names of all language, yet, the experimental group achieved higher progress rates. English names received the highest accuracy rate with an overall average progress rate of 45% by the experimental group and 36% by the control group. Followed by French and Spanish, both of which received very similar scoring where the average progress rate was 36% in French and 35% in Spanish names by the experimental group and 23% and 22% by the control group respectively. German names received the least progress rate scores with an average of 30% for the experimental group and 11% for the control group.

Table 16: Progress Rate of the Experimental and Control Group Per Language

Category	Experimental Group Average Progress	Control Group Average Progress
English	45%	36%
French	36%	23%
Spanish	35%	22%
German	30%	11%

Table 17: Progress Rate in English Names

Participant	Experimental Group	Participant	Control Group
PEX17	62%	PCT19	54%
PEX18	60%	PCT10	45%
PEX14	60%	PCT22	53%
PEX11	59%	PCT15	50%
PEX20	58%	PCT03	47%
PEX01	54%	PCT18	45%
PEX06	53%	PCT14	48%
PEX07	53%	PCT11	42%
PEX16	50%	PCT01	39%
PEX08	49%	PCT23	37%
PEX09	47%	PCT12	24%
PEX23	46%	PCT13	35%
PEX05	42%	PCT16	35%
PEX15	41%	PCT17	29%
PEX02	40%	PCT07	31%
PEX10	39%	PCT05	26%
PEX19	38%	PCT06	30%
PEX13	35%	PCT04	36%
PEX12	21%	PCT02	23%
PEX04	18%	PCT08	20%
PEX03	17%	PCT09	16%
Average	45%	Average	36%
Median	47%	Median	36%
Mode	60%	Mode	45%

Table 18: Progress Rate in German Names

Participant	Experimental Group	Participant	Control Group
PEX17	45%	PCT19	28%
PEX18	39%	PCT10	30%
PEX14	39%	PCT22	23%
PEX11	36%	PCT15	18%
PEX20	40%	PCT03	21%
PEX01	36%	PCT18	22%
PEX06	42%	PCT14	16%
PEX07	37%	PCT11	19%
PEX16	40%	PCT01	18%
PEX08	33%	PCT23	19%
PEX09	29%	PCT12	12%
PEX23	31%	PCT13	7%
PEX05	31%	PCT16	10%
PEX15	29%	PCT17	7%
PEX02	23%	PCT07	3%
PEX10	25%	PCT05	4%
PEX19	24%	PCT06	0%
PEX13	28%	PCT04	0%
PEX12	12%	PCT02	-3%
PEX04	7%	PCT08	-7%
PEX03	0%	PCT09	-12%
Average	30%	Average	11%
Median	31%	Median	12%
Mode	39%	Mode	18%

Table 19: Progress Rate in French Names

Participant	Experimental Group	Participant	Control Group
PEX17	50%	PCT19	33%
PEX18	52%	PCT10	35%
PEX14	50%	PCT22	35%
PEX11	48%	PCT15	36%
PEX20	46%	PCT03	29%
PEX01	39%	PCT18	30%
PEX06	39%	PCT14	30%
PEX07	40%	PCT11	23%
PEX16	38%	PCT01	26%
PEX08	40%	PCT23	22%
PEX09	42%	PCT12	27%
PEX23	40%	PCT13	22%
PEX05	36%	PCT16	26%
PEX15	26%	PCT17	18%
PEX02	29%	PCT07	20%
PEX10	33%	PCT05	21%
PEX19	30%	PCT06	18%
PEX13	19%	PCT04	17%
PEX12	30%	PCT02	6%
PEX04	14%	PCT08	7%
PEX03	14%	PCT09	2%
Average	36%	Average	23%
Median	39%	Median	23%
Mode	40%	Mode	35%

Table 20: Progress Rate in Spanish Names

Participant	Experimental Group	Participant	Control Group
PEX17	48%	PCT19	32%
PEX18	55%	PCT10	34%
PEX14	56%	PCT22	35%
PEX11	49%	PCT15	35%
PEX20	44%	PCT03	29%
PEX01	39%	PCT18	28%
PEX06	38%	PCT14	28%
PEX07	41%	PCT11	21%
PEX16	40%	PCT01	28%
PEX08	36%	PCT23	25%
PEX09	39%	PCT12	24%
PEX23	32%	PCT13	19%
PEX05	24%	PCT16	23%
PEX15	35%	PCT17	20%
PEX02	32%	PCT07	22%
PEX10	26%	PCT05	20%
PEX19	30%	PCT06	17%
PEX13	26%	PCT04	15%
PEX12	16%	PCT02	2%
PEX04	13%	PCT08	0%
PEX03	9%	PCT09	-2%
Average	35%	Average	22%
Median	36%	Median	23%
Mode	39%	Mode	28%

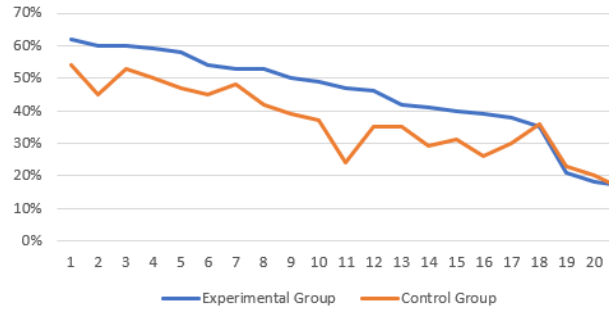


Figure 7: Progress Rate of Experimental & Control Groups in Rendering of English Names

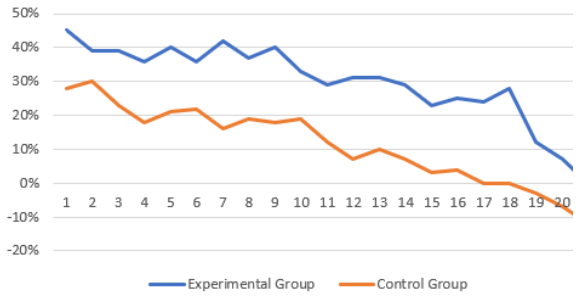


Figure 8: Progress Rate of Experimental & Control Groups in Rendering of German Names

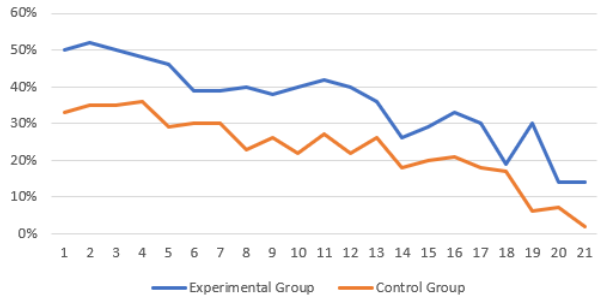


Figure 9: Progress Rate of Experimental & Control Groups in Rendering of French Names

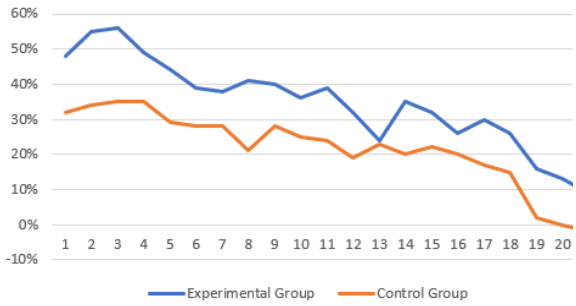


Figure 10: Progress Rate of Experimental & Control Groups in Rendering of Spanish Names

5.5.13 Interpreting of Names and Abbreviations: Quantitative and Descriptive Analysis

In the quantitative approach described above, the statistical analysis of this study gives us the numbers and figures that demonstrate students' performance. It does not, however, explain or justify why or how participants have performed in this manner. In light of this, it would be worthwhile to examine possible reasons specific items were difficult or why certain proper names or names of specific languages were more difficult. In light of students' recall and explanations during class discussion and their responses to questions regarding difficulties they faced while interpreting names and abbreviations, we can determine whether the coping strategies they adopted were conscious or not.

Before T1 and T2, participants were asked to rate the difficulty of English, French, Spanish, and German names on a scale of 1-10 (10 being the most difficult) according to their general perception or knowledge of the languages. In both the experimental group and the control group, the average difficulty, for each language was:

English: 6/10 French: 9/10 Spanish: 7/10 German: 9/10

When asked to describe their general perception or knowledge of the languages and identify the bases on which they perceive the names to be difficult, the factors were the language's phonemic system (including both consonantal and vocal system) and how distinct it is compared to English, alphabetical system, and length of morphemes.

English was the least difficult, as it is their B language and is extensively used. However, the students unexpectedly rated French to be as difficult as German even though all the students have taken at least one French course as an elective during their BA program, and generally, French is more used far more than German in the Arab world; hence, the students' exposure to French is much higher compared to German. Even so, for various reasons, students still viewed French to be as difficult as German. They attribute difficulty of French names to the lack of phonemic orthography, while difficulty of German names is attributed to non-familiarity with the language in general.

Considering students' remarks and the test results, we can conclude there are mainly two factors that dictate the level of difficulty when interpreting names. The first is the language itself, i.e., the difficulty of the names of a specific language as perceived by the students. The second factor is familiarity, i.e., how much students have been exposed to the language or how familiar they are with it, whether it was through the media, interest, previous language course, etc. To examine this conclusion further, a comparative analysis of the students' perception of language difficulty and the students' familiarity and exposure to the language has been investigated.

The two tests the students were given included proper names of different origins: English, German, French, and Spanish. German received the highest error rate followed by French and Spanish with almost equal error rate and English with the lowest error rate. Not surprisingly, the participants, with no exception, rated German names to be the most difficult, with an average difficulty rating of 9/10. This was also reflected in their performance in both the pre-test and post-test. And it was also no surprise that the participants, with no exception, have rated English names to be the least difficult, with an average difficulty rate of 6/10. This was also reflected in their performance in both the pre-test and post-test.

However, the average difficulty rate for the French names was 9/10, the same difficulty rate as the German names; however, the students in both groups have performed significantly better in French compared to German, as evident in their scores in the charts above. But the average

difficult rate for Spanish names was 7/10; yet most students' performance in both Spanish and French names was linear, and was almost identical for the most part. Albeit. French and German names were perceived to be equally difficult, the results indicate otherwise. All the students' performance in interpreting German names was far lower than their performance in interpreting French language. Surprisingly though, students' performance in interpreting French names was similar to their performance in interpreting Spanish names even though none had had any previous Spanish course, unlike French.

With this in mind, we find that the students perform at their highest when interpreting names of a language they perceive as easy and have exposure to, as is the case with English. We see that the students perform at their lowest when interpreting names of a language they perceive as difficult and have little or limited exposure to such as German. On the other hand, students perform equally mediocre when interpreting a language they perceive as easy or difficult according to the extent of exposure or previous knowledge they have of the language. (courses) This can be seen with French names where students perceived them as difficult but had previous knowledge and Spanish where students perceived them as easy but had limited exposure. This is important because being aware and conscious of this could help anticipate the level of difficulty and lower the probability of error.

It is also interesting to mention that students who performed relatively well in Spanish compared to others pointed out that they have found Spanish names to be somewhat easier because one of their hobbies is watching Spanish series; this demonstrates how higher familiarity with or exposure to the language positively affected students' performance and contributed to their higher accuracy rate.

All students in both groups reported that the German names were the most difficult while interpreting, and this category received the highest error rate. The most frequent error is omission, followed by incorrect pronunciation. Most students explain that, since they are not used to hearing German names, they faced difficulties in reproducing them while interpreting. Other students say that the German names were easy to hear but were difficult to mimic and, therefore, they could not pronounce them accurately. In this respect, some students elaborated that they reproduced the name to simplify it for themselves while interpreting. For example, instead of pronouncing "Steinmeier" as "SHT-EYE-N-m-eye-her", they utter it "Shtenmer". Others who described their mental process explained that they had to put extra effort into

pronouncing the name accurately, which caused them to miss the information in the message immediately following the name, which made them omit the other German names so that the message was not compromised.

As for French names, students reported that they have had little difficulty interpreting or pronouncing proper names. All the students in the study have taken at least one French elective course during their undergraduate program. Thus, they did not feel that the French names were very "foreign" to them. Students also explain that French media coverage is more frequent than German on Saudi channels, meaning they are more exposed to French names and are already familiar with some names in the speeches of French politicians or diplomats such as François Hollande and Brigitte Marie-Claude. Another factor that makes French names less difficult could be that French is widely used and spoken in several Arab countries such as Lebanon, Morocco, and Algeria. Thus, many Arabs from countries that were previously French colonies have French names. This made French names more familiar to the students, which made these names less difficult to interpret as compared to German names.

