Challenges that Novice Interpreters Encounter when Interpreting Scientific Texts from English into Arabic

التحديات التي يواجهها المترجمون المبتدئون في الترجمة الفورية للنصوص العلمية من الإنجليزية إلى العربية

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Authorization

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Dedication

This thesis is dedicated to my mother for the unlimited patience and unconditional love she has been offering, without whom this thesis would have not been possible. Hopefully, she sees this thesis, in essence, as a fruit of her selfless giving and unlimited affection.

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Abstract

This study aims at investigating the difficulties that novice interpreters face when they interpret scientific texts from English into Arabic. It also aims to explore the reasons lying behind these difficulties and to suggest solutions that ease such difficulties.

To achieve the goals of this study, the researcher conducted informal open-ended interviews with experts and professional interpreters who taught interpreting courses or participated in scientific conferences. Each interview consists of questions related to the difficulties both the novice interpreters and M.A. students encounter during interpreting scientific texts , the causes, and suggestions that could be given to ease such difficulties. The researcher selected a sample of twenty graduate students who were enrolled in the M.A program in MEU University during the first semester of the academic year

2013/2014 to respond to the actual interpretation of texts that consisted of scientific material containing specialized terminology and scientific vocabulary.

The results of the study revealed that graduate students face different kinds of difficulties when interpreting such texts. The major difficulty is mostly attributed to specialized terminology, lack of equivalence for some terms, abundance of acronyms and abbreviations, peculiar style and structure of scientific discourse. The study also revealed that lack of prior knowledge of the subject matter, lack of working memory and lack of specialized training courses pose additional burden on the shoulders of graduate student interpreters and lead to the lack of confidence. The study confirmed the need for having professional and experienced interpreters who can handle such texts.

ملخص الدراسة
التحديات التي يواجهها المترجمون المبتدئون في الترجمة الفورية للنصوص العلمية من الإنجليزية إلى العربية

هدفت هذه الدراسة إلى استقصاء الصعوبات التي يواجهها المترجمون الفوريون حديثو العهد في ترجمة النصوص العلمية من الإنجليزية إلى العربية بالإضافة إلى استكشاف الأسباب التي تقف خلف هذه الصعوبات واقتراح الحلول التي تعمل على التخفيف منها.

ولتحقيق أهداف هذه الدراسة، قام الباحث بإجراء مقابلات مع خبراء ومحترفين في مجال الترجمة الفورية ممن قاموا بتدريس هذه المادة أو المشاركة في مؤتمرات علمية، حيث تكونت المقابلة من الأسئلة المتعلقة بالصعوبات التي يواجهها كل من المترجمين المبتدئين وطلبة الماجستير في ترجمة النصوص العلمية، والأسباب الكامنة خلف هذه الصعوبات وكذلك المقترحات لتجاوزها، وقد قام الباحث باختيار عينة تتكون من عشرين طالبا من طلبة الماجستير في جامعة الشرق الأوسط خلال الفصل الأول من العام الدراسي 2014/2013 ليقوموا بأداء الاختبارات التي تتكون من مواد علمية تتضمن مصطلحات متخصصة ومفردات علمية.

وقد أظهرت النتائج أن هؤلاء الطلبة يواجهون العديد من الصعوبات في الترجمة الفورية لمثل هذه النصوص، وكان أغلبها يعزى إلى المصطلحات المتخصصة وعدم توفر المكافئ لبعض هذه المصطلحات وكذلك كثرة الاختصارات والرموز وطبيعة بناء الجملة في النصوص العلمية، كما خلصت الدراسة إلى أن عدم توفر المعرفة المسبقة بالموضوع وضعف الذاكرة ونقص الدورات التدريبية الاختصاصية تشكل عبئا إضافيا على عاتق المترجم الفوري المبتدئ مما يؤدي إلى فقدان ثقته بنفسه . وقد أكدت الدراسة ضرورة توفر المترجمين الفوريين المحترفين ذوي الخبرة القادرين على التعامل مع مثل هذه النصوص.

Chapter One

Introduction

1.0 Background of the Study

Interpretation is a branch of translation that has a short history of less than 60 years and practiced by a small community of active researchers. It has been taught mostly in translation and interpretation schools, which are generally considered professional training courses rather than academic institutions so that it has a marginal role of research. It has been characterized by calls for more empirical studies and there has been an increasing communication between interpreting researchers.

While translation is the rendition of the meaning of a text into another language in the way the writer intended the text, with the translator having time and access to resources (dictionaries, glossaries, etc.), interpreting is conveying the message *orally* from one language to another, with the interpreter having no time to refer to the written resources available to translators. There are two main types of interpreting: simultaneous interpreting and consecutive interpreting. Simultaneous interpreting is carried out in real time, i.e. the simultaneous interpreter listens to the speaker, through headphones, and at the same time, interprets into a

microphone. In consecutive interpreting, the speaker delivers a part of his speech then stops in order to give the interpreter the chance to interpret.

However, during its short history interpreting has gained a great significance and evolved enormously. The process of simultaneous interpreting (SI) is not a simple transformation of text from a source language (SL) into a target language (TL), but is a complex process. The fact that the interpreter is both recipient and transmitter of the information simultaneously strongly influences the process of interpreting.

Interpreters with language skills are important in many areas such as in social services, health, education, courts and conferences. They are crucial in facilitating communication and in ensuring that such events run smoothly. Government departments, the police, the National Health Service (NHS) and lawyers use interpreters on a daily basis. The visits of international politicians, political and scientific conferences and conventions all require interpreters to assist in overcoming language barrier. Professional interpreters are always guided by a code of ethics and standards of practice to ensure that privacy is maintained.

Al-Hasnawi (2010, p.2) mentioned several requirements adopted by the London Institute of Linguistics for scientific translators, which necessarily apply to scientific interpreters. These requirements incorporate the following:

1. Broad knowledge of the subject-matter of the text to be translated;
2. A well-developed imagination that enables the translator to visualize the equipment or process being described;
3. Intelligence, to be able to fill in the missing links in the original text;
4. A sense of discrimination, to be able to choose the most suitable equivalent term from the literature of the field or from dictionaries;
5. The ability to use one's own language with clarity, conciseness and precision; and
6. Practical experience in translating from related fields.

These factors constitute additional burden to the essentially hard and stressful task of the interpreter.

1.1 Statement of the Problem

Interpreting in general is a demanding job as it entails more effort and exceptional potential than translation. Interpreters encounter different problems while interpreting texts, especially in scientific conferences. Although they may have professional skills in interpreting general texts, they may face certain difficulties when dealing with scientific issues. The researcher in this study will try to unfold such difficulties.

1.2 Objectives of the Study

The purpose of this study is to investigate the difficulties that novice interpreters face when they interpret scientific texts from English into Arabic. It also aims to explore the reasons lying behind these difficulties and to suggest solutions that ease these difficulties.

1.3 Questions of the Study

This study tries to answer the following questions:

1. What are the challenges that novice interpreters encounter while interpreting scientific materials from English into Arabic?
2. What reasons stand behind such challenges?
3. What suggestions can be offered to overcome such challenges?

1.4 Significance of the Study

Since this field of study has rarely been investigated, a necessity has emerged for further research and investigation, especially in scientific aspects. As far as the researcher is concerned, few studies in Jordan have tackled this issue. So this study may fill a gap in literature. Furthermore, the deficiency of M.A studies and resources, especially technological resources,

justify conducting this study which may be beneficial to interpreters in general and scientific interpreters in particular.

As we are witnessing the rapid pace of technology, it has taken a large portion of our new daily lives and necessitates the need for interpreters dealing with scientific and technical issues, i.e. the need for dual expertise in both disciplines (interdisciplinarity).

New terms and even new fields of science come into view and new scientific conferences are held continuously investigating new innovations and scientific developments. This process has raised the necessity for interpreters who have both linguistic and specialized knowledge in such fields of technology to render these new terms in the best acceptable way without distorting the original meaning.

1.5 Limitations of the Study

The results of this study are limited to the time and sample of the study and cannot be generalized to interpreting all fields of interpretation, since it is concerned with scientific interpretation in conferences. Furthermore, the results of this study are restricted to the instrument (interpretation texts and interviews). Also, the lack of M.A studies and resources, especially technological resources, is another constraint of this study.