Most students said that transliteration was their "go-to" coping strategy; they explain that some transliteration decisions made during interpreting were deliberate because they feared that if they lingered too long trying to interpret the name or abbreviation, it would cost them the interpretation of the message and they felt it was more important to deliver the message than the name or abbreviation. For instance, most students transliterated the abbreviation "MENA countries" and did not translate it to "Middle East and North African countries". They stated that they also did so even when transliteration was not applicable; for instance, many students transliterated the abbreviation "UNHCR", as they did not want to dedicate more attention span on the name and less on the message.

The students also explained that, while transliterating certain names, they were aware of making the error while interpreting, but chose to continue and not correct themselves due to the fear of missing important information during the speaker's discourse. For instance, many students who made the error of translating "Andalusia" as "Indonesia" instead of "Andalusia" said that while uttering "Indonesia" they were aware that something was not right since the context of the speech was on Spain. Yet, they did not want to exert the mental effort it would take to make the correction. Interestingly, some of the participants did not even realize that they made that error or realize that the name was "Andalusia" and not "Indonesia; they stated

that, during interpreting, they utter the name exactly as they hear it, with no analysis; therefore, they did not even realize that "Indonesia" was completely out of context. The rate for these phonological errors, where a name was rendered incorrectly but phonologically similar to the original, is minute, yet, the error can provide insight on the cognitive processing of the students during simultaneous interpreting and the level of students' awareness regarding errors during interpreting.

Different categories of error have been observed in both groups and in both T1 and T2. Even though these errors did not count for much in the statistical analysis, one interesting error was language transfer. Language transfer is where the names of countries or cities were rendered accurately but in the same language of the source speech. For instance, some participants transliterated "Spain" and did not render the Arabic version of it, which is "Espanya". Others transliterated "Mexico" instead of translating the name to "Almaxique". A few said they were not aware of doing so, and others explained that, by the time they realized they had pronounced it as the source language, it was already too late to correct the error and moved on to avoid distraction and the risk of making even more errors.

As for compound names consisting of two or three names such as Frank-Walter Steinmeier and Briggite Marie-Claude, most students stated that they deliberately decided to only partially utter the name and omit the first or last name of the person. Others explain that they omitted the entire name when that person's position was mentioned in the speech, and they only translated the position, such as "Prime Minister Theresa May". Students who omitted "Theresa May" and only translated "Prime Minister" justify this strategy by assuming that the listener should know from the context to whom the speaker is referring. They thought that interpreting both the name and the position was unnecessary and would only cost them more time and effort that should be dedicated to the message. Others, however, said that they were not aware that they omitted part of the compound name. They believe they did so unconsciously, as they were focusing more on the message rather than the name. Some participants also said that they have omitted the full name because they took quite a while translating the person's position, as it was not readily available in their working memory.

5.6 Conclusion

The results above reveal that the subskills approach was in fact an effective pedagogical tool in the interpreting of names and abbreviations. In this setting, effectiveness is measured by the accuracy and error rates at which the experimental group have achieved compared to that of the control group. Moreover, it is highly important to take into account not only the error and accuracy rates, but also the type of errors encountered in the experimental study as well as those occurring repeatedly.

As previous research has proven that the translation and interpreting of proper names and abbreviations pose a challenge, it is evident from the results that students have an issue when rendering names and abbreviations in simultaneous interpreting. This research study investigates why students find it difficult to interpret names and abbreviations specifically from English into Arabic, how students manage this issue, what strategies could help them cope, what pedagogical implications should be considered when teaching simultaneous interpreting at university level. As elaborated, abbreviations trigger the most problems for students, as both groups in both tests have an error rate higher than 50%, and the average progress rate was only 5% for the experimental group and only 2% for the control group. This indicates that abbreviations are an issue that require experimental investigation that aims to improve the accuracy rate. On the other hand, the rendition of names seems to have improved greatly with the experimental group as compared to the control group, which reflects the efficacy of a subskill approach.

Omission rate, although significant in both groups, has decreased greatly in the experimental group. As a result, this suggests that the subskills approach is beneficial to students' retention. The experimental group's improvement could explain that the subskills approach for names and abbreviation training helped train students' minds to process these items more rapidly, leading not only to significantly fewer omissions but also higher overall accuracy rates. This could mean that the subskills approach could improve students' ability to interpret names and abbreviations more accurately and should be investigated further, as it has the potential to create an internalized skill they can master.

This experimental study has demonstrated that the subskills approach to rendering names and abbreviations during simultaneous interpreting training is effective and possible to result in the internalization of the micro-skills of interpreting. The results of the participants' progress of

accuracy rates and the error analysis are in line with Gile's Effort Model (Gile 1995), explaining that it takes substantial cognitive effort to process and store names and abbreviations and this often exhausts and exceeds the threshold of the attention span. The accuracy of rendering names and abbreviations might be a rather minute element of simultaneous interpreting, yet such an insignificant aspect could significantly contribute to other aspects of interpreting, and research could give more in-depth insights. In conclusion, the findings of this study support the claim that subskills approach may increase accuracy, precision, and minimize errors associated with interpreting names and abbreviations. It could also help students achieve a level of internalization when interpreting names and abbreviations and more efficiently deal with these items.

6. DISCUSSION

6.1 Discussion and Conclusions

In the final chapter of my thesis I will discuss the general and overall findings of this research, how the findings compare to previous research and how they relate to the literature and theoretical framework. After that, I will elaborate the contributions of my experimental studies to interpreting research and pedagogy, and implications for further research. And, finally, I will present the concluding remarks for my thesis and how the research fulfils its objectives. I would also like to point out that each experimental study has a dedicated independent discussion section and this discussion will restate and summarise the outcomes of the studies in relation to previous research.

The purpose of the discussion of the findings of my research is to answer the research question: Is the subskills approach effective in the teaching of the simultaneous interpreting of numerical data, proper names, and abbreviations? The findings aim to establish whether or not the proposed subskills training approach implemented in the experimental studies is deemed successful, and the degree of its effectiveness. In addition to that, I will discuss how the findings of my experimental studies compare to the outcomes of previous similar studies conducted by other researchers.

It is of essence to mention that to ensure the validity of the research results, the experimental studies only investugated and assessed the accuracy and error rates of numerical datae, names and abbreviations without the interpretation as a whole. It is crucial to emphasize that ultimately, this study investigates whether the subskills approach would be more effective in terms of accuracy rate achievement and progress in the rendition of numerals, names and abbreviations.

Furthermore, the results of the experimental studies align with similar experimental studies conducted by other samples with different language combinations, discussed further below. The comparative discussion between the findings of the studies of this thesis and those conducted by other researchers can give us more in-depth insights on the magnitude of the issues posed by numbers, names and abbreviations as well as possible approaches to help interpreting students overcome them.

6.1.1 Discussion of the Interpreting of Numerical Data

From the outcomes of the experimental study, we can see the potential of the subskills approach in the training of simultaneous interpreting and internalization of numerals. The error analysis is in line with Gile's Effort Models (1995); it explains that numerals require substantial cognitive effort to be processed and stored as they often exhaust the mental capacity and exceed the threshold of the interpreter's attention span.

Accuracy rates of the interpreting of numerical data have improved in both the experimental and control groups. This was an expected result as both groups have gone under intensive SI training for four weeks. Therefore, improvement to a certain degree is anticipated, yet, the experimental group has improved more significantly in comparison to the control group. Also, amongst all the participants of the experimental group, only 1 participant has not improved in the rendering of numerical date. This single participant received an accuracy rate much lower than she had scored in the pre-test. She received a score of -25% making her below the extreme low outlier (ELO) which is -18.5%. This event makes her result excluded for the statistical analysis of the experimental group as a whole. After the exclusion of the ELO, 100% of the participants of the experimental group received higher accuracy rates compared to 70.5% of the participants in the control group. On the other hand, a total of 5 participants from the control group did not improve, 4 of which scored lower in the post-test and 1 participant did not show improvement in the accuracy rate and received the same score in both the pre-test and post-test.

As far as the types of errors are concerned, number omission is the most frequent and recurrent error in both groups contributing to 46% in T1 and has declined to 18% in T2 in the experimental group, and from 36% to 27% in the control group. Regardless of the improvement, I still find the omission rates to be quite alarming.

As for other errors related to numerals, other/non-categorized errors were the second most frequent error in which the numeral rendered is not only incorrect but also completely different from the original and cannot be explained or justified (for example rendition of 53 instead of 62). The experimental group had an average of 11% of total other/non-categorized errors in T1, but this decreased to an average of 6% in T2. The control group had an average of 11% in both T1 and T2. Phonological errors (for instance 50 instead of 15), counted for an average of 4% in T1 but increased to 6% in T2 for the experimental group. It was a bit surprising to

encounter that after the improvement of the experimental group in all aspects, they have received lower performance rates in the phonological error category. Hence, it would be difficult to be able to make an assumption of the reasons behind which this decrease has occurred without further examination. A possible explanation could be that the numerals selected in T2 are ones subject to frequent phonological or acoustic mistakes. But, of course, I would not leave room for non-investigated speculation here. As for the control group, phonological errors while pronouncing numbers counted for 11% in T1 and decreased to 7% in T2. Decimal errors counted for an average of 4% in T1 but increased to 9% in T2 for the experimental group. As for the control group decimal errors counted for 4% in T1 and decreased to 3% in T2.

In fact, as I already mentioned in previous chapters, many categories of error in interpreting numerical data have been observed in both groups and in both T1 and T2. However, even though some of these errors were not significant in the statistical analysis, it might be worthwhile to target and investigate them further in future experimental studies. One interesting point that was noticed was the language transfer error, which is when the numeral was "shadowed" rather than interpreted. Two participants in the experimental group, one in T1 and another in T2, rendered the number, although accurately, in the same language as the source speech. Interviewing the students would have been interesting to find out if they were aware of doing so and whether they felt shadowing as a coping strategy was a better compromise than omission.

Another interesting error was number inversion (for exmpaple 34 instead of 43). Although I did expect this would be a frequent error, as the pronunciation of numerals are converted from English into Arabic, only three participants from each group made a conversion error. However, it should be mentioned that only two numerals (out of 14) were subject to the inversion rule and were of only double digits and not large numbers. Since the aim of this experimental study was to investigate the subskills approach regardless of error type, the numerals inserted in the speeches were not designed to focus on a particular type of error. Further research on this would be very enlightening.

Another error observed was magnitude, although only four occurances of magnitude errors were identified; in the speeches, there was only one numeral with a large magnitude. Also, whole-to-decimal errors and vice versa were also noticed, where participants have interpreted

a decimal number as a whole number but maintained both digits correctly and/or the other way around. Incomplete rendition was also noticed where the participant starts to interpret the numeral correctly, but then suddenly stops or "umms". It would be interesting to interview the participants and explore whether they have stopped due to a shift of attention to the message linked to the numeral or whether the numeral in itself was the cause.

Phonological errors related to numbers were intriguing to investigate, as they have received a higher error rate than expected counting for an average of 4% in T1 and 6% in T2 for the experimental group and 11% in T1 and 7% in T2. Most phonological errors were made on years. This could be easily explained since, for instance, 2013 in English is pronounced "Twenty Thirteen", but this form does not exist in Arabic, and interpreters must express it as "Two thousand and thirteen". Thus, all those who have made a phonological error in dates have interpreted "November 2013 > November 23". It is also interesting to point out that, until 2018, this form has never existed in Arabic, but has recently been used after the Saudi Government's Development Vision of 2030, in which the numeral in Arabic is pronounced in linearity to English as "Twenty Thirty". It is unusual and incorrect grammatically but has been repeated too many times that people's ears have gotten used to it. One could wonder if this would change with other years and not just 2030.

As for the most frequent error, number omission was on the top of the list, with a significant average omission rate for the experimental group of 46% in T1 and 18% in T2 and, for the control group, 36% in T1 and 27% in T2. The experimental group's improvement could explain that the subskills approach in number training helped train students' minds to process numerals more quickly, leading not only to significantly fewer omissions, but higher overall accuracy rates. The average progress rate of the experimental group is 28%, while the average progress rate of the control group is 14%. This shows that the subskills approach could improve students' ability to interpret numerals more accurately and lead to a deeply internalized skill they can master.