1.6 Limits of the Study

The study was conducted in Amman, Jordan during the academic year 2013- 2014.

1.7 Definition of Terms

Novice Interpreters: interpreters with little or no experience or knowledge. They still grapple with numerous difficulties (background knowledge, comprehension, concentration, time lag, finding equivalents, keeping up with the speaker, etc.) in comparison with professional or experienced interpreters. Therefore, what has become a routine situation for experienced interpreters is likely to constitute a highly stressful event for student interpreters.

Operationally, this term is used in this study to refer to the M.A. students enrolled in translation programs in Jordanian universities who have not experienced interpreting.

Interpreting: the oral translation of spoken discourse from one language into another. Actually, there are three modes of interpretation: sight, consecutive and simultaneous interpretation.

Sight interpretation is a mixed type of interpretation and translation. The interpreter reads a document written in one language while converting it orally into another language. Operationally, it is the most simple phase of interpretation carried out in this study which involves presentation of the message aurally and visually.

In consecutive interpreting, interpreters listen to a single intervention in its entirety, while taking notes. They then render the meaning of the message in another language. Operationally, it refers to the intermediate phase which incorporates the translation of short utterances and taking notes of what is being said.

Simultaneous interpreting involves orally translating the message heard in one language immediately and continuously into another language while the message is still being produced. It is a complex cognitive activity that requires various training and qualifications from the interpreter to listen to what the speaker says and render it immediately into another language, listen to the speaker's next message, store the message in memory before retrieving it again for translation, and monitor his or her own output, all at the same time. For the purpose of this study, it refers to the advanced phase of interpretation

Scientific texts: this term indicates fundamental science and its application to industry, medicine, engineering and agriculture. It also incorporates special knowledge of a particular domain of science and technology or the specialties related to them.

For the purpose of this study, the term refers to texts related to medical and dental fields as well as various publications, e.g., technical reports, periodical articles, patents and servicing instructions and specifications.

Chapter Two

Review of Related Literature

2.0 Introduction

This section covers theoretical literature submitted by specialized theorists and examines several notions peculiar to interpreting. It also looks into empirical studies that have investigated difficulties in interpreting scientific texts and reasons that stand behind such difficulties.

2.1 Review of Theoretical Literature

2.1.1 History of Interpreting

Interpreting occurs when a communication process involves two or more people of different languages. Gaiba (1998) argues that the official practice of simultaneous interpreting dates back to the forties of the previous century. "The Nuremberg Trial was the first official international gathering in which simultaneous interpreting was used" (p.19). However, according to Pochhacker and Shlesinger (2002), interpreting began in the old ages; in exile cases, exploration campaigns and when slaves were forced to work for their colonizers.

According to Gile (1998,p.42), the work on interpreting includes:

> (1) an early period (1950s and 1960s) that produced the reflective writing of teachers and practitioners;
> (2) an experimental period (1960s and early 1970s) in which psycholinguists investigated psychological and psycholinguistic aspects of simultaneous interpreting;
> (3) a practitioners' period (late 1960s to early 1980s) in which interpreting teachers developed an interest in research and theory;
> (4) a renewal period (mid-1980s to the present) that has seen an increasing production of interdisciplinary research as well as the use of more scientific methodologies.

In the late 20th century, with increasing communication among languages and cultures worldwide, the demand for interpreting services rose correspondingly and led to the establishment of interpreting schools. For example, to support EU enlargement from 2004 and the need for interpreters of additional ten official languages, many postgraduate interpreting programs in the new member states were established, such as those in Slovenia, Slovakia and Astonia. In addition, Association Internationale des Interpretes de Conference (AIIC)'s global survey of Conference Interpreter training programs in 2004 involved at least 178 interpreting schools.

2.1.2 Conference Interpreting and its Modes

Conference interpreting as a profession is relatively young. It only started to attract public attention during the Nuremberg trials (1945-46), where simultaneous interpreting was successfully used on a wide scale for the first time. Gaiba (1998) gives a comprehensive judgement of interpretations at the Nuremberg trials. To do this, she used both judicial records and interviews with interpreters. She focused on practical arrangements for SI and its effect on the proceedings. Later in 1953, following the formation of the United Nations, where the need of SI was further demonstrated, the first international organization of professional conference interpreting, AIIC, was established. AIIC now has over 2500 members. The adoption of a code of ethics and professional standards in 1957 enabled AIIC successfully to regulate working conditions for interpreters and established a high profile for the profession worldwide. It has also" played a significant role in the areas of training and research on important issues of the profession" (Pöchhacker 2004, p.29). According to AIIC (2005), ' a conference interpreter is a professional language and communication expert who, at multilingual meetings, conveys the meaning of a speaker's message orally and in another language to listeners who would not otherwise understand'.

According to AIIC (2005), there are two major modes of work in conference interpreting: *simultaneous* and *consecutive*. In SI, interpreters sit in a sound-proof booth with usually a direct view to the conference room. From there, they listen to a speaker through earphones and simultaneously transmit the message in another language through a microphone to listeners in the room. Interpreters need to listen to the speech, understand it, and translate it into another language - usually their native tongue. Meanwhile, they need to monitor themselves to ensure the quality of the performance while, at the same time, processing the next part of the speech. It is thus clear that interpreters must exercise great concentration and work under constant pressure to produce accurate and reliable performance, covering a wide range of subjects and dealing with specialized terminology. SI is arguably demanding, both cognitively and linguistically (Frauenfelder & Schriefers, 1997).The interpreter, under severe time constraints, must comprehend a message presented in one language and store it temporarily while preparing to produce a translation equivalent in another language. Apart from the demands posed by simultaneity of comprehension and production, characteristics of the input message speech rate, density, and

content are additional potential sources of difficulty for simultaneous interpreters (Darò, Lambert, & Fabbro, 1996; Setton, 1999).

In consecutive interpreting (CI), interpreters listen to a single intervention in its entirety, while taking notes. They then render the meaning of the message in another language. As CI does not need any technical support, such as sound-proof booths and microphones, it was widely used in international conferences(AIIC, 2005).

2.1.3 Problems Encountered during the Interpreting process

2.1.3.1 Problems Related to Strategies and Techniques in Rendering the Meaning

Interpreting strategies can be defined as any goal-oriented, potentially conscious employment of tactics designed to overcome the processing problems interpreters encounter during simultaneous interpreting. This definition includes interpreters' responses to any problems occurring during the stages of comprehension, translation, or production, such as anticipating, restructuring, or generalizing (Chang 2005, p.7).

Interpreters develop strategies at various levels to deal with the challenges in interpreting from a given language to another. As a result, conference interpreters' proficiency levels in each language they work in must be quite high, and extensive practice with interpretation between the two languages in the direction or directions they will employ professionally is crucial. Bartlomiejczyk(2006,p.63) argues that " Successful repeated use of a specific strategy leads to its automation. Automated strategic processes reduce the cognitive load of interpreting." She proposes the following definition: "interpreting strategies are methods that are potentially conducive to solving particular problems encountered by interpreters or generally facilitating the interpreter's task and preventing potential problems."

Gile (1995, p.23) presents a much more comprehensive list of coping tactics and discusses them in relation to his Effort Model of SI. They fall into three main categories: comprehension tactics, preventive tactics and reformulation tactics.

1. Comprehension tactics are used when comprehension problems arise or threaten to arise. He lists four basic comprehension tactics: delaying response, reconstructing the segment with the help of the context, using the boothmate's help and consulting documents in the booth.

2. Preventive tactics are used to limit the risks of failure when the interpreter feels that problems are likely to arise due to time or processing-capacity pressure. These include taking notes, changing the ear–voice span, segmentation and changing the order of elements in an enumeration.

3. Reformulation tactics ,the largest group, , are used to eliminate the potential consequences of problems related to production or short term memory. The interpreter also resorts to other reformulation tactics: replacing a segment with a superordinate term or a more general speech segment, explaining (paraphrasing), reproducing the sound heard in the source-language speech, instant naturalisation, and transcoding.

2.1.3.2 Problems Related to Qualifications and Qualities Necessary for Interpreters

It is widely believed that interpreters should be competent linguistically and non-linguistically. Due to the intricate and highly specific nature of the content, experience of the relevant industry is required. Having a background in the sector, and knowledge of the terms used within it, allows a translator to ensure that all meaning is conveyed correctly. Gerver (1972, p.11) argues that" besides being a "translator", the simultaneous interpreter is considered to be as a complex information processing device who is able

to monitor, store, retrieve and translate "input" into one language, while at the same time speaking in another language, and monitoring and occasionally correcting his/her own output."

The interpreter should also be aware of the language difference. According to Gerver et al (1989), the following five specific criteria are important for trainees or professional interpreters:

1. Profound knowledge of active and passive languages and cultures.
2. Ability to grasp rapidly and convey the essential meanings.
3. Ability to project information with confidence, coupled with a good voice.
4. Wide general knowledge and interests, and a willingness to acquire new information.
5. Ability to work as a member of a team (p.724).

According to House (1997; 1998), the assessment of quality postulates a theory of translation/interpretation involving the relationship between source and target text (e.g., equivalence, adequacy, fidelity, ideational clarity, linguistic acceptability, or terminological accuracy) as well as the perception of this relationship by individuals who make use of the services of interpreters. In his review of the approaches to the evaluation of quality of interpreting (e.g., anecdotal and subjective approaches, response-oriented approaches, and text-based approaches), House (1998) argues that these are based on a number of very different theoretical perspectives. Moreover,

there are many conflicting views even about central notions, such as equivalence that some scholars consider to be common-sense terms.

Gile (1990) suggests guidelines that identify the performance of interpreters, such as source language, speed of delivery, style, degree of specialization, pronunciation, ambient noise, temperature in the booth, non-visibility of the speaker and the conference room, and prior knowledge of the subject.

The accumulation of SL items is another major issue that poses additional burden on the interpreter; the time interval for separating words in the interpreters' speech from corresponding words in the source speaker's speech, what is called "ear voice span" (EVS), or time lag, or phase shift which may cause the loss of SL information.

2.1.3.3 Problems Related to Working Memory, Conference Glossaries and Stress

According to Gile (1995),working memory (WM) has been considered another critical issue. Working memory is a limited-capacity component of information processing that is involved in processing and storage of currently active information while other cognitive tasks are being carried

out. Working memory resources affect all facets of simultaneous interpretation, including analysis and understanding of discourse in the input language, reformulation from the input to the target language, storage, production, and control.

Just & Carpenter (1992) point out that processing and storage functions are thought to compete for a shared limited capacity. Individuals who are more efficient in executing cognitive tasks are argued to have larger working memory spans. Wickens (2002) raises the possibility that working memory can be altered by training or practice. According to Liu(2001), working memory span could be enhanced through formal training in simultaneous interpreting so that individuals become more efficient in allocating multiple cognitive resources in real time. A number of studies with interpreters have incorporated measures of working memory (e.g., reading span, listening span, or digit span) to test this possibility.

The practice of building glossaries is part of the contextualization process. By reading conference materials beforehand so as to obtain items for a glossary, the interpreter learns about the theme of the conference, the speakers, the issues discussed and the relevant terminology. During the conference, the glossary may be further enhanced by both knowledge and

phraseology captured from various sources: speakers, colleagues, further conference materials or on-the-spot consultation with experts. An interpreter may even continue to work on the glossary after the conference, reviewing, revising and archiving it for future reference at similar conferences. This sustained focus, from initial organization through to later fine-tuning, makes the glossary a tangible vehicle for the construction of the conceptual knowledge that supports interpreting.

Jones (2002) points out to the need for ad hoc glossary, or previously prepared glossary as a corpus for particular source text, which proved to be useful in the interpretation for specific fields, such as scientific interpretation, the case of our study. It is considered one of the best terminology management methods. Yet, these glossaries should provide additional requirements, such as acronyms and abbreviations.

An interpreter's glossary is often built up throughout the entire duration of the conference, and not simply completed before the event begins. Gile (2002, p.12) refers to this ongoing process as "online preparation (during the conference)". Setton (1999, p.89) too points out that, while much important preparation is done beforehand, what he refers to as contextualization continues in the booth: More than in the case of ordinary conversation, contextualization begins before input: the interpreter starts

assembling pieces of the model before entering the booth (perhaps weeks before), adding features at an accelerating rate, as she gets the agenda, the minutes of the previous meetings, and the list of participants, then sees the meeting room; finally, if her colleague ("booth-mate") starts working first, she is fully contextualized by the time she begins.

Regarding the stress and tension that encounter novice interpreters while interpreting, Haddad (2006) focuses on the importance of bolstering the student interpreters' confidence in order to help them handle the interpretation task that involves an exceptional degree of stress, and requires gradual, carefully-designed training programs. To achieve her purpose, she suggests three phases, developing from the least up to the most complicated: the warm-up phase (sight translation), the intermediate phase (consecutive interpretation), and the advanced phase (simultaneous interpretation). Haddad (2008) modifies her previous model by involving some training stages (memory & sight interpretation) from the screening instruments used to select applicants for the Graduate Diploma Program at the University of Ottawa (Canada), suggesting the new model as a potential two-year diploma/MA program for training interpreters at Syrian universities. She applies stressful and unstressful events in her new gradual model, where preparation time and use of external resources are allowed during the

unstressful interpretation. However, during stressful interpretation, access is denied to such resources with no preparation time ("on the spot" interpretation).

2.1.4 Scientific Interpreting, Terminology, and Specialty

Undoubtedly scientific advancements and modern technologies are invading almost all fields of our life. New products and innovations are being invented. This necessitates the transformation and translation of such disciplines into other languages, as most literature is written in English as a Lingua Franca, in order to disseminate knowledge and new inventions to all nations in their own languages. We are living in an era of scientific revolution with information overload and new disciplines and sub disciplines coming to the fore every day.

Scientific translation has two characteristics which may affect both the methodology of translation and its theoretical component. One such characteristic is the cohesive association of scientific translation with scientific literature genres and specific special domains of study. The other one is the cohesive relation of scientific translation with the "Language for Special Purposes" (Mengzhi, 1999, p.186). Picht (1987) tried to differentiate between LGP (Language for General Purposes) and LSP (Language for

Specific Purposes) and believes that there still occurs what he calls "twilight zones", i.e., no dividing lines have been successfully found, and attempted to reduce such twilight zones. He argues that "LSP is characterized by, among other features, a particular terminology, i.e., the special vocabulary of the special field in question. At word class level this is realized through nouns and noun syntagmas, verbs, adverbs and adjectives, but also through numerals and prepositions".(p. 149)

Jumplet (1957, p. 23) accentuates that in translating scientific and technical fields, the principal quality of the translation depends upon the precise rendering of concepts.

According to Buzzelli(1969, p.141) this field of translation can cover " the translation of material that has to do with both pure and applied science or technology". In general, Scientific language often deals with concrete and tangible realities and rarely use idiomatic or culturally- bound expressions.

As scientific interpretation is the core of the current study, the concept of terminology is a major issue in this type of interpretation. According to

Newmark (1988, p.151), technical translation "is still primarily distinguished by its terminology from other forms of translation."

Moser-Mercer(1992) highlights the necessity of a terminology management system made particularly for the needs of interpreters focusing on the time limit and work conditions. Farghal and Shunnaq (1999) point out that "the major problem facing translators at present is terminology standardization and dissemination in the sphere of science and technology."

2.1.5 Major Characteristics of Scientific Translation

According to Finch (1969,p.4), the following features are important for scientific translation:

1. Scientific texts are intended to be read by scientists and so are scientific translations.

2. Scientific translation is usually made from a recent original work, intended to be read immediately, unlike literary translations which may be made from classical texts and used for centuries.

3. It is rare for more than one version of a scientific translation to be made-when this occurs it indicates a failure of communication.

Accordingly, a good scientific translation is one that conveys to the reader of the translation the information that the original was intended to

convey. Moreover, producing such types of translation not only concerns grammar and syntax; instead it concerns the choice of words rather than their arrangements. The fundamental point here is to pick out the right word to convey the right meaning.

Savory (cited in Buzzelli,1969,p.144) divides the vocabulary of science into three major categories:

1) Borrowed words - words taken from the natural language and assigned a new function by scientists;
2) Imported words - words taken from other languages, usually from Latin or Greek which undergo no change except that required by the standards of the transliteration system; and
3) Invented words - words coined by scientists to meet new needs and express new ideas faced in the course of their research.