Based on the outcomes of the experimental study, we can see the potential of the subskills approach to train numbers in simultaneous interpreting and internalize micro-skills. The progress of the participants' accuracy rates and the error analysis are both in line with the Effort Model (Gile, 1995), explaining that numerals require substantial cognitive effort to be processed and stored, and often exhaust and exceed the threshold of the attention span. The

accuracy of numerals might seem to some as a rather minute element of SIM. Nonetheless, although it is important that the assessment of SI quality is held from a global perspective focusing on the message and idea rendition, studies with a such specific focus should also be integrated with a more holistic examination of SI performance in addition to numerals. What might seem to be an insignificant aspect could significantly contribute to other aspects of interpreting, and further research could give more in-depth insights.

Besides Giles's contributions on interpetng numerical data, the results of the experimental study can also be connected with other studies. For instance, in his experimental study on simultaneous interpreting of numbers between Cantonese and English, Cheung (2009) divided 54 participants into 3 groups: one experimental group received only number-in-isolation exercises, another experimental group received only number-with-referent exercises, and the control group which did not receive any subskills training exercises. The results show that the group that received no number training had the highest percentage of omissions accounting for 57.1% as opposed to the first and second groups that received an average omission percentage of 17.9% and 25%, respectively. In comparison, the present experimental study also shows higher improvement rates in the participants of the experimental group which received the subskills training exercises accounting for an average of 18%, while the control group received an average of 27%. Such similarity could explain that the participants were able to be trained to manage numerical data more rapidly through the subskills exercises. Nevertheless, although there is much improvement in omission rates in the experimental groups, I do believe that these rates are quite high after receiving the subskills training. The fact that in both my study as well as that of Cheung (2009) omission is the highest and most recurring error amongst all groups, indicates that much work is yet to be done to unravel the reasons behind this phenomenon.

Similarly, in her experimental study on Italian><English interpreting students, Mazza (2001) first examined the overall performance of interpreting speeches that included numerical data as opposed to speeches that did not include any numerical date. The outcomes show that 81.8% of the information that did not include numbers was interpreted accurately; whereas 53.9% of the information that did not include numbers was interpreted accurately. Through such an experiment, she has established that the occurrence of numerical data does indeed pose an issue for interpreters. These outcomes are parallel to the theoretical framework which explains why numbers pose a challenge to interpreters. Furthermore, she also examines the most frequent error, and again, omissions receive the highest error rate.

In comparison, in another study on Italian><German interpreting students conducted by Braun and Clarici (1996), the participants were asked to interpret 2 speeches, one of which was only a list of numbers with no information or referents, and the other speech included numbers and information. The outcomes reveal an error rate of 28.6% when interpreting lists of numbers and a total error score of 69.4% for numbers within texts. The data explains that numerical data is a problem trigger to interpreters, and the fact that the error rate of numerical data within context received a much higher error rate is parallel to the theoretical framework which illustrates the effect of cognitive overload on the accuracy of the interpretation of numbers. With this same language combination, Pinochi (2009) investigates the error rates of interpreting numerals and the results show that there was a 50% omission rate, making it the most recurring error in the interpretation of numbers. This corresponds to the results of the other studies investigating most common error category in the interpreting of numerical data. I believe this is truly concerning as I find omission of numeral data is quite elevated amongst my own students as well as interpreting students of all language combinations that have been investigated. It would be, not only interesting, but also integral to investigate and compare accuracy rates of numeral interpretation of professional interpreters with different levels of experience. Or conduct case studies on the same interpreters throughout a few years of experience. This could help explore the extent to which experience effects the accuracy and error rate of interpreting numbers.

6.1.2 Discussion of the Interpreting of Names and Abbreviations

Although at first thought proper names might seem to be an insignificant component of problem triggers for interpreters, they are actually much more complex than what meets the eye. This is mainly due to the decision-making process that is involved in the interpreting of names (Meyer, 2008; Vermes, 2003) as well as the shift between the immediate memory and the working memory. And as I have extensively discussed earlier in the theoretical framework of this dissertation any decision-making skills required during interpreting demand a mental effort that takes an integral part in the cognitive load. Unless the interpreter have already come across the names to be interpreted or have the interpreting readily available in the mental archive in her or his head, interpreting names entail several possible strategies and a decision that needs to be taken in a matter of a split second. The reason interpreting of names require decision-making, whether consciously or subconsciously, is because the interpreter is confronted by several options to choose from. For instance, the choice between linguistic

adaptation of the name also referred to as naturalisation by Moya (2002) where names are adapted to the phonological system of the target language, and between linguistic transfer where names retain their original phonological pronunciation as it is in the source language or the closest possible pronunciation. The later entail much more than merely the interpreting of a proper name, but also involve cultural aspects and what is culturally accepted and/or expected by the target culture.

As previous research has demonstrated proper nouns and acronyms are problematic areas for interpreters, and the results clearly show that students do indeed have difficulty interpreting nouns and acronyms. This study goes beyond what has been demonstrated in previous research and investigates why students have difficulty interpreting names and abbreviations from English to Arabic, how students deal with this problem, what pedagogical implications should be considered when teaching SI to university students, and most importantly, the effectiveness of the subskills approach.

As discussed, acronyms were the most challenging for students, as both groups on both tests have error rates above 50% and average progress rates of only 5% for experimental group and 2% for the control group. This is natural since acronyms are not at all common in Arabic and are almost non-existant in speeches. Although the progress rate is very low in both groups, the experimental group has received a slightly higher progress rate in comparison to the control group. In contrast, the interpreting of names appeared to have been significantly improved in the experimental group with a progress rate of 24% while the control group progress rate was only 8%, reflecting the effectiveness of the subskills approach.

The omission rate, although significant in both groups, fell sharply in the experimental group. Omissions declined by 25% in the experimental group, and only 8% in the control group. The improvement in the experimental group could explain that the subskills approach to training names and abbreviations helped train students to be able to process these items faster, not only leading to fewer omissions, but also have a higher overall accuracy rate. This shows that the subskills approach does indeed have the potential to improve a student's ability to interpret names and acronyms more accurately. The results of the progression of participants' accuracy rate and error analysis are consistent with Gile's Effort Models (Gile, 1995), which explain that considerable cognitive effort is required to process and store names and abbreviations. It also explains that these elements of speech exhaust and often exceed the threshold of the attention

span. The accuracy of the interpreting of names and abbreviations may be viewed as an insignificant element of SIM, but such an insignificant aspect may contribute significantly to other aspects of interpretation. and research can yield further insights.

Moreover, the results of the experimental study on names and abbreviations of this dissertation align with the literature as well as the theoretical framework. For instance, the high rate of omissions and incorrect renditions correspond to what have been theoretically explained by Seleskovitch (1962), Gile (1995), Setton & Darwant (2016), Rumelhart (1980), Quini (1993), and Hanaoka (2002). In addition, the outcomes of the study are also similar to other experimental studies conducted by other researchers in terms of the magnitude of error rates and frequency of error type. For example, Simon (2019) investigated the corpus English-French Louvain Corpus of Students' Simultaneous Interpretations (LOCOSSI) of transcribed speeches and interpretations of 8 students with a language combination of English and French. The results reveal that the total average inaccuracy rate was at 31%, with omissions receiving the highest error rate of 14% which is quite high. Such findings make us open our eyes to such an issue where many might think is miniscule, when in fact it is nothing but.

Another interesting point made by the researcher is that with unfamiliar or difficult names to the students such the name "Rembrandt", more than half the students did not render the name and was omitted from their interpreted speech. This point also aligns with the results of my experimental study where the lowest correct rendition of names were the names of German origins where the average error rate was 70% for the experimental group and 89% for the control group in T2 compared to the English names error rate which was 55% for the experimental group and 64% for the control group in T2, which is also very high, but not as alarmingly high as unfamiliar names to students such as German names. Interestingly, though, Gile (1984a) examined the renditions of proper names by 15 professional interpreters, and with a compound name as simple as "Jim Joseph", only 1 interpreter out of the 15 professional interpreters correctly rendered the name. This suggests that names are in fact an issue, and it could become an even greater issue the more proper names are unfamiliar to the interpreter or belong to a languge or accent which the interpreter is not used to.

In summary, the results of this study support the notion that the subskills approach can increase accuracy, precision, and reduce errors associated with the interpretation of names and

acronyms. It can also help students achieve a level of internalization when interpreting names and abbreviations and handling these problem triggers more efficiently.

6.2 Contributions and implications for future research

The subskills tapproach has the potential to enhance simultaneous interpreting training, and it is worth researching further to build and improve effective pedagogical methods and strategies for teaching interpreting. Challenges as to why students find it difficult to interpret numerals, names and abbreviations specifically from English into Arabic, how students deal with these issues, what strategies could help them cope, what pedagogical implications should be considered when teaching simultaneous interpreting to university students, and most importantly, the efficacy of a subskills approach during training on students' performance in interpreting numerals, names and abbreviations.

The research studies conducted for the purpose of this dissertation can be replicated and improved. There are certain aspects that could have been executed more efficiently in a way that could have explained the results better. For instance, in the study of the numerical data, all participants have improved with the exception of one participant whose score did not even remain unchanged, but actually declined significantly (declined by 25%). Such a decrease was quite surprising after receiving training for several weeks. This could have been explained shall the participants were interviewed after the tests. Such decline in the participant's score could be attributed to several underlying causes. These causes could be either internal such as emotional, psychological or cognitive reasons or external such as distraction by an outside constituent of some sort. However, I will not make much room for speculation here, as the only way to know what could have caused a decrease in a participant's score is to conduct a post-test interview.

Interviews after the tests could explain not only the reasons for which a participant would receive a much lower score but could also explain why participants have improved and what could have contributed to the degree to which they have improved. This is essential mainly to extract information that go beyond numbers and figures and explain how and why participants have performed the way they did. This could also help the researcher to eliminate and exclude any other possible variables that could have had an effect on the participant's performance.

As discussed in Chapter 2 of the theoretical background, SI is a purely cognitive activity and can be affected by the slightest trigger, whether external or external. Thus, much of participants' performance can be understood by investigating further through interviews. Their performance could have been affected by as little as not having a cup of coffee the morning of an exam or not having a good-night's sleep the night before. Many factors could have played a role in the performance of the participant, and it would be worthwhile to investigate possible elements as they could be considered as variables affecting the results of the study.

I believe that omission rates of numerical data, names, and abbreviations in all groups are very concerning. Further research should be done to investigate reasons behind high rates of omissions amongst students. This could reveal more serious underlying issues such as mismanagement of cognitive efforts, inability to restore, retain, or retrieve certain information in/from the working memory, or inability to properly control ear-to-voice span.

Another aspect that I would recommend is to compare performance of male and female participants, different age groups, and different levels of experience as processing of such data might differ between genders, different age groups, and of course years of experience. Since all participants of my experimental studies were females of the same age and same level of education and experience, these differences have not been investigated. Of course this was done deliberately as to decrease variables that could have an impact on the results of my study, with the exception of gender where was not made by choice as PNU is an all-female university.

As mentioned in the very beginning of this chapter that to ensure validity and reliability of the results, only numerals, names, and abbreviations are scored without the interpreting as a whole. Thus, I feel it would be of value to conduct an experimental study in the future that further explores the accuracy of both numerical data, names and abbreviations as well as the immediate message and compares the effectiveness of the subskills method in interpreting the message that accompanies numerals, names and/or abbreviations.

I have realized that there is yet much to be explored in the world of interpreting pedagogy. I felt that my research is merely the tip of the iceberg of much needed studies that could be used as a didactic tool and that would be of tremendous help to interpreting students, and for this reason I have taken consideration of how my own research could be advanced. In addition to that, I would like to dedicate some parts of this section to very important and quite intriguing considerations that I have taken note of during class discussions with the participants.

Firstly, it is important to note that the experimental studies I have conducted can be replicated either by the same language combination or by other language combinations. And I do propose the replication of the study to compare and contrast results and discover new findings.

Secondly, the studies I have conducted examine the accuracy and error rates in isolation of surrounding texts. I have done so as it has been evident from the literature of neuroscience and neurolinguistics discussed in this thesis that the mental processing of ideas is different from that of other speech units such as names, numbers, and abbreviations. Thus, to investigate the impact that resonates from these problematic speech items on the ideas of the speech would require a distinct approach, a different research methodology, material and evaluation tools. This could be a second phase to the present research; after examination of the extent and magnitude to which these speech items are problem triggers for interpreting students, we can then investigate the effects on other speech components.

Thirdly, I have tried as much I possibly could to limit and control variables that could affect the performance of the participants. For this reason, participants were selected in both the experimental and control group, with almost equal characteristics essential to the study such as interpreting education background, languages, competence in interpreting languages, GPAs, and age. Additionally, all participants were of female gender, though this was not deliberate. Nevertheless, there are always factors that cannot be controlled given the fact that interpreting is a mental activity and much of the participants' emotions and psychological influences are involved, as I mentioned previously. Therefore, for future and further research, it would be interesting and insightful to examine this element in the analysis. This could be done through surveys and/or interviews with the participants regarding factors that could have played a role in their performance such as sleep, nutritional intake, any pre-test practices or habits they do, emotional state before and during the tests, etc.

In addition to the implications for future research that I have extracted from the analysis and findings of the experimental studies, other implications have arose from the class discussions with participants. Much of the class discussions in both groups has opened my eyes to new possible variables that were not taken into consideration during the planning and designing of the experimental studies. The class discussions were very rich and it would be worthwhile to investigate the participants' commentary. For instance, during the class discussions one participant reported that she normally meditates as part of her morning routine before leaving

home for class, and on the days where she missed her meditation session, she did not perform as well as she normally would in the interpreting of speeches in class. Although the relationship between meditation and interpreting performance would be an entirely independent experimental study, we cannot ignore the fact that these are also variables that could have contributed to the error and accuracy rates of the participants in my experimental studies. Not only that, but without experimentation it would be difficult for us to know to what extent these variables have played a role in the performance of some participants. And it is quite intriguing to know if meditation does indeed free the mind from interpreters' daily chaotic thoughts and open more space for cognitive capacity and mental processing.

Another insightful aspect that would be of value to consider for future research is students' own perception of their performance. Many students have reported that they felt very confident in the delivery of the interpreting of these items; however when they listened to their own interpreting, many reported their surprise to have found that they did not perform as well as they had believed they did. Similarly, it would be not only interesting, but also integral to investigate and compare accuracy rates of numeral interpretation of professional interpreters with different levels of experience. Or conduct case studies on the same interpreters throughout a few years of experience. This could help explore the extent to which experience effects the accuracy and error rate of interpreting numbers.

Another interesting observation from one of the participants is how she managed to deal with her own struggle in interpreting proper names pronounced by speakers with a British accent. She reported having performed more successfully after listening to podcasts by British speakers. She stated that because she has never interacted with people speaking British English, she found it very difficult to render names, even fairly easy and common English names. Her comment goes in conjunction with Gile's experimental study (1984a) where only 1 out of 15 professional interpreters correctly rendered a name as simple as "Jim Joseph". He explains that the slightest distraction to the mental processing during interpreting causes saturation and could results in errors. In the case of this participant, a new accent could cause distraction or lead to extra load to the Listening and |Comprehension Effort which overloads the mental capacity. I find it interesting how the participant felt that listening to British speakers helps her in the rendition of names as it might be categorized as a subskill training since it targets a specific linguistic item which in this case is accents. It also implies that the subskills approach might play a role in promoting learner autonomy as the participants has become aware of this issue.

6.3 Conclusion

The general objective of this thesis, as mentioned in the introduction section of this work, was to to explore whether a subskills approach is effective in simultaneous interpreter training from English into Arabic. After having concluded this research, I can say that I have achieved this general goal. As we have already seen through the outcomes of the study and in the discussion section, the subskills approach has proved to be a very effective pedagogical approach in simulataneous interpreting from English into Arabic. The results obtained from the experimental group show that the training in subskills approach is much more effective than the tradictional holistic training approach.

Regarding the specific objectives, the first of them aimed to investigate the extent to which the subskills approach would impact students performance and accuracy rate when interpreting numerical data from English into Arabic. The results show that all the participants in the experimental group received higher accuracy rates in the numerical data study and lower omission rates, as compared to the control group, who also improved but not as much as the experimental group.

The second specific objective of the thesis was also to investigate to which extent the subskills approach would impact the students accuracy rate when interpreting names and abreviations from English into Arabic. In this case, the results also prove the efficacy of the subskills approach over the traditional holistic approach. Nonetheless, it is worthly to mention that the improvement of the experimental group in abreviations was minimal compared to the control group. This could be attributed to the fact that abreviations are almost non existant in Arabic and are almost never used in spoken speeches.

The third objective was to propose a successful interpreter training approach to be used in simultaneous interpreting university level, for the specific language combination English-Arabic. This approach would aim to improve curricular design and planning in the teaching of simultaneous interpreting from English into Arabic. I think that this study constitutes in itself a well substantiated methodological proposal to be considered in academic syllabi in simultaneos interpreting for the specific combination English-Arabic. It is worth mentioning that this research is the first extensive and in-depth one conducted in this specific language combination, which sets a precedent for future studies in the field.

Finally I consider that the last specific objective, that is, to contribute to new findings in interpreting pedagogy research, has also been fully achieved, since the results of my two experiments show the potential of optimisation and improvement of the subskills approach on other language combinations and/or other subskills of interpreting.

I would like to finish this dissertation with a final remark. It is very important that interpreter trainers are vigilant regarding frequent and recurring errors made by their students and do their own research to find and create solutions that would enhance the performance of their students. It is of essence that trainers are mindful about, not only students' errors, but also what measures need to be taken to make students' learning experience more successful. Action research has proven to be an effective way to transform my curiosity and reflections as a trainer to a sound research whose results can directly be applied to interpreter training. I highly encourage every interpreting trainer to explore the literature and recent research on the issues they encounter with students in order to find approaches and strategiesthat have been investigated and tested by other researches that could be of help to the learners. As far as myslef is concerned, I have tried my best to follow this advise and this thesis is a humble contribution to this.

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Appendices

Appendix 1

Pre-Test of the Numerical Data Experimental Study
Speech: Unemployment in France

Transcription

Hello, my name is Sophie Llewellyn Smith, this is a speech about unemployment in France. Ladies and gentlemen, in November 2013 Francois Holland committed publicly on the news on television to turning unemployment around to reversing the unemployment curve. And the results of this very public commitment was that people have always eagerly anticipated the latest unemployment figures in France to see whether Francois Holland would be successful which he has not been so far, and he took a blow in Spring of 2017 because unemployment grew more quickly than it has at any time in the last 4 years.

So today I would like to take stock in the star pupils in Europe when it comes to employment and the dunces of the class.

In February 2017 the unemployment rate in the EU was 8%, 9.5% in the Eurozone and on average this unemployment rate has been falling steadily since 2013. The rate of unemployment in France however is 10%, this is one of the highest rates of unemployment in the EU. In fact, France is in the 6th position among those member states most effected by unemployment according to Eurostat.

However, it's worth baring in mind that there are extremes within these averages, there are huge contracts. In fact, there is a Gap of 20 percentage point between the best performer and worst performer. The best is Czech Republic with unemployment rate of just 3.4% followed by Germany 3.9% these are two countries that are heavily dependent on the automobile sector and experts. On the other end of the scale, the winner of the wooden spoon, if you like, is Greece with 23.1% of unemployment, and a horrifying figures of youth unemployment 48%.

Appendix 2

Post-Test of the Numerical Data Experimental Study

Speech: Child Labour in India
Transcription

Hello, my name is Laura Michael, this is a speech about child labour in India.

In November 2013 Ram Kovind announced publicly on the news on television to turning Child Labour around to abolish this unethical situation. And the results of this very public commitment was that people, not only in India, but all over the world have always eagerly anticipated the latest child labour figures in India to see whether Ram Kovind would be successful which he has not been so far, and now in 2018, 5 years after that announcement, President Ram too a hard blow, because child labour figures have not improved, as a matter of fact they have increased since then.

Before I discuss methods to eliminate child labour, and why this problem exists in the first place, I would like to state some important figures.

As we speak now, there are at least 12 million child laborers in India. In a study in February 2017 child labour rate in New Delhi increased by 8%, 9.5% in Mumbai and on average this child labour rate has been increasing steadily since 2013. The rate of child labour in the Indian state Uttar Paradesh, however, is 20%, this is one of the highest rates of child in any city in the world. In fact, Uttar Paradesh is in the 4th position among third world countries most effected by child labour according to the official campaign against child labour.

Now, why do parents allow their children to work and deprive them of education? Or do parents even have a choice in that or re they forced to do so? It's worth baring in mind that the main cause behind child labour is poverty. Most children work is sweatshops; they are considered cheap labour by greedy corporate officials. They also work in other industries; 3.4% work in the chocolate industry, and 3.9% in the coffee and tea industry, but the majority work in the diamond industry with a 23.1% and a horrifying figure of 48% in the the making of firearms.

Appendix 3

Pre-Test of the Names and Abbreviations Experimental Study

Speech: Unemployment in Europe
Transcription

First Diagnostic Test - English

Session 1

Speech: Unemployment in Europe

Hello, my name is Sophie Smith, this is a speech about unemployment in the EU.
In the past few years, the EU has suffered from unemployment enormously, specially after the UK has decided to exit the European Union. So let's take a look at the EUP's latest reports on how different countries were affected and why some countries were able to survive more than others.

The UK, just like other EU countries has suffered from unemployment, until recently. The Prime Minister Theresa May has declared that the unemployment dilemma has healed significantly ever since she has been ruling the country after the former Prime Minister David Cameron, according to the British Broadcasting Corporation BBC. In an interview on UKTV with Thomas Brighton, ever since Britain has left the
European Union, the unemployment rate has decreased steadily, and many UK nationals have been receiving better job opportunities after other Europeans were forced to leave the UK due to visa issues as stated by the MIO, the
Manchester Immigration Office. Cities with the highest employment rate are, of course, London, as well as Liverpool, Nottingham and Leeds.

France on the other hand has suffered deeply. A few years ago, President Francois Hollande has announced that France has never experienced such a dip in unemployment rates in the history of the country. The current President Emmanuel Macron and his wife Brigitte Marie-Claude declared that the country is still suffering greatly. On the French Channel TV5 Monde, Camille Blanche discussed the Un's IMO report stating reasons behind this increasing issue with her guest the Economist Clementine Colette on her Program Bonjour France. The main issue in France is that companies refuse to hire employees whose educational background does not specifically match the available positions because they are not willing to invest and pay for training their employees. Another reason is that most French

people lack in foreign languages, especially English, which is currently in high demand. Most cities suffering from Unemployment are Strasbourg and Yves Rocher.

Germany, however, hasn't suffered at all in terms of unemployment. As a matter of fact, in a recent report by President Frank-Walter Steinmeier on the TV Channel BR Bayerishcer Rundfunk, he stated that Germany has never been more stable in terms of employment rate due to the ME or Ministry of Education's heavy investment in the people's education and training programs as well as the cooperation between the public and private sector. Furthermore, in his interview on BR, he stated that the country's investment and contracts on projects with different countries such as MENA countries have helped greatly in job opportunities for the German people.

Finally, Spain, has unfortunately been on the low end of the spectrum in terms of the unemployment rate. The King of Spain Felipe Juan announced this year that the unemployment rate has reached its peak since decades. The most province affected by unemployment is Andalucia. This could be attributed to the fact that the largest number of immigrants reside there and many are accepting jobs with extremely low wages which results in the thousands of jobless nationals, According to Economist expert Pablo Alfonso and Financial Analyst Anna-Maria Sanchez. The
Province of Catalunya on the other hand is suffering less than other, which explains why Catalunya is currently demanding independence from Spain.

Appendix 4

Post-Test of the Names and Abbreviations Experimental Study
Speech: Child Labour

Transcription

Hello, my name is Laura Michael, this is a speech about child labor based on recent reports of the UN.

In the past few years, the UN announced that many countries around the world have suffered enormously from child labour due to different factors whether it was poverty, an economic crisis, or even war, including powerful countries such the US and the European Union. Many would think that countries such as those would not have child labor, but that is not true. So let's take a look at the UN's latest reports.

According to the UN, just like many countries, the US has witnessed an unexpected number of child labor. The Vice President Mike Pence has declared that the child labor dilemma has increased significantly once he held this position after the former Vice President Joe Biden, according to the Cable News Network CNN. In his interview on USTV with Jason Brandon, after America has ended immigration from from Mexico, many companies took advantage of this situation and started to hire children to lower their costs in the US and after many Mexicans were forced to leave the US due to visa issues as stated by the MIO, the Mexican Immigration Office. States with the highest child labour rate are, of course, those closer to the border such as Texas, California, Florida and Arizona.