It is true that scientific and technical words should be short, easy to pronounce and at the same time appropriate to convey the required connotation. Limaye (1955,p.16) describes scientific words as those that "have very little romance and but rare literary association; they are seldom to be found in the works of Shakespeare or Milton".

Pinchunk (1977,p.19) argues that "the most significant linguistic feature of the technical texts is its vocabulary, the specialized terminology of the particular discipline." Furthermore, he cites the Russian writer Fedorov who treats technical terminology and technical phraseology as the

characterizing features of a class of translation literature that can be news (Journalism), and documentary material (Commercial and Official) and science.

2.1.6 Scientific Translation and Language Change

It is undoubtedly true that languages change over time, yet this change does not involve language death . The emergence of new concepts and disciplines and the rapid pace of technology entails the use of new ideas, nomenclatures and innovations which have a profound impact on language so that language change is an inevitable result of the change in human culture. Trask (1994, p.1) argues that "new words are constantly coming into use, and not only new words, but also new pronunciations and even new grammatical forms. At the same time, old words, old forms and old pronunciations are gradually dropping out of use." This indicates that every living language should undergo change through history in the same sort of ways and this change is natural and unavoidable and should not be considered as a basis for alarm and condemnation.

Language change includes vocabulary change that is the most difficult part of the problem of scientific translation. Within this context, Khuwaileh (2000) suggests that "the problematic side of vocabulary results from the

changing nature which can be due to the changing nature of language in general and to the scientific, industrial and technological advances." (p98) The problem in technical translation, Finch (1969, p.5) claims, becomes harder when there are new ideas and new methods. The original text may include existing terms or newly invented ones or metaphors. This can be ascribed to the fact that different languages have widely differing resources for expressing ideas, i.e., different languages operate on different levels-they evolve to fulfil the needs of the users, and they change when these needs alter.

The language problem can be considered as one aspect of the total problem of information transfer. Yet this problem has its own complications at the syntactic, semantic, and stylistic levels. Language change, for example, is always accompanied by change in meaning. Stressing the ongoing phenomenon of the change in meaning Trask (ibid, p.41) writes "like other aspects of language, the meanings of words can change over time. So, translators should always be up-to-date with the changes that the languages in question undergo.

BeekMan & Callow (1986, p.175) emphasize that "languages not only differ in their phonological and grammatical structures, but also in their lexical structures." Regarding word order, it is believed that "differences in

word order of various languages present a major problem to the inexperienced translator .But problems of word order are common to all forms of translation, and not only to technical translation of all aspects of the problem, it is one of the most difficult" (Finch, 1969, p.16).

A completely internal change at the level of the lexical item itself where the entire meaning is changed into something different is seldom seen in scientific terminology. Instead, scientific terms add to the language stock a large scale of change at the level of language. That is, scientific terminology contributes immensely to language change due to the ever-emerging new ideas that require to be summed up in new terms. Even if an already existing term is given a new meaning, this term should be dealt with as a new term like any neologism since both contribute to the entire language .

Hence, as mentioned earlier, all types of words usually undergo change over time. However, words of scientific texts can be said that they undergo less semantic change than literary words. If there is usually a change, it mostly involves a designation of a new sense to the word but with sometimes a novel meaning for that word different from that old one.

In conclusion, scientific translation is concerned with sharing and communicating ideas and, at the same time, avoiding emotions and feelings. Thus, scientific language has its own features and characteristics. While literary language depends on synonyms and emotions, scientific translation gives no attention to such factors. On the contrary, it deals with specific vocabulary and accurate terms and symbols.

2.2 Review of Empirical Studies

Awawdeh (1990) conducted a study which aimed to identify major problems translators may face when translating a scientific – technical text from English as a source language (SL) into Arabic as a target language (TL). Moreover, he suggested some guidelines to deal with these problems and establish principles and rules for translating scientific and technical texts. He carried out this process by analyzing 26 translated texts from English into Arabic, representing various disciplines, and comparison of Arabic and European technical writing characteristics. The study has come up with the broad categories of problems, such as, lexical problems, syntactic problems, morphological problems, cultural problems, metaphorical problems, and cohesive problems. Furthermore, he suggested a number of ways to deal with these problems, such as emphasizing the translator's competency and

standardizing scientific terminology on the national and regional levels. In addition, he confirmed that this process is an institutional rather than an individual responsibility.

Moser-Mercer(1992) investigated how conference interpreters handle terminology documentation. She used a questionnaire sent to the AIIC members. She also shed light on the interpreter's generalist versus specialist knowledge. 52.5% of all respondents have fields of specialization , 51% of whom are seasoned interpreters with more than 21 years in the profession and 49% work between 100 and 200 days a year. The findings suggest that the more years an interpreter spends in the profession and the more days s/he works per year, the greater the likelihood for fields of specialization having been developed. However, when interpreters were asked whether they have rejected a conference for technical complexity of the subject matter involved, there was no correlation between years of experience or days worked per year: 46% answered positively, indicating that specialty is a key issue in interpreting scientific texts.

Hobson(1996) investigated the role of the interpreter in medical communication in the Eastern Cape. Data were collected from interviews

with interpreters and patients and from interviews and questionnaires given to medical professionals. The results suggested that using trained medical interpreters in the interpreted medical consultation may solve some of the problems that arise and medical professionals should be encouraged to learn the languages of their patients to alleviate some of the misunderstanding which occurs. The study also raised questions about the way in which interpreting is viewed and showed that interpreting does not always observe the ideals perceived by theories of interpreting.

Tommola and Heleva (1998) examined the effects of both language direction and text complexity on interpreter trainees' performance by means of propositional accuracy scores in a study on 12 Finnish/English student interpreters' performance. They constructed sets of texts in English and in Finnish with varied surface structure complexity. They found that linguistic complexity of the source text produced a significant effect on students' performance. When texts were linguistically simple, students performed equally well in both directions in terms of the number of propositions accurately rendered, but when texts were linguistically complex, students performed slightly better in the L1 to L2 direction, although the difference was not statistically significant in their small data set.

Ivanova (1999; 2000) aimed to elicit data about the discourse processing of expert and novice interpreters during SI. To achieve this, she employed retrospection as one of a number of different methods. Ivanova used only the script of the source text and the notes she had taken during the interpreting as stimuli. In her analysis of the retrospection protocol, she divided her data into three categories: problem, monitoring observations, and strategies, and found that, compared to student interpreters, professional interpreters often used a variety of strategies for different types of problems.

Halloush (2000) investigated the acceptability of the Arabicized medical terms by physicians and medical students and evaluated the efforts of the Academy of the Arabic Language in Jordan in the Arabicization of medical terms. She also examined the problems that faced the process of Arabicizing medical terms and introduced several recommendations and possible solutions for these problems. In order to achieve this goal, she developed a questionnaire to investigate the different aspects of the study. She circulated the questionnaire to a sample of 100 recipients of physicians and concluded that:

1- The extent of acceptability of Arabicized medical terms is very low.

2- Most physicians and students of medicine in Jordan are not prepared yet under the current circumstances to accept and adopt Arabicized medical terms regardless of the physician's degree of specialty, place of work, gender, or language of education.

3- Most of physicians in Jordan call for a fundamental change in the current mechanism in which the Academy conducts its work as well as the attributes of Arabicized medical terms published by the Academy.

Mazza (2001) conducted a study on numbers in simultaneous interpreting to investigate problems pertaining to numbers. The study was implemented on 15 students of interpretation, aged between 24 and 28 years of age, who had attended interpretation courses for at least 3 years at the Faculty for Interpreters and Translators in Forli, Italy. Subjects were asked to carry out simultaneous interpreting from English into Italian. She also administered a questionnaire to all subjects after the interpretation. The purpose of the questionnaire was to confirm that subjects considered the texts fairly easy except for numbers and to provide a basis for matching subjects' perception of certain points (their performance in text 1 (with note-taking allowed) and text2 (without note-taking), the influence of numbers,

the usefulness of note-taking) against their actual performance. Subjects would evaluate both texts as generally easy, and numbers as very difficult; that they would perceive numbers not only as inherently difficult, but also as the cause of the problem in interpretation of the context; that performance would be rated worse for T2 than for T1; and that note-taking would be considered important when interpreting numbers. She specified six types of mistakes:

1. *Omissions*: the numeral is left out altogether or replaced by a generic expression such as *molti, pochi* (many, few), etc.