Similarly, France has also witnessed a large number of child labor. A few years ago, the Prime Minister Dominique deVillepin has announced that France has never experienced such a rise in child labour. The current Prime Minister Eduard Phillippe and his Consultant Jacques Chirac declared that the country is still suffering greatly. On the French Channel TV3, Stephanie Joseph discussed the UNHCR report stating that due to high increase of immigrants from Africa, many families are sending their children to work instead of school so they are able to put food on the table according to Chantelle Corentine on her Program Bonsoir France. Most cities suffering from child labour are those on the coast such as Marseille and Montpellier.

Germany, is also suffering from child labour mainly within the past few years after the government allowed immigrants into the country after the wars of the Arab Spring. As a matter of fact, in a recent report by Prime Minister Heinrick Merkel on the TV Channel NDR Norddeutscher Rudfunk, he stated that Germany has never witness a child labor crisis like this before. According to the ME or Minister of Education many children are reported absent in

school or even dropping out without explanation from the parents. In his interview on NDR, he stated that even though these children's families are not admitting to why their children are missing out on their classes, we suspect that it is because they are making them work, specifically immigrants from the MENA region. He also declared that the government is currently designing a strategy to eliminate child labor. Most industries where children work are in coffee and chocolate fields followed by factories making low-cost clothing.

Finally in Mexico, the situation is even worse. The President of Mexico Andres Manuel announced this year that child labor rate has reached its peak since decades. The most affected city in Mexico is Guadalajara. According to child psychologist Lopez Obrador and Ricardo Santos, not only Mexico and America, but all Governments and the International Organizations should apply sanctions to the countries and companies who allow child labour, and they should put a minimum age for working, such as 14-15 years old, and make sure that it does not affect their education. Before I end my speech, I would like to remind you, that you also have a responsibility, next time you want to enjoy a cup of coffee or a chocolate bar, take a minute to read the label and make sure it has the sign stating it was not made by a child!

Appendix 5

Translation Test to Assess Participants' Linguistic Competence from English to Arabic

Title: SHS Secondhand Smoking

Is also known as Environmental tobacco smoke (ETS), which refers to exposure to *tobacco smoke* – not from your *smoking*, but from being exposed to someone else's cigarette
It is a very serious form of indoor air pollution. For example, in the US secondhand smoke causes about 3,000 lung cancer deaths a year, compared to less than 100 lung cancer deaths per year from traditional forms of outdoor air pollution.
Nonsmokers breathe in the same toxic chemicals in tobacco smoke as the smokers do, with similar, although smaller effects. The smoke nonsmokers breathe is known as *secondhand smoke* and the process of breathing secondhand smoke is called *involuntary smoking* or *passive smoking.*
It also causes asthma and other breathing problems, particularly in children.

Secondhand smoke can be harmful in many ways. For instance, it affects the heart and blood vessels, increasing the risk of heart attack and stroke in non-smokers. Some studies have linked SHS to mental and emotional changes, too. For instance, some studies have shown that exposure to SHS is linked to symptoms of depression. More research is needed to better understand the link between SHS and mental health.

Secondhand smoke and your children's health

Young children are most affected by SHS and least able to avoid it. Most of their exposure to SHS comes from adults (parents or others) smoking at home. Studies show that children whose parents smoke:

- Get sick more often
- Have more lung infections (like bronchitis and pneumonia)
- Are more likely to cough, wheeze, and have shortness of breath
- Get more ear infections

Appendix 6

Translation Test to Assess Participants' Linguistic Competence from Arabic to English

التنمر في المدارس

لطالما رأيت العديد من صور التنمر لكن فقط في الأفلام والقصص
لم أعتقد يوما أن تكون واقعا أراه في مدارسنا
هذا ما قالته المعلمة م ع عندما تحدثنا
قبل أن نشرع في القصص والأحاديث عن التنمر لنتحدث عنه بشكل عام أولا
يُعرَّف التنمُّر بأنّه: شكل من أشكال العنف، والإساءة، والإيذاء، الذي يكون مُوجَّهاً من شخص، أو مجموعة من الأشخاص، إلى شخص آخر، أو مجموعة من الأشخاص الأقلّ قوّة، سواء بدنيّاً، أو نفسيّاً، حيث قد يكون عن طريق الاعتداء البدنيّ، والتحرُّش الفِعليّ، أو التخويف، والترهيب، والتهديد، وقد يُمارَس التنمُّر في أكثر من مكان، كالمدرسة، أو العمل، أو غيرها من الأماكن المختلفة

:وله أنواع عديدة منها
.لتنمُّر اللفظيّ: كالتلفُّظ بألفاظ مُهينة للشخص الآخر، أو مناداته بأسماء سيّئة والسخرية منه، وتهديده
.التنمُّر الجسديّ: وهو إيذاء الشخص، عن طريق ضَرْبه، وإهانته، وايذائه في جسده
التنمُّر الاجتماعيّ: وهو إيذاء الشخص معنويّاً، كتَرْكه وحيداً، ودَفْع الآخرين إلى تَرك صحبته، وإخبارهم بعدم مصادقته، .أو التعرُّف إليه
.التنمُّر الجنسيّ: وهو إيذاء الشخص باستخدام الألفاظ، والمُلامَسات غير اللائقة
.التنمُّر في العلاقة الشخصيّة، والعاطفيّة: وهو إيذاء الشخص بنَشْر الأكاذيب، والإشاعات التي تُسيء إليه
التنمُّر الإلكتروني: وهو التنمُّر الذي يتمّ عن طريق استخدام الانترنت والوسائل الحديثة
. سواء في مواقع التواصل الاجتماعي أو ألعاب الاونلاين كالبلايستيشن
في المدارس غالبا ما يمار التنمر اللفظي والاجتماعي والشخصي
فتقول المعلمة م ع أن احدى طالباتها كانت لا تجيب على الأسئلة وتتأخر عن الصف مما دعا مجموعة في صفها بمناداتها بالغبية، وهذا تنمر لفظي شخصي، عانت تلك الفتاة حتى استطعنا وأخيرا حل المشكلة
وتقول س ف أن ابنتها تدرس في مدارس أ م الأهلية لكنها دائما وحيدة لأن بقية الفتيات كونّ مجموعات وأخبرن الأخريات ألا يقتربن منها وهذا فقط لأنه بقي على يديها بعض الآثار من الجدري المائي بعد شفائها منه
التنمر أمر سيء، ويؤثر على الشخص وعائلته ومن حوله كثيرا، لذا علينا توعية أطفالنا بمدى سوئه وآثاره كي لا يقعوا فيه وكيف يكونوا أقوياء لمواجهته

Appendix 7

Sample Exercises of the Subskills Training Approach Delivered to the Experimental Group

Hajj

1. أعلن وزير وزارة الحج محمد بن صالح بنتن إعادة أكثر من ٥٠ الف شخص لأنهم لا يحملون تصاريح الدخول للمدينة ومكة المكرمة، وبناءًا على ما صرّح به الوزير السابق بندر بن محمد حجار تم منع دخول عدد هائل من المركبات غير المرخصة.

2. وقد صرّح مدير شرطة منطقة مكة اللواء عيد العتيبي أن هذا الازدحام غير القانوني هو ما يتسبب بحالات التدافع مثل تلك التي شهدتها مكة المكرمة سابقًا مثل تلك والتي توفي إثرها حول ١٠٠٠ حاج.

3. بالاضافة إلى ذلك صرح كلًا من الطبيب فايز الغامدي والطبيب ناصر العمري والطبيب محمد القرني أن الدخول غير المصرح به إلى مكة يتسبب في أغلب الأمراض المعدية للتي تنتشر أثناء أداء مناسك الحج مثل الانفلونزا.

4. German scientists Friedrich Hans and Gunter Kurt warned the German Muslim people of the deadly risks of extreme heat on Hajj pilgrimage where it takes place this year in August during which the climate reaches the highest peak of heat.

5. In France, Dr. Franc Étienne from the hospital of Saint Louis in Paris states that French people are not used to such extreme weather which puts them in a higher risk of death compared to Arabs.

6. In Spain, President of the MCC, Muslim Community Center Omar Lorenzo, announced that Spanish Muslim women do not require a male guardian to perform Hajj as long as they remain within their group because it is not easy for all woman to have a male guardian. And so far more than 200 women have applied to perform Hajj without a male guardian.

Appendix 7-2

Sample Exercises of the Subskills Training Approach Delivered to the Experimental Group

Coffee Consumption

1. يتصدر اللبنانيون المركز الأول عربياً كأكثر الشعوب شرباً للقهوة حسب التقرير الذي أعدّه أخصائي التغذية د. جوزيف آدم بوزارة الصحة العامة ويليهم الفلسطينيون ثم الجزائريون.

2. أما في أوروبا تصدرت الدول الإسكندنافية الترتيب وجاءت فنلندا على رأس القائمة حيث أظهرت تقارير NSS **احصائيات الاستبانات الخاصة بالتغذية أن الفرد الواحد يستهلك ما يقارب ١٠ كيلو من القهوة سنويًا تليها النرويج ثم أيسلندا بحسب ما قاله الدكتور آندرياس توماس.**

3. يستهلك المغرب أكثر من ١٠ كيلو من الشاي سنوياً لكل مواطن والأمر نفسه بالنسبة لموريتانيا حسب احصائيات التغذية للشرق الأوسط وجنوب أفريقيا او منطقة MENA.

1. According to the NHS national health service, the majority of Americans prefer coffee over tea. Nutritionist researcher Dr. Martin Martinez claims that coffee is one of the causes of many diseases in the US where as scientist Dr. Melanie Trode claims that coffee actually has many beneficial effects.
2. According to the FDA, Americans consume around 50 gallons of coffee per year.
3. According to economist Frederic Jones, coffee sales in the US reach over 20 billion per year.

Appendix 7-3

Sample Exercises of the Subskills Training Approach Delivered to the Experimental Group

Exercising

1- In a survey taken last year teenagers exercise at least once a week. This puts children at a high risk of obesity, according to Dr. Jonathan Michaelson & Dr. Mary Hanson from Harvard University.

2- In that same year, Saudi Arabia also showed a figure a low figure among teenagers, but has now increased greatly thanks to the Vision 2030 plans of Prince MbS

3- According to Ministry of Health reports, Thé 2030 vision aims to increase that percentage

١- أوضح مسؤولو في مستشفى الملك عبدالعزيز، الأستاذ عبدالله الهاشمي والأستاذ بدر الرميحي بأنه تبلغ نسبة الأفراد الممارسين للنشاط الرياضي في المملكة لمدة 150دقيقة فأكثر في الأسبوع من إجمالي سكان المملكة لمن تبلغ أعمارهم 15 سنة فأكثر تبلغ (14٪) فقط.

٢- وأضافت إلى ذلك الطبيبة رغد المهنا والطبيبة العنود الجعيد والطبيبة زينة العيدي بأن نسبة السعوديات من الإناث 9% الممارسات للأنشطة الرياضية لمدة 150دقيقة فأكثر في الأسبوع لمن تصل أعمارهن 15 سنة فأكثر لا تزيد عن

٣- نسبة الذين يمارسون الرياضة بالمملكة من داخل المرافق العامة بلغت 59٪ من إجمالي الممارسين، بينما بلغت نسبة الممارسين للرياضة في المراكز الرياضية

Appendix 7-4

Sample Exercises of the Subskills Training Approach Delivered to the Experimental Group

English

No.	Interpretation	Correct	Incorrect
1985			
1200			
3.2			
6o6			
360			
6.8			
1664			
76			
1.764.222			
A dozen			
	Total		

\ 10

Arabic

No.	Interpretation	Correct	Incorrect
1405			
6,7			
14,600			
2,7			
1.500,000			
مليار			
6.2			
1429			
89			
1200			
	Total		

\ 10

20\

Appendix 7-5

Sample Exercises of the Subskills Training Approach Delivered to the Experimental Group

١	يتصدّر اللبنانيون المركز الأول عربيًا كأكثر الشعوب شربًا للقهوة إذ يتجاوز معدل استهلاك اللبناني ٤.٨ كيلو سنويًا ويليهم الفلسطينيون ٣.٨ ثم الجزائريون ٣.٥ كيلو.
٢	أما في أوروبا فتصدرت الدول الاسكندنافية الترتيب وجاءت فنلندا على رأس القائمة ب ١٢ كيلو للفرد سنويًا، أي بمعدل كيلوغرام واحد من القهوة شهريًا لكل مواطن. تليها النرويج ب ٩.٩ كيلو ثم ايسلندا ٩ كيلو.
٣	بالنسبة للشاي، يستهلك المغرب أكثر من ٢ كيلو من الشاي سنويًا والأمر نفسه بالنسبة لموريتانيا التي لا يتجاوز فيها الاستهلاك الفردي سنويًا ال ١٠٠ غرام
٤	أما في الخليج فتعد الإمارات من أبرز الشركاء الرئيسيين في مجال تجارة الشاي مع إعادة تصدير ما يقارب ال ١٨،٠٠٠ طن من الشاي وكان ذلك بين العامين ٢٠١٠ و ٢٠١١

Total /11

1	**The majority of Americans prefer coffee over tea. However, Americans 19% prefer drinking tea while 17% prefer drinking coffee.**
2	**In 1946, the average American consumed 48 gallons of coffee that year.**
3	**The coffeehouse market in 2017 reached sales of 23.4 billion, which represent a 41% growth from the previous year.**

Total /7

Total /18

Appendix 8
Informed Consent for Participants

Informed Consent

Please read this consent document carefully before deciding to participate in this study
Date:
To: Participant
Project Title: A Pilot Experimental Study on the Effectiveness of a Subskills Approach in the Teaching of Simultaneous Interpreting
Researcher: Abeya Aldabbagh
Directors: Dr. Anna Gil-Bardají and Dr. Marta Arumí Ribas

OBJECTIVES OF THE STUDY

The objectives of this study are:
1- To develop successful interpreter training methodologies in university-level interpreter training programs.
2- To examine and enhance current interpreter training approaches
3- To attempt to narrow the existing gap in interpreter training research, and to contribute new findings in conference interpreting pedagogy research.
4- To utilize this study as a step to curricular reform in the teaching and training of simultaneous interpreting.

WHAT YOU WILL BE ASKED TO DO

During this study, you will attend a Simultaneous Interpreting course. You will also be asked about your opinion on your classroom experience during the course, the benefits of the course, and on the teaching methodology compared to other Interpreting courses you have previously taken.

REQUIRED TIME

The training course requires 60 hours of classroom practice over the duration of 6 weeks.

BENEFITS AND RISKS

Benefits

Potential benefits would be for you to take part in a study that could serve your fellow students in later classes for better teaching quality where we have better understanding of methodology use and selection.
You will also be awarded a certificate of attendance and participation from Princess Nourah University upon the completion of the course as long as you have attended a minimum of 95% of the course hours.
You will receive professional simultaneous interpreting, and a report of your performance and improvement.

Risks

There is no risk of any kind associated with your participation in this study.

CONFIDENTIALITY

Your identity will remain confidential and only the members of the research team will have access to the project data. If it were the case that cases of study were to be presented, pseudonyms would always be used.
This informed consent will be kept in a safe place by the main investigators and will be destroyed after 5 years after the research has been completed. When the study has been completed and the data analyzed, the entire database will be anonymized and may be made available to interested researchers.
All information you provide is considered confidential; your name will not be included or, in any other way, associated with the data collected in the study. Furthermore, you will not be

identified in any way in written reports of this research. Also, your real name will never appear in any of my records and will be kept secure and confidential through using code numbers assigned for each student. Any information revealed will not have any distinctive character or recognition factor, such that information can be matched to you.
Data collected during this study will be securely stored. All written records and audio-taped records will be secured. Softcopy materials will be password-encrypted and hardcopy materials will be placed in a locked and secure place.

COMPENSATION

The course is free of charge for participants, and you will be awarded a certificate of attendance and participation from Princess Nourah University upon the completion of the course as long as you have attended a minimum of 95% of the course hours.

VOLUNTARY PARTICIPATION AND RIGHT TO WITHDRAW FROM THE STUDY

Participation in this study is completely voluntary. You are not, in any way, obligated to participate in this study. If you wish, you may decline to participate in any component of the study. Further, you may decide to withdraw from this study entirely at any time, and all your information and data collected will be immediately eliminated and destroyed, and you still have the right to remain in the course and receive the completion and achievement certificate.

PUBLICATION OF RESULTS

Results of this study will be reported in my PhD Research. Furthermore, the results may be published in professional journals and presented at conferences.

FEEDBACK

After completion of the study, and after the data has been analyzed and the results and conclusion have been derived, participants, upon their request, can provide their e-mail address in order to be informed about the results of the study.

CONTACT

Shall you have any questions about the study, you can contact the researcher using the information provided below.

Name: Abeya Aldabbagh
E-mail: abeyaali.aldabbagh@e-campus.uab.cat
Phone: +34-674-547-232

AGREEMENT

- I agree to participate voluntarily in this study, and I have received a copy of this consent form.
- I have read the information about the research project and I have had the opportunity to ask questions.
- I understand that information (without personal identifiers) of this project will be made available to other researchers at any time after the project has been completed.
- I herewith give my permission to be audiorecorded during the course.
- I herewith give my permission to digitalize my written tests / essays.

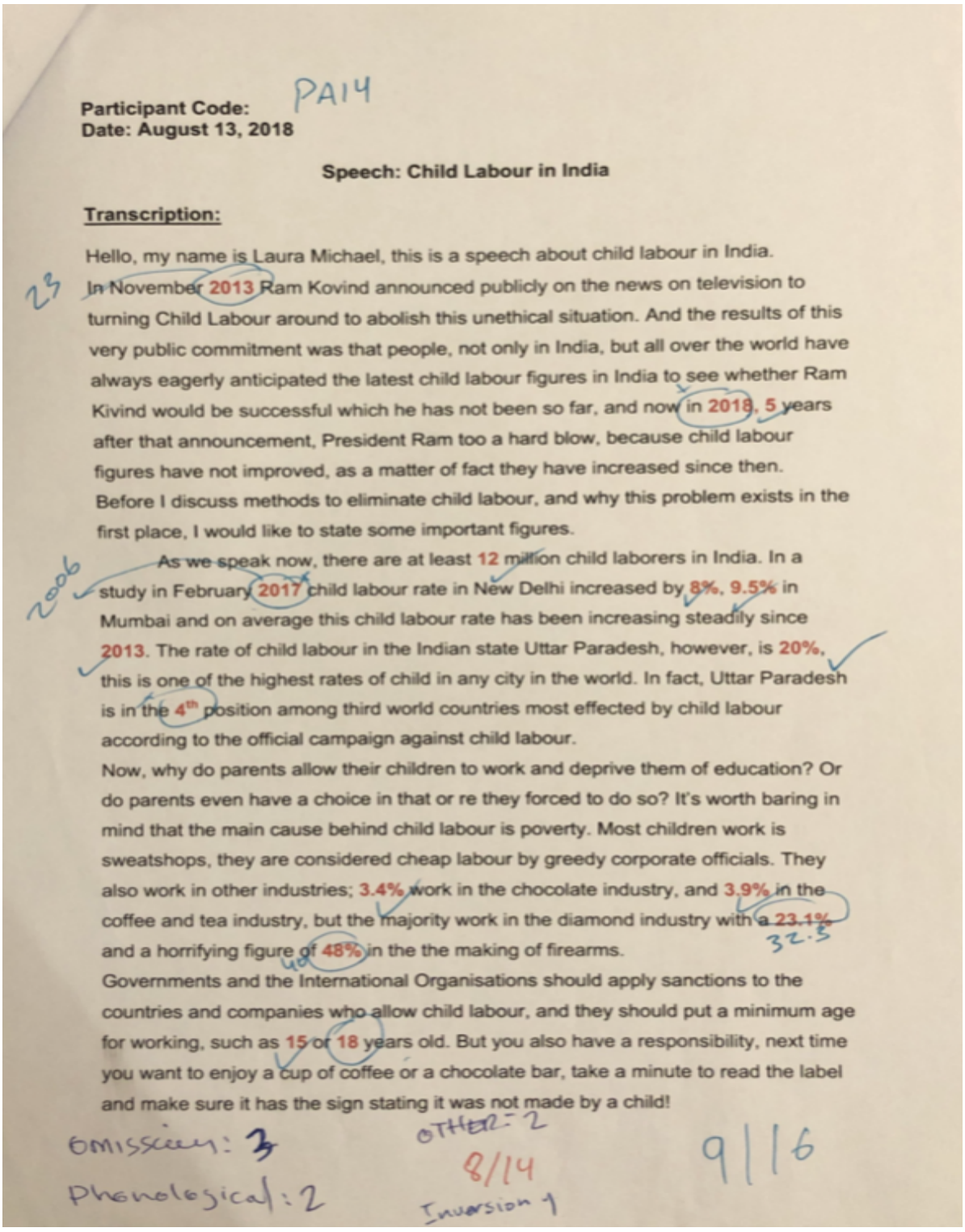
Name and surname of the participant:
Signature _____ Date: _____

Researcher:

Signature _____ Date: _____

Appendix 9

Sample Evaluation Sheets of the Pre-test and Post-test



Participant Code: PA14
Date: August 13, 2018

Speech: Child Labour in India

Transcription:

Hello, my name is Laura Michael, this is a speech about child labour in India. In November 2013 Ram Kovind announced publicly on the news on television to turning Child Labour around to abolish this unethical situation. And the results of this very public commitment was that people, not only in India, but all over the world have always eagerly anticipated the latest child labour figures in India to see whether Ram Kivind would be successful which he has not been so far, and now in 2018, 5 years after that announcement, President Ram too a hard blow, because child labour figures have not improved, as a matter of fact they have increased since then. Before I discuss methods to eliminate child labour, and why this problem exists in the first place, I would like to state some important figures.

As we speak now, there are at least 12 million child laborers in India. In a study in February 2017 child labour rate in New Delhi increased by 8%, 9.5% in Mumbai and on average this child labour rate has been increasing steadily since 2013. The rate of child labour in the Indian state Uttar Paradesh, however, is 20%, this is one of the highest rates of child in any city in the world. In fact, Uttar Paradesh is in the 4th position among third world countries most effected by child labour according to the official campaign against child labour.

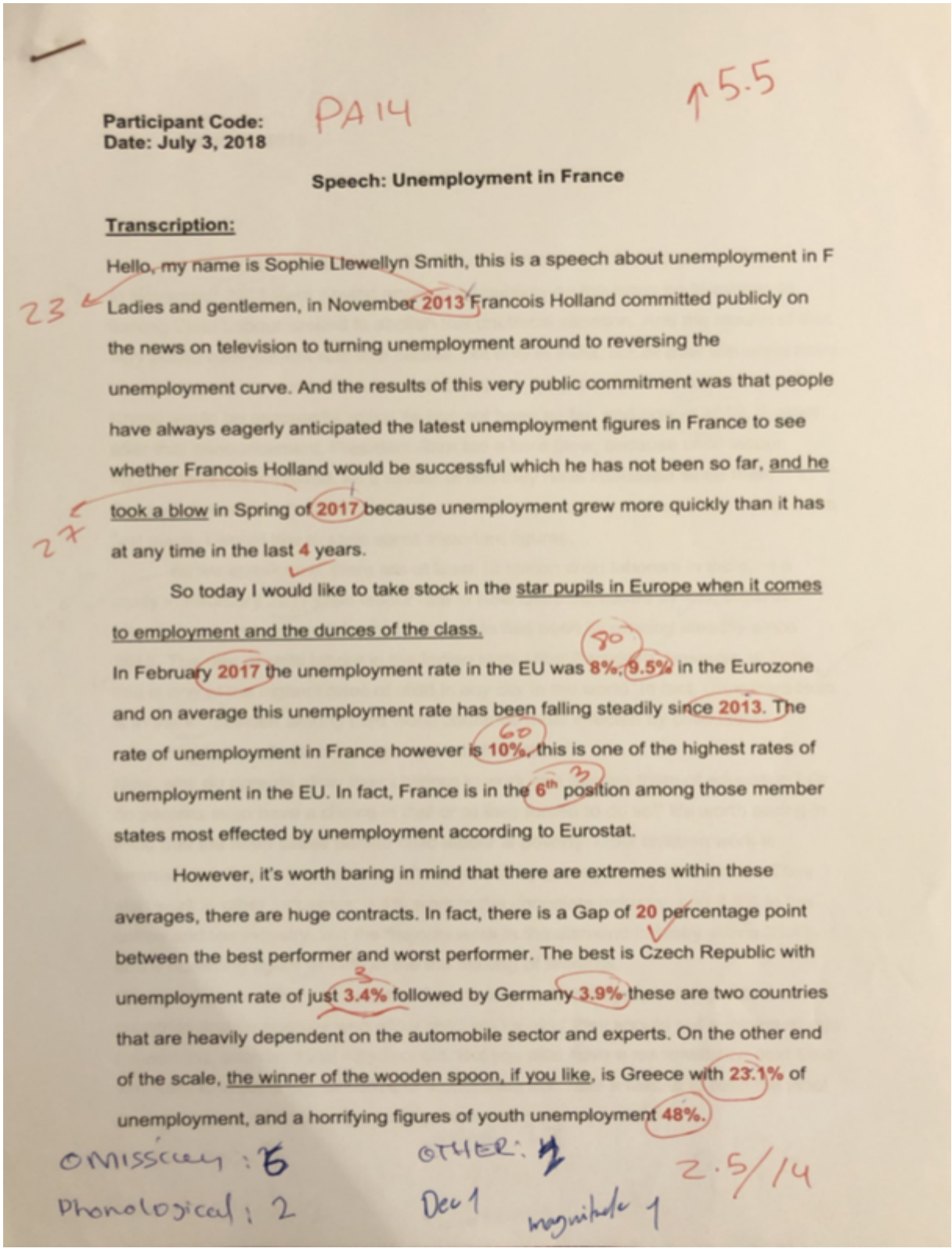
Now, why do parents allow their children to work and deprive them of education? Or do parents even have a choice in that or re they forced to do so? It's worth baring in mind that the main cause behind child labour is poverty. Most children work is sweatshops, they are considered cheap labour by greedy corporate officials. They also work in other industries; 3.4% work in the chocolate industry, and 3.9% in the coffee and tea industry, but the majority work in the diamond industry with a 23.1% and a horrifying figure of 48% in the the making of firearms.