2. *Approximation*: numbers were rounded up or down. e.g., 5,853,769 was translated into "about 5,800,000".

3**.** *Lexical mistakes*: maintaining the order of magnitude of the stimulus, but the elements composing the numeral are in the wrong order, e.g. 768 into 678.

4**.** *Syntactic mistakes*: containing the right figures in their correct sequential order, but the number is of a wrong order of magnitude, e.g. 110,000 into 1010 and 51.1/1000 into 51.1%.

5. *Phonological mistakes*: the error can be related to a phonemically wrong perception of similar sounding figures in English (e.g. 17, “seventeen”, perceived as 70, “seventy”)

6**.** *Other mistakes*: she did not classify such mistakes and their causes were not apparent.

Gauton, Taljard &De Schryver (2003) examined the problem of lack of terminology in most fields of specialties as being the major problems translators encounter when translating into the African languages. They carried out a preliminary study to compare and analyze various strategies adopted by African translators for the most proper equivalent. A multilingual corpus of ten parallel texts, in all the eleven South African official languages, was studied with a combined size of 348,467 running words, with an average of 32,000 words per language. The study reported the finding of a good correlation between the terms, in spite of the difference between languages. The study also observed several strategies of translation . One of these strategies was the retention of loanwords translation with English spelling, which were adapted to reflect the phonological system of the borrowing language. Moreover, new scientific and technical terms were formed and their phonological structure was adapted and accommodated by the borrowing language.

Hamidi and Pöchhacker (2007) conducted a study at the university of Vienna to test the advantage of technology-assisted consecutive interpreting as a new method for conference interpreting. The Interpreter recorded the digital voice of the original speech which s/he can play back into earphones and render in simultaneous mode. This technique enabled interpreters to take over the traditional method of note taking. The renditions of three professional interpreters who interpreted from French into German in the consecutive and simultaneous mode were assessed . Analysis of two thirds of the transcript and video-based indicated that digital voice recorder-assisted CI leads to better interpreting performances, more fluent delivery, closer ST equivalence and fewer prosodic deviations. Furthermore, performances in the technology assisted mode were received by preferable responses of the experimental audience.

Balciunaite (2008) aimed to investigate, identify and discuss the main strategies of simultaneous interpreting used by Lithuanian conference interpreters practitioners. The methods undertaken in the thesis were the descriptive analysis of interpreter training and interpretation studies as provided by the higher education institutions in Lithuania.

Analysis of the subjects revealed the existence of a heavy shortage of accredited institutions which would train interpreters according to the international standards. Finally, the results of the frequency of strategy usage only partially confirmed the hypothesis of the research that anticipation will be universal, widely used and popular among Lithuanian interpreters as well. This can be related to the fact that there is a lack of proper training of conference interpreters in Lithuania. The more the interpreter is knowledgeable in the domain specific skills and particular aspects of SI, the more s/he is able to anticipate.

Jiang (2013) conducted a survey which aimed to gain a better understanding of the interpreter's glossary as an essential operational feature in the professional practice of interpreting. A pilot survey was carried out at a United Nations conference in 2010, involving 18 interpreters working in the four conference languages (Chinese, English, French and Russian). A printed questionnaire was given to each interpreter. All interpreters had more than 5 years' experience at the time of the survey, including 10 with over 15 years' experience, 2 with 10–15 years' experience and 4 with 5–9 years' experience. In terms of training background, 9 of these interpreters had graduated from MA-level interpreting schools, 5 had received training of

limited duration, and 2 were self-trained. With regard to professional status, 9 were staff interpreters of the United Nations and 7 were freelancers. 62.5% of the sample generate a glossary only for "technical or unfamiliar" meetings, while 31.3% of them generate glossaries for most meetings.

With regard to the intended functions of the glossary, 75% of respondents state that their reason for using the glossary is to learn about issues and concepts, 50% use it to learn vocabulary, while 43.7% see it as a way to "get themselves into action mode".

In terms of the medium interpreters use for their glossaries, 68.8% include "loose paper" as one of the media and 31.3% use a paper notebook. Less than half the sample (43.3%) use MS Word, and a quarter use MS Excel. A small percentage (12.5%) uses online applications. The survey results reflect practice in relation to glossaries among a large group of experienced professional interpreters.

Summary:

To sum up, we can classify reviewed studies in terms of the following categories:

1. Problems: most reviewed studies investigated problems related to translation and interpretation. Results revealed the existence of two types of

problems; linguistic and non-linguistic. Such problems include, but not limited to, specialized terminology, lack of equivalence, acronyms and abbreviations, lexical, syntactic, morphological, cultural, metaphorical and cohesive problems. These problems will be described in detail in the following chapters.

2. Strategies: Other studies dealt with strategies of interpreting and the difference between novice and professional interpreters and found that professional interpreters have more expertise in using a variety of strategies and tolerate harsh conditions of the profession, e.g. stress, memory loss, specialized terminology, than novice ones.

3. Scientific context: results in this field concluded with the emphasis of using trained scientific interpreters who can handle rising problems. Specialized interpreters are indispensable to overcome such difficulties. One major issue pertaining to scientific fields is lack of terminology in most fields of specialties. Studies also examined the notion of text complexity, especially in specialized areas. Results also revealed that using glossaries is a substantial technique that aids interpreters throughout their task.

This study is distinctive in its style and methodology as it adopts descriptive and analytical approach. It uses distinguished style of translation in terms of the diverse methods of translation, starting with sight interpreting

and consecutive and liaison interpreting then ending with the most challenging mode, i.e. simultaneous interpreting. It focuses on translating various scientific texts that have peculiar style and specific context. The study carries out two kinds for training interpreters on such texts; guided training and unsupervised self training. two types of instruments are used; interviews with experts and professional interpreters in addition to the interviews conducted with the student interpreters who also responded to the actual interpreting texts.

From the previous discussion and presentation of studies on challenges faced by novice interpreters, the researcher became familiar and well-acquainted with the field of interpreting and its problems.

The researcher investigated theoretical concepts and empirical studies and research regarding interpreting in different contexts with great emphasis on scientific texts. Hence, he has gained significant experience and profound knowledge about procedures and methods used in implementing research in such fields. Thus, the researcher is fully prepared now to conduct his intended study.

Chapter Three

Methods and Procedures

This chapter deals with the population and the sample of the study, the research instrument, procedures of the study. The study is qualitative and aims to elicit a better perspective of the scientific field of interpretation and particularly in the medical context where interpreters are used. The model of the study of Haddad (2008) "Training interpreter: No easy task" was followed in this research. She suggests gradual training program of three phases which starts firstly with the warm-up phase (sight translation), then the intermediate phase (liaison and consecutive interpretation), and finally ends with the advanced phase (simultaneous interpretation).

The first phase is divided into three rungs where sight translation is used intensively as a warm-up technique. In rung 1, students interpreters are provided with both source and target texts. Students are guided to read them within maximum 10 minutes then start sight translation aloud without looking at the target texts while translating. In rung 2, no translated texts are provided. However, student interpreters are allowed to use their dictionaries prior to sight translation. In rung 3, they are denied access to dictionaries but instructed to highlight the main verb in every sentence.

The intermediate phase, which deals with liaison interpreting, is divided into two stages. In the first stage, students are provided with interviews and instructed to listen to every recorded segment and start liaison interpreting during the pause time. In the second stage, students are provided with two versions of the same text accompanied by its translation. The first version (V1) is recorded in short segments, and the second (V2) in relatively longer segment. Students are instructed to start consecutive interpreting of version 1 then version 2 respectively and to take notes. Afterwards they are asked to check how close/far their translation is to/from the translation provided.

The advanced phase (simultaneous interpreting) is divided into five experiments. In experiment one, student interpreters listen to the source text through headphones and start simultaneous interpreting from English into Arabic, without looking at the target text while recording their interpreting. In experiment 2, they listen to their voices on the cassette tape to check their translation. In experiment 3, source and target text swap position and students start simultaneous interpreting. In experiment 4, they check their translation. In experiment 5, teachers make a chat with students about the difficulties encountered in the above four experiments. Finally, students are given several texts and start simultaneous interpreting, then locate areas of

difficulties. Interpretation of every text is followed by a chat by the instructors to discuss such difficulties.