Governments and the International Organisations should apply sanctions to the countries and companies who allow child labour, and they should put a minimum age for working, such as 15 or 18 years old. But you also have a responsibility, next time you want to enjoy a cup of coffee or a chocolate bar, take a minute to read the label and make sure it has the sign stating it was not made by a child!

Omission: 3 OTHER: 2 8/14 9/16
Phonological: 2 Inversion 1

Appendix 9-2

Sample Evaluation Sheets of the Pre-test and Post-test



Participant Code: PA14 ↑5.5
Date: July 3, 2018

Speech: Unemployment in France

Transcription:

Hello, my name is Sophie Llewellyn Smith, this is a speech about unemployment in F
Ladies and gentlemen, in November 2013 Francois Holland committed publicly on the news on television to turning unemployment around to reversing the unemployment curve. And the results of this very public commitment was that people have always eagerly anticipated the latest unemployment figures in France to see whether Francois Holland would be successful which he has not been so far, and he took a blow in Spring of 2017 because unemployment grew more quickly than it has at any time in the last 4 years.

So today I would like to take stock in the star pupils in Europe when it comes to employment and the dunces of the class.

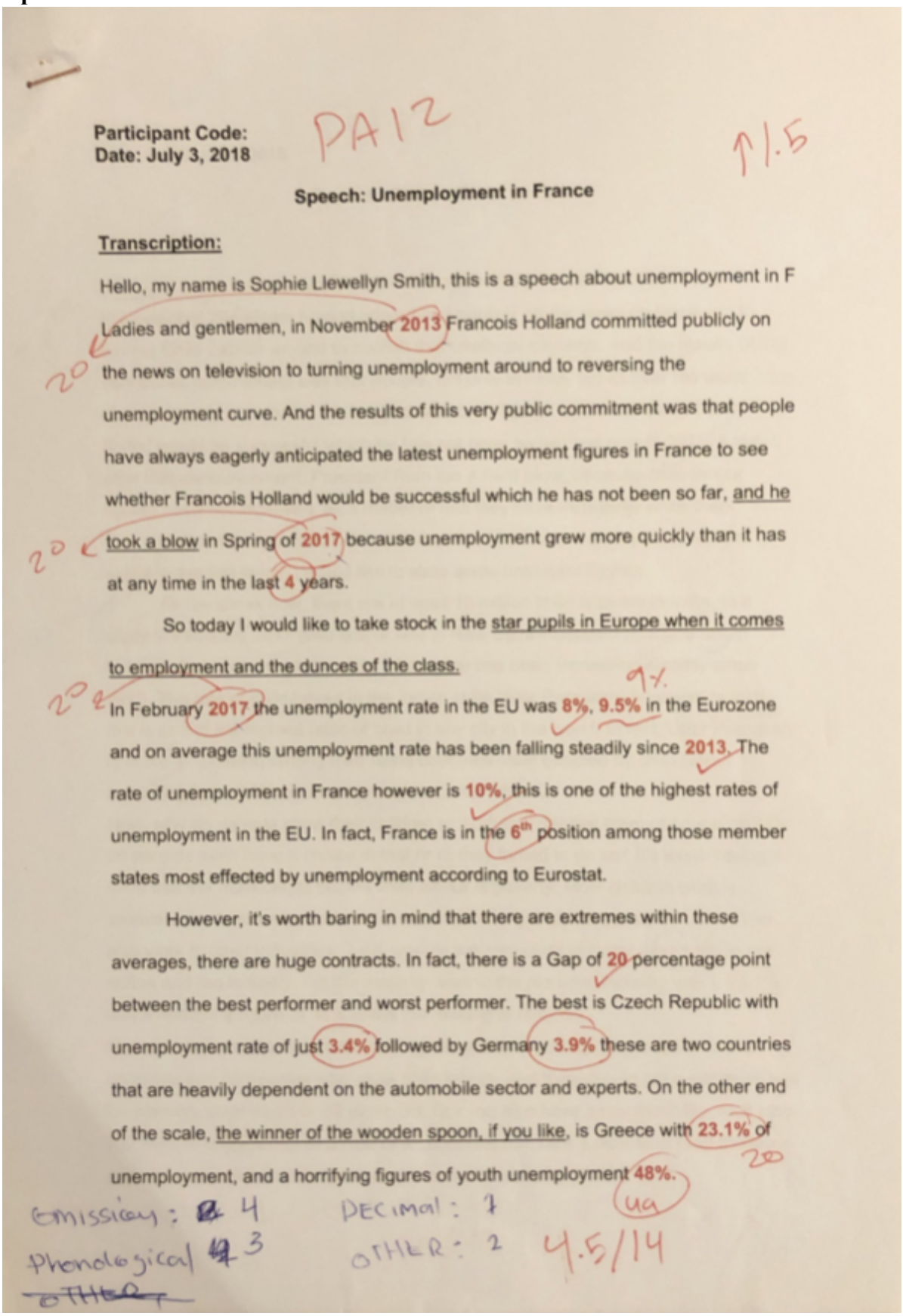
In February 2017 the unemployment rate in the EU was 8%, 9.5% in the Eurozone and on average this unemployment rate has been falling steadily since 2013. The rate of unemployment in France however is 10%, this is one of the highest rates of unemployment in the EU. In fact, France is in the 6th position among those member states most effected by unemployment according to Eurostat.

However, it's worth baring in mind that there are extremes within these averages, there are huge contracts. In fact, there is a Gap of 20 percentage point between the best performer and worst performer. The best is Czech Republic with unemployment rate of just 3.4% followed by Germany 3.9% these are two countries that are heavily dependent on the automobile sector and experts. On the other end of the scale, the winner of the wooden spoon, if you like, is Greece with 23.1% of unemployment, and a horrifying figures of youth unemployment 48%.

OMISSION: 5 OTHER: 4 2.5/14
Phonological: 2 Dec 1 magnitude 1

Appendix 9-3

Sample Evaluation Sheets of the Pre-test and Post-test



Participant Code: PA12
Date: July 3, 2018

↑1.5

Speech: Unemployment in France

Transcription:

Hello, my name is Sophie Llewellyn Smith, this is a speech about unemployment in F

Ladies and gentlemen, in November 2013 Francois Holland committed publicly on the news on television to turning unemployment around to reversing the unemployment curve. And the results of this very public commitment was that people have always eagerly anticipated the latest unemployment figures in France to see whether Francois Holland would be successful which he has not been so far, and he took a blow in Spring of 2017 because unemployment grew more quickly than it has at any time in the last 4 years.

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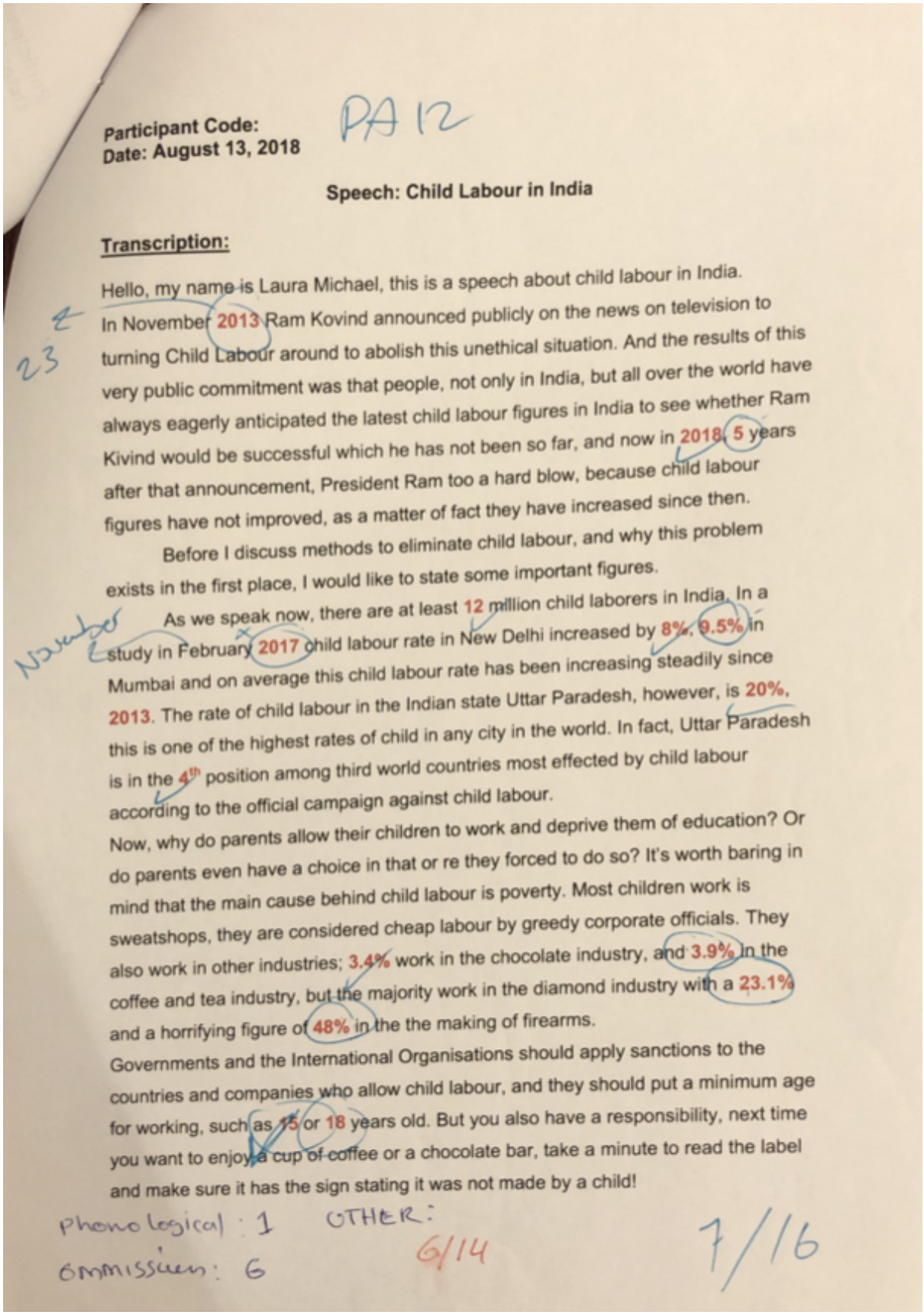
Emissions: 4 Decimal: 7 4.5/14
Phonological 3 Other: 2

Appendix 9-4

Sample Evaluation Sheets of the Pre-test and Post-test



Participant Code: PA 12
Date: August 13, 2018

Speech: Child Labour in India

Transcription:

Hello, my name is Laura Michael, this is a speech about child labour in India. In November 2013 Ram Kovind announced publicly on the news on television to turning Child Labour around to abolish this unethical situation. And the results of this very public commitment was that people, not only in India, but all over the world have always eagerly anticipated the latest child labour figures in India to see whether Ram Kivind would be successful which he has not been so far, and now in 2018, 5 years after that announcement, President Ram too a hard blow, because child labour figures have not improved, as a matter of fact they have increased since then.

Before I discuss methods to eliminate child labour, and why this problem exists in the first place, I would like to state some important figures.

As we speak now, there are at least 12 million child laborers in India. In a study in February 2017 child labour rate in New Delhi increased by 8%, 9.5% in Mumbai and on average this child labour rate has been increasing steadily since 2013. The rate of child labour in the Indian state Uttar Paradesh, however, is 20%, this is one of the highest rates of child in any city in the world. In fact, Uttar Paradesh is in the 4th position among third world countries most effected by child labour according to the official campaign against child labour.

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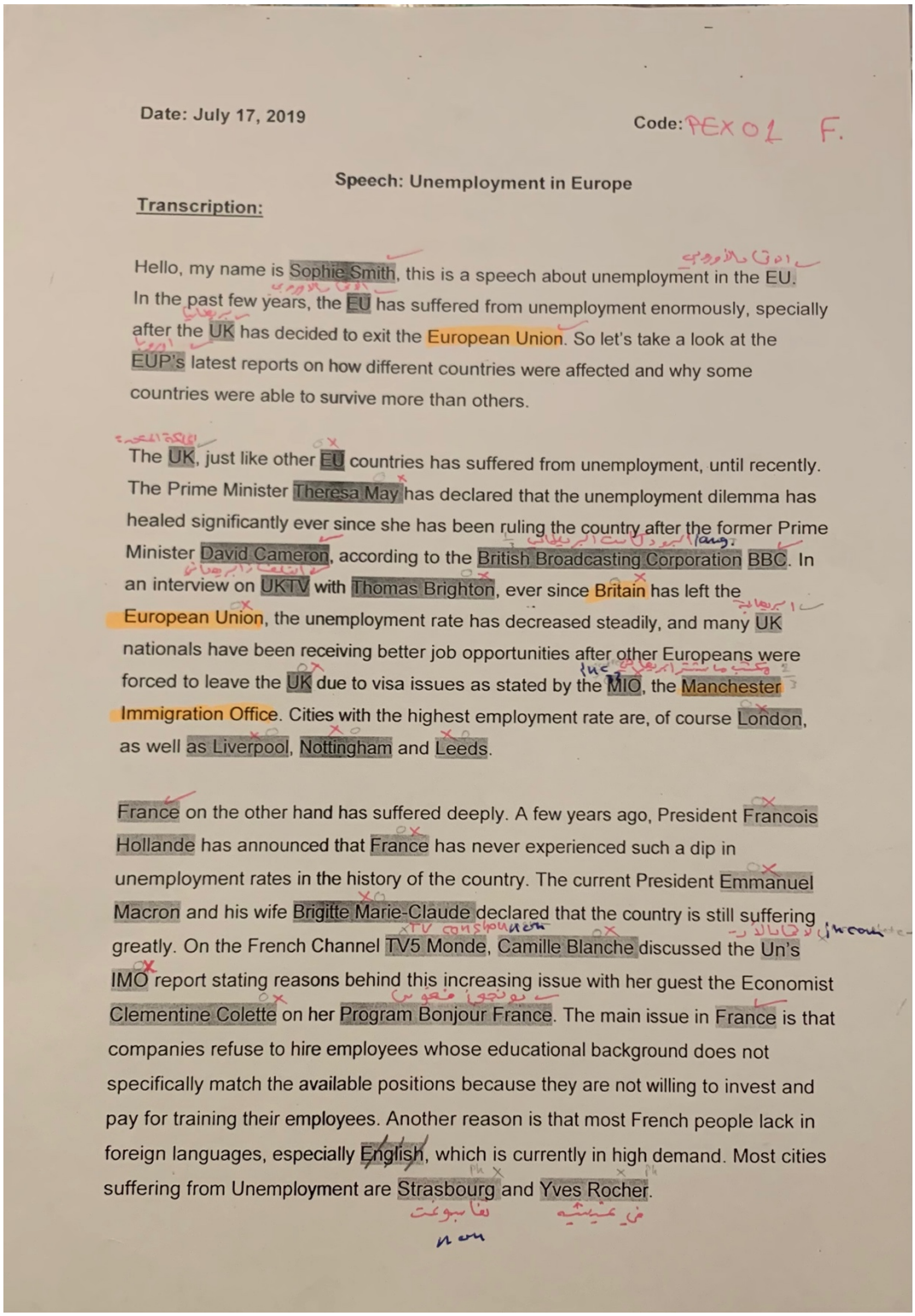
Governments and the International Organisations should apply sanctions to the countries and companies who allow child labour, and they should put a minimum age for working, such as 15 or 18 years old. But you also have a responsibility, next time you want to enjoy a cup of coffee or a chocolate bar, take a minute to read the label and make sure it has the sign stating it was not made by a child!

Phonological: 1 OTHER: 6/14
Omission: 6

7/16

Appendix 9-5

Sample Evaluation Sheets of the Pre-test and Post-test



Date: July 17, 2019 Code: PEX01 F.

Speech: Unemployment in Europe

Transcription:

Hello, my name is Sophie Smith, this is a speech about unemployment in the EU. In the past few years, the EU has suffered from unemployment enormously, specially after the UK has decided to exit the European Union. So let's take a look at the EUP's latest reports on how different countries were affected and why some countries were able to survive more than others.

The UK, just like other EU countries has suffered from unemployment, until recently. The Prime Minister Theresa May has declared that the unemployment dilemma has healed significantly ever since she has been ruling the country after the former Prime Minister David Cameron, according to the British Broadcasting Corporation BBC. In an interview on UKTV with Thomas Brighton, ever since Britain has left the European Union, the unemployment rate has decreased steadily, and many UK nationals have been receiving better job opportunities after other Europeans were forced to leave the UK due to visa issues as stated by the MIO, the Manchester Immigration Office. Cities with the highest employment rate are, of course London, as well as Liverpool, Nottingham and Leeds.

France on the other hand has suffered deeply. A few years ago, President Francois Hollande has announced that France has never experienced such a dip in unemployment rates in the history of the country. The current President Emmanuel Macron and his wife Brigitte Marie-Claude declared that the country is still suffering greatly. On the French Channel TV5 Monde, Camille Blanche discussed the Un's IMO report stating reasons behind this increasing issue with her guest the Economist Clementine Colette on her Program Bonjour France. The main issue in France is that companies refuse to hire employees whose educational background does not specifically match the available positions because they are not willing to invest and pay for training their employees. Another reason is that most French people lack in foreign languages, especially English, which is currently in high demand. Most cities suffering from Unemployment are Strasbourg and Yves Rocher.

Germany, however, hasn't suffered at all in terms of unemployment. As a matter of fact, in a recent report by President Frank-Walter Steinmeier on the TV Channel BR Bayerishcer Rundfunk, he stated that Germany has never been more stable in terms of employment rate due to the ME or Ministry of Education's heavy investment in the people's education and training programs as well as the cooperation between the public and private sector. Furthermore, in his interview on BR, he stated that the country's investment and contracts on projects with different countries such as MENA countries have helped greatly in job opportunities for the German people.

Finally, Spain, has unfortunately been on the low end of the spectrum in terms of the unemployment rate. The King of Spain Felipe Juan announced this year that the unemployment rate has reached its peak since decades. The most province affected by unemployment is Andalucia. This could be attributed to the fact that the largest number of immigrants reside there and many are accepting jobs with extremely low wages which results in the thousands of jobless nationals, According to Economist expert Pablo Alfonso and Financial Analyst Anna-Maria Sanchez. The Province of Catalunya on the other hand is suffering less than other, which explains why Catalunya is currently demanding independence from Spain.

Accuracy:

Total 28 \ **56**

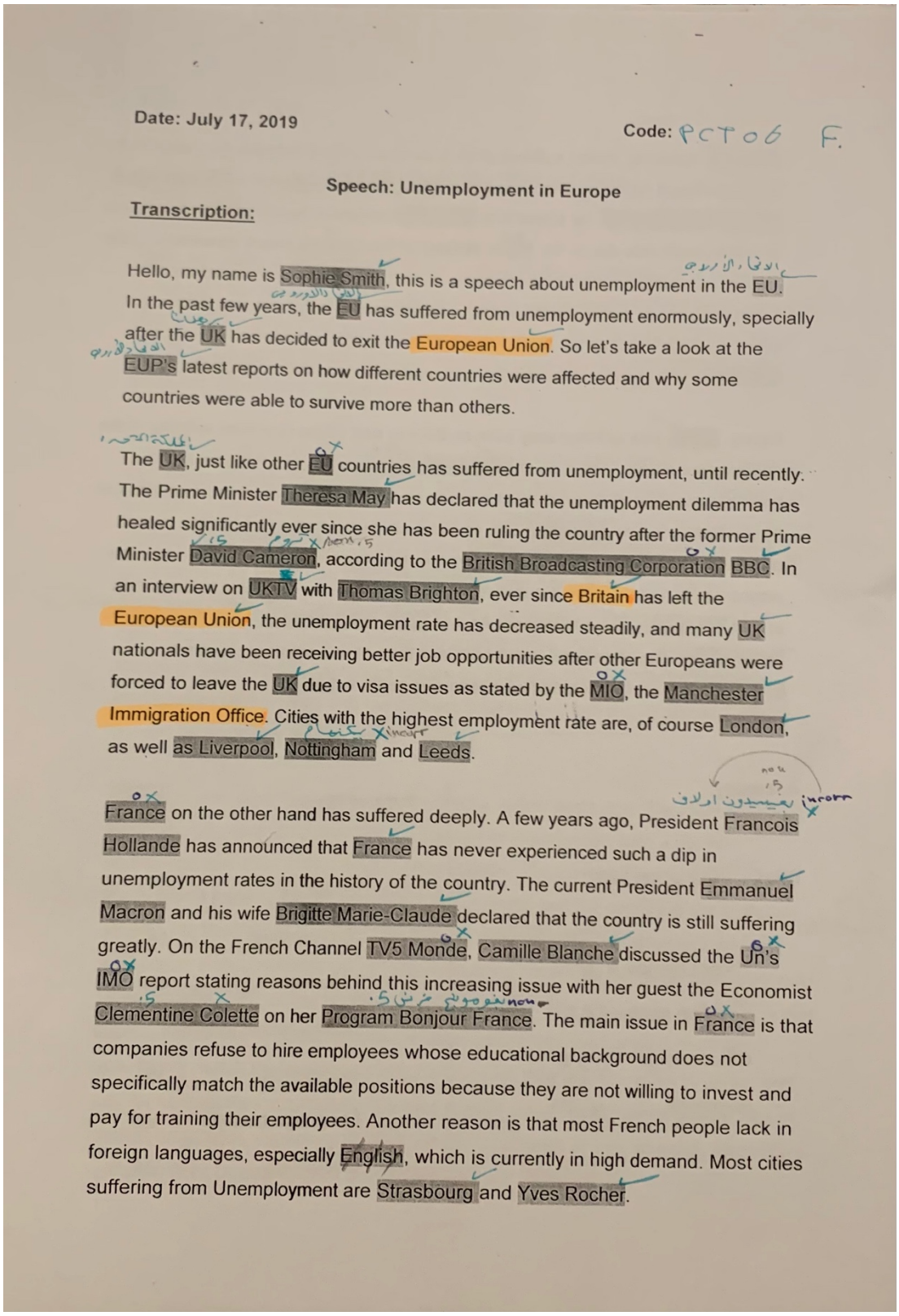
- Proper names 5 \13
- Location names 11 \20
- Other names 2 \6
- Acronyms 10 \17

Type of Error

- Omission 22 \56
- Phonological 2 \56
- Incorrect 1.33 \56
- Phonological\ Incorrect 0 \56
- Non-existent 2.33 \56
- Language transfer .33 \56
- Incomplete 1 \56

Appendix 9-6

Sample Evaluation Sheets of the Pre-test and Post-test



Date: July 17, 2019 Code: PCT06 F.

Speech: Unemployment in Europe

Transcription:

Hello, my name is Sophie Smith, this is a speech about unemployment in the EU. In the past few years, the EU has suffered from unemployment enormously, specially after the UK has decided to exit the European Union. So let's take a look at the EUP's latest reports on how different countries were affected and why some countries were able to survive more than others.

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Accuracy:

Total \ 6·33 \ **56**

- Proper names 3 \13
- Location names 7 \20
- Other names ·33 \6
- Acronyms 6 \17

Type of Error

- Omission 34·66 \56
- Phonological ·5 \56
- Incorrect 2 \56
- Phonological\ Incorrect \56
- Non-existent 2·5 \56
- Language transfer \56
- Incomplete \56