Haddad embedded some training stages (memory, sight translation & sight interpretation) from the screening instruments used to select applicants for the Graduate Diploma Program at the University of Ottawa (Canada), suggesting the new model as a potential two-year diploma/MA program for training interpreters at Syrian universities. She also stressed the importance of carrying out two kinds of training: guided training and unsupervised self training, which should not be undermined, as major part of the task depends on self training. She also pointed out to the responsibility of the interpreters to develop their own vocabulary. She also suggested that during unsupervised training, the use of normal equipment, i.e. only a tape recorder with texts, can serve the purpose, without any further advanced tools.

3.1 Population and Sample of the Study

The population of the current study comprises novice interpreters who are currently enrolled in some M.A translation programs in Jordanian universities . A sample of twenty graduate students were selected to respond to the actual interpretation texts as well as to the interviews. The demographic background information about the respondents' general

background include gender, age, level of education, professional background and number of years spent in English speaking countries. Another sample of five experts and professional interpreters were selected to respond to the interviews. Those experts and professional interpreters have long expertise and knowledge in the field of interpreting (as set out in appendix A, p.89).

Table 1. Demographic characteristics of the sample

Item		**Frequency**	**Percentage**
Gender	Female	14	70%
	Male	6	30%
Age	20-24	7	35%
	25-29	4	20%
	30-34	7	35%
	Above 35	2	10%
Nationality	Jordanian	18	90%
	Non-Jordanian	2	10%
Years of practice	None	17	85%
	0-2 years	3	15%
	3-5 years	0	0%
	Above 5	0	0%
Years spent in English-speaking countries	None	18	90%
	0 – 5	1	5%
	More than 5	1	5%

3.2 Instruments of the Study

For the purpose of this study the researcher used two instruments; the first was informal open-ended interviews and the second was actual interpreting texts that consisted of two scientific texts that meet the needs of the current study.

3.2.1 Informal Open-Ended Interviews

The researcher interviewed five experts and professional interpreters who taught interpreting courses or participated in scientific conferences (as described in appendix C, p.93). The group of twenty students who interpreted the texts were also interviewed (as shown in appendix D, p.94). Each interview consisted of questions related to the difficulties both the novice interpreters and M.A. students encounter during interpreting scientific texts , the causes, and suggestions that could be given to ease such difficulties. This technique helped the researcher to compile more information that could not be compiled from the texts being interpreted.

3.2.2 Actual Interpreting Texts

The participants were asked to do interpreting for actual interpreting texts from English into Arabic with scientific and technical material

covering some aspects of science and technology to detect the problems encountered and to explore the causes of these problems in addition to provide some suggestions to overcome such problems. The texts were divided into two parts. The medical text, (shown in appendix E, p.95) constitutes the first part of the interpretation texts with the title "upper gastro intestinal endoscopy" to be *initially* interpreted by student interpreters, as novice interpreters, using sight translation technique to make them feel more comfortable and confident than starting with more difficult modes of interpreting, i.e. consecutive or simultaneous. Students were given enough time for preparation to get familiar with topics. After students had become more experienced and confident in interpreting, they continued their gradual training by advancing another step on the ladder of interpreting. This was performed by the second part of the texts, "Performance of some diagnostic systems in examinations for small occlusal carious lesions", (as shown in appendix F, p.97) which was interpreted using consecutive and simultaneous interpreting.

The researcher selected the first scientific text from "*A textbook of translation*" by Peter Newmark. The second text was a study taken from the publications of University of Nijmegen, The Netherlands.

Novice interpreters tried to interpret the terms, structures and statements in their context. The purpose was to examine their abilities in interpreting such texts and figuring out the challenges they faced. Both the original texts and the interpreted material were recorded, transcribed and later analyzed to outline and detect the problems encountered and their causes and to provide suggestions to get over such problems.

3.3 Procedures of the Study

To conduct this study, the researcher followed these steps:

1. Reviewing theoretical and empirical related literature with particular focus on difficulties and strategies related to interpreting.

2. Selecting the sample of the study.

3. Conducting the informal interviews.

4. Preparing the texts to be interpreted.

5. Interpreting the texts, recording data, transcribing and analyzing it.

6. Analyzing and discussing the results and making some suggestions and recommendations.

7. Writing the references according to the APA style and adding the appendices mentioned in the body of the proposal.

Chapter Four

Results

4.0 Introduction:

This chapter answers the questions of the study which aimed to investigate the challenges that novice interpreters encounter when interpreting scientific texts. Here are the study questions and results thereof. The three research questions are:

1. What are the challenges that novice interpreters encounter when interpreting scientific texts?
2. What are the reasons behind these challenges?
3. What suggestions can be recommended to address these difficulties and promote interpreting quality for novice interpreters?

4.1 Results Related to the First Question

The first question of this study was: *what are the challenges that novice interpreters encounter while interpreting scientific materials from English into Arabic?*

The researcher had elicited a wide variety of problems that novice interpreters face while interpreting scientific texts through the tests he

conducted to a sample of 20 novice interpreters as well as interviews with professional interpreters who experienced conference interpreting, faculty members who taught interpreting courses and some of the novice interpreters themselves to have a better and omni directional view of such difficulties .

After conducting the actual interpreting texts, a number of problems has emerged. These problems can be classified into two categories. The first one concerns language - related problems. The second category constitutes problems related to non-linguistic aspects.

4.1.1 Language-Related Problems

These problems include:

1. Specialized terminology: which is the major problem in our study. Each discipline has its own terminology, as we are in the age of specialization.

2. lack of equivalence for some terms since Arabic is far lagging behind English speaking countries in terms of scientific progress.

3. Lack of specialized scientific dictionaries and resources. One of the main problems facing speakers and language practitioners is the shortage of appropriate dictionaries for a variety of purposes. This lack results in users

consulting any available but inappropriate dictionaries which leads to improper lexicography.

4. Acronyms and abbreviations: there are recognized acronyms and abbreviations as well as symbols for almost all fields of knowledge that cannot be realized except by the experts of that field.

5. Numbers recognition: since scientific texts are abundant and rich of figures and statistics which pose additional burden on the interpreter as he lacks time.

6. language mistakes and erroneous pronunciation which may result in misinterpreting or omission.

7. Style: interpreters should be familiar with scientific style in order to render the text appropriately without distorting the original meaning.

8. reproduction of coherent interpretations from messages which were sometimes incoherent.

4.1.2 Non-Linguistic Problems

Non-linguistic factors in the form of context are important for bridging the gap between the linguistic meaning of an utterance and the meaning that the communicator wishes to convey. Good knowledge of context, background

and world are important elements in the determination of utterance interpretation.

Hence, non-linguistic problems can be categorized as follows:

- Lack of prior knowledge of the subject matter: since the interpreter has no specialized knowledge, or even no general knowledge which may lead to poor rendition.
- Speed of delivery: which is a considerable problem in interpreting in general, but more demanding for scientific aspects in particular.
- Working memory: which differs from one discipline to another. Scientific fields need more short term memory (STM) than literary ones.
- Lack of time for preparation: when the institution or organization that held the conference did not inform the interpreter early before the conference so that he/she can prepare well and consult adequate information and documents about the subject in question.
- Loss of concentration: the interpreter becomes distracted and suffers from stress and information overload. The interpreter's attention is split between comprehending one set of words and speaking the translation of a just-prior set of words, and one must self-monitor to

assure that the translation produced is correct in content, structure, and word-choice.

- Non-visibility of the speaker: the interpreter cannot take advantage of the body language and gestures of the speaker making him/her feel unconfident and annoyed.
- Number of attendees and attitudes towards the interpreters which can affect the morals and, consequently, the performance of interpreters.
- Necessity of the knowledge of the target audience because it will determine whether the text is translated or interpreted to layperson or to specialist one. When physicians talk to their patients they usually use a common term of the disease which is different from its scientific name since this patient does not know its professional name. If the audience is specialized then the interpreter should stick to the specialized technical terms, but if it is directed to laypersons, the interpreter has to choose the proper technical term that can be understood by such audience. For example, in the medical context the term "mumps" is translated for a layperson as "أبو دغيم", while it is translated/interpreted to physicians as "النكاف".
- Time constraints: when the interpreters need to make treatment and adjustment as mentioned in the above point which consumes more

precious time and may hinder the overall interpretation. However, the interpreter should be fully prepared as s/he interprets "on the spot".

In addition to the interpretation texts, the interviews with the M.A students and interpreting professionals revealed some other difficulties.

Novice student interpreters were interviewed and asked three questions. The first question dealt with the difficulties that they encountered while interpreting scientific texts that contained specialized terminology. Their answers were summarized as follows:

- Unfamiliarity with some technological and specialized terminology that require high level of proficiency in order to pick up the most proper vocabulary or synonym, without distorting the original meaning, since some of them have more than one meaning.
- Difficulty to grasp the overall meaning of the text, i.e. in context.
- Poor Arabic rendition due to both the peculiarity of scientific discourse as well as lack of proficiency in the mother tongue.
- Loss of interest in the subject matter. Some novice interpreters get bored to handle such technical texts since they entail more concentration, higher attention and additional effort.
- Lack of experience in using specialized dictionaries.

- Complexity of the structure, syntax and semantics of the scientific text.
- Lack of solid background in this subject area. As novice interpreters, they have never been exposed to this type of discourse before.
- Lack of equivalence, since some English words do not have equivalence in Arabic.
- Lack of memorization since the interpreter has to concentrate on listening, memorizing and reproduction at the same time (in the case of simultaneous interpreting) with extra focus on technical terms.
- The need for more accuracy when dealing with scientific texts, since they are more sensitive and contain figures and numbers as well as symbols.
- Abbreviations and acronyms, which cause a serious problem to the interpreter, are used heavily by specialists because of the ease of use and time saving. In our case, the acronym "FOTI"(fiber optic transillumination) was checked in the dictionary by the novice interpreters who also visited several websites to interpret it correctly.
- The nature of the audience to whom the text will be delivered; whether a layperson or specialist. for example, the term "fissure" in

the dental text would be interpreted as "شقوق" for a layperson, whereas it would be rendered as "میازیب" for a specialist.

Student interpreters also listed a number of errors that can occur during interpreting which include:

- Loss of information
- Lack of intelligibility
- Interference between source language and target language
- Errors in the use of target language.

These errors may all contribute to the incomprehensibility of the message which is sent.

The experts in translation and linguistics had answered this question based on their experience. The first expert pointed out that the major challenge is the existence of technical terms, acronyms and abbreviations and stylistic forms of scientific discourse. The second expert pointed out that inadequate language proficiency in L2 related to structures, vocabulary and science register is a major problem. Moreover, he argued that Incorrect interpreting of science subjects such as physics and chemistry conferences is due to interpreters' little knowledge of these subjects. He also indicated that lack of attention and concentration are substantial drawbacks while

interpreting scientific texts. The third expert clarified that technical challenges lie in the presence of untranslatable terms. The researcher conducted the interview with him while he was on a real conference at the University of Science and Technology in Irbid. The conference was restricted, but after some efforts by the interviewee the researcher had the opportunity to attend a session of this conference. The interviewee mentioned some examples from the current conference; the term "biosafety" which cannot be translated as "السلامة الحيوية", rather it should be translated as "السلامة البيولوجية" so as not to distort its meaning. Another example he mentioned is the term "containment" which is generally rendered as "احتواء" while its correct translation in scientific context is "إزالة التلوث"or "الحد من التلوث". The fourth expert, he indicated that technical terms, particularly medical ones, are the major problems, in addition to the lack of specialty for the interpreter who should not stand for such specialized disciplines. Rather, he should specialize in one sub discipline. Regarding the fifth expert, she argued that the first difficulty that novice interpreters might encounter is the idea of being in a booth and the responsibility that it implies. A novice interpreter is going to be under pressure knowing that there are many people listening to what he/she is saying and this may lead him/her to panic and stop interpreting. The second major problem they might encounter is the

terminology of a certain field . They are going to hear some terms for the first time since every event is different from the other. She also believed that the accent of the speaker can also be problematic for interpreters in general and for novice interpreters in particular. Another issue, she added, is memory loss or (blocking) - when the interpreter loses the ability to remember a certain term while it is on the tip of his/her tongue is also a problem that needs to be dealt with if it continues to happen.

4.2 Results Related to the Second Question

What reasons stand behind such challenges?

After conducting the actual interpreting texts, the researcher have elicited the following reasons that stand behind such difficulties:

- Lack of experience and training of the interpreter:

  Any interpreter in scientific field should have adequate experience as well as special technical courses in order to fulfill his work fully, correctly and in a better way.

- Lack of adequate preparation which may result in embarrassing situations, unexpected turn of events and can even lead to a complete communication breakdown among the participants. Interpreter can refer to and consult several resources prior to his task.

- Lack of communication: The meeting, mainly in the medical context, takes place between at least two people, i.e. the health professional and the patient. This interaction is conducted primarily through language, although there are non-verbal elements involved as well, e.g. body language, gestures and physical examination as it is always said that "sharing is caring".
- The existence of different cultures of both the speaker and the interpreter which may affect the interpreter's production when s/he tries to project his/her own culture on his/her rendition.
- Peculiarity of scientific discourse: scientific discourse has a particular type of language and structure which can cause a variety of problems, especially in the medical field when medical professionals and patients need to communicate. This peculiarity is apparent in the semantic, syntactic and lexical differences between English and Arabic. In general, there is a big gap between English and Arabic almost in all scientific fields especially in the field of medicine. English is richer than Arabic regarding the discovery of new innovations, new medicines, etc. This, in turn, implies the richness of English scientific vocabulary.

- Lack of specialized scientific dictionaries and resources. Even when the interpreter refers to resources, he/she may not have the ability to pick up the proper terminology.
- The obvious contrast in directionality between English and Arabic. The English sentence begins with noun or subject and the verb comes afterwards, while the opposite is true in Arabic where the verb usually comes first. In this case the interpreter needs to wait for the verb to start his rendition which is considered a time- consuming process.
- Poor quality of medical care and bad relationship between doctor and patient. This would complicate the task of diagnosis and ensure that important facts are omitted. It is sometimes argued that the doctor is deemed the expert in the interaction and the patient is assumed to lack knowledge and does not know what is relevant or irrelevant and should strictly comply with recommendations and conversational control by the professional doctor, which leads to the lack of respect, underestimation and negligence of the patient.

  Hence, communication via an interpreter is better than a situation where no communication can take place at all.
- Taboos**:** Some areas in medical discourse regarding human body are considered taboos, especially in our conservative culture. Some

people feel shy and embarrassed to mention sexually transmitted diseases or sexual organs directly and replace them with more euphemistic expressions. These problems particularly appear when there is a male – female interaction. This phenomenon results in a barrier of communication.

The answers of graduate students and novice interpreters for the second question of this study about the reasons behind the difficulties that they encounter while interpreting scientific texts were as follows:

- Lack of knowledge and exposure to scientific issues which leads to ambiguity of some technological and specialized terminology. Some scientific fields, especially medicine, are growing dramatically on a daily basis accompanied by the emergence of new technical terms.
- The existence of two different cultures which impedes the process of interpreting.
- Time constraint for the interpreter compared to the time available for the translator.
- Inability to refer to resources and dictionaries due to the time constraint and even the rarity of such resources.
- Articulation and pronunciation of some scientific terms.

- Nature, accuracy and sensitivity of the scientific text which contains facts, figures, technical terms and jargon and needs special attention comparing to literary text.
- Lack of self confidence and fear of presenting before the public which causes a negative impact on the rendered output.
- Noise, distraction, high temperature and lack of hi-tech equipment inside the booth.

The translation teachers and professors had their own point of view regarding the reasons that might stand behind the poor interpretation of technical texts. For instance, the first expert mentioned that lack of good memory constitutes a major challenge to the interpreter. He further commented on the lack of confidence as a drawback that impedes interpreting as s/he feels that s/he is under tension. The nature of scientific discourse is also one of the major causes of poor interpretation. Regarding the second expert, he believes that interpreters do not usually receive adequate training in the skill of interpreting in general and in the skill of interpreting scientific subjects in particular in addition to the inadequate acquisition of L2, which is due to interpreters' poor training in the language. He also commented on the shortage of training programs offered to interpreters in Jordan, due to interpreters' belief that a superficial command

of English is adequate to qualify interpreters to interpret and the erroneous assumption that good command of English necessarily implies an ability to translate and interpret from L2 to L1 even in specialized science subjects such as chemistry and genetics. The third expert pointed out that speed of delivery and time constraint are major reasons that incur problems for interpreters. For the fourth expert, he pointed out that the reasons of such difficulties may be attributed to the fact that technical terms are sophisticated and of Latin origins. From his experience, the interpreter cannot grasp all these terms and vocabularies. He added that the interpreter may succeed to handle, for example, general health issues, but when it comes to specialized fields, e.g. anatomy or surgery, s/he feels completely unable to deal with such fields. The fifth expert mentioned that the reasons behind such difficulties lie in insufficient practical training, lack of knowledge in the subject of interpretation and unfamiliarity with the terms and expressions that can be used, inability to predict or expect the areas that can be covered in a certain event or conference, fear of committing mistakes, unfamiliarity with note-taking techniques and short term memory problems.

4.3 Results Related to the Third Question

What suggestions can be offered to ease the above-mentioned difficulties?

professional interpreters and experts gave the following responses for this question:

- More proficiency and experience in scientific fields and being up-to-date with new innovations and be familiar with the language of scientific context, which mostly dates back to Latin linguistic origins. Interpreters can establish their own glossary for new terms and update their vocabulary in these fields so that they can convey the original message without errors.
- Translator and interpreter have to consult specialized dictionaries, yet still it is not enough because even if we know the term we should refer to scientific resources and check references which could be more helpful than specialized dictionaries in order to interpret the text in its context. Translator could even consult a specialist, e.g. a doctor or physicist, to gain better understanding of the subject matter, yet interpreter is deprived from this facility since s/he is translating "on the spot".
- Interpreters should give additional information and explanation, i.e. glossing, where necessary to demystify any ambiguous term and statement.

- The significance of holding specialized meetings and seminars by interpreters as an important part of their work prior to any conference. During such meetings interpreters acquaint themselves with the subject matter, sub topics and research jargon terms and compile glossaries (terminological preparation) as well as assess the background of participants. Interpreters base their preparations on the documentation provided by organizers supplemented by internet search, consulting experts and referring to documentation from previous conferences. Responses also pointed out to the importance of holding preparation meetings which has also been stressed by the International Association of Conference Interpreters (AIIC) which included a clause about the provision of conference documents to interpreters for the purpose of preparation in the interpretation contract it recommends for use with clients. Such meetings and seminars may update their knowledge with the new developments in the field of interpretation.
- Interpreters may improve their renditions by exploiting redundancy gaps such as repetition, excessive synonymy, ellipsis and glosses.
- Paying more attention to the mother tongue, Arabic in this case. Institutions consider trainees skilled in their A language, while this is

not the case; They tend to focus on training students on their foreign language ability with the misconception that students are naturally proficient in their mother tongue. A sound knowledge of standard Arabic articulatory skills, grammar and rhetoric is essential to the interpreter's efficient delivery skills.

- Conducting specialized training courses for novice interpreters and trainees in order to get acquainted and familiar with technological issues. The aim of these courses is not to teach languages, but to develop the skills and techniques of simultaneous and consecutive interpretation as well as the terminologies for the national and international settings in which the interpreter can expect to work and to improve the specialized backgrounds and terminologies of a wide range of technical and subject areas. This notion is adopted in some western countries but needs to be transferred to the Arab world as well.
- Interpreters should make use of information technology resources, such as online corpuses and dictionaries, translation memories, terminology data banks, machine translation engines, computer aided technology (CAT) and other software tools used in translation.

- Specialized professionals, i.e., physicians, engineers, geologists, etc. could be invited as guest speakers to lecture trainee interpreters on scientific issues side by side with main professional lecturers.
- Renewal of the course curriculum on a yearly basis to assimilate the rapid pace of technology.

However, student interpreters interviewed suggested that interpreters need to learn how to listen accurately and then transmit the total message. This entails more than linguistic skills. They believed that the following items should be given emphasis when training technical interpreters:

- Understanding major grammatical differences between English and other languages.
- Learning listening skills
- Learning summarizing skills
- Learning memorization and concentration skills
- Selecting the appropriate register
- Learning specialist terminology and concepts

In conclusion, it can be seen from the above sections that interpreting is not a simple process. It is influenced by a variety of factors including the role of the interpreter, the culture, context and languages involved. It is

prone to problems since there are different ways of seeing the world and encoding these perspectives in language. Scientific interpreting which includes various fields is subject to these limitations and complicated by further aspects which are a result of dealing with a specialized field, having participants with unequal status and knowledge, and operating in a particular institutional environment.

Chapter Five

Discussion, Conclusions and Recommendations

5.0 Introduction

This chapter presents a brief summary and a short discussion of the findings of the three questions. It also attempts to explain and interpret the results in the light of the reviewed literature and the views of experts and professional interpreters. The chapter concludes with recommendations and suggestions for future research.

5.1 Discussion of the Findings of Question One

What are the challenges that novice interpreters encounter when interpreting scientific texts?

Results related to difficulties encountered by novice interpreters while interpreting scientific texts indicated that these problems are categorized into two types: linguistic and non-linguistic. This agrees with Al-Salman & Al-Khanji (2002,p.608) who argue that "the process of interpretation is a challenging task – a task that requires various types of both linguistic and non-linguistic skills: mastery of the active language, solid background of general knowledge, some personal qualities like the faculty of analysis

and synthesis, the ability to intuit meaning, the capacity to adapt immediately to change in subject matter and different speakers and situations. Other qualities include the need to have good short and long term memory, the ability to concentrate, a gift for public speaking, and physical endurance and good nerves."

Results indicated that the major difficulty interpreters face is terminology. This result agrees with Newmark (1988) as he stated that "Technical translation is primarily distinguished from other forms of translation by terminology, although terminology usually only makes up about 5-10% of a text"(p.151). It also agrees with Farghal and Shunnaq (1999) who indicated that the major problem facing translators at present is terminology standardization and dissemination in the sphere of science and technology. For example, the term "management" was rendered by nine interpreters as "إدارة", while the correct rendition was "علاج". seven student interpreters rendered the term indications as "مؤشرات", while the correct interpretation in this context is "استطبابات". Moreover, Arabic suffers a serious shortage of vocabulary that covers the fields of technology and science; therefore, translators and interpreters should consider this problem before anything else. This constitutes additional burden on the interpreter, as he/she cannot be acquainted with all fields of knowledge and specialties. In

addition, the new discoveries and innovations as well as the emergence of new disciplines and sub-disciplines give rise to this critical issue.

Furthermore, the results have shown that there is a shortage of some equivalent terminology, as some technical terms in English do not have equivalents in Arabic. This result agrees with Al-Dahesh (2008) who found that failure to achieve the equivalence is one of the most important difficulties. For example, in the dental text, the expression "fiber optic transillumination" is a technique used by dentists to examine teeth. Half of the novice interpreters rendered it as الجهاز الضوئي الليفي while the correct translation known by dentists is الجهاز الضوئي النافذ. Another example is the term "occlusal caries" which was interpreted by six novice interpreters as "التسوس الإطباقي " while the correct is "التسوس السطحي" which was later confirmed by consulting one of the dentists.

Scientific and technical texts are characterized by the abundant use of acronyms and abbreviations. For example, the acronym "FOTI" (fiber optic transillumination) was rendered verbatim by six interpreters by using borrowing.

Numbers and figures are major challenge to interpreters, particularly in the medical context as it depends on facts and statistics. This agrees with

Mazza (2001) who found that interpreters perceive numbers as a serious impediment to the process of interpreting.

The results has also shown that interpreting is a demanding job that needs to be performed in a limited time and be fully prepared. This agrees with Petite (2005) who argues that "Unlike translators of written texts who have some time to 'polish' their translation, interpreters need to perform 'online' and 'on the spot'"(p.27).

Cooperation between the speaker and the interpreter is another important issue that should be borne in mind . This is clearly apparent in Gile (1995) who argued that since generally all parties wish to communicate, more cooperation can be expected from them than in translation, where they are aware of a text rather than of a communicative situation. This includes cooperation from the speakers, who may try to speak more slowly, enunciate more clearly, choose certain terms and structures and avoid others, and clarify terms and concepts that they would not otherwise bother to explain.

Working memory is another challenge that hinders interpreting in scientific discourse, since it requires the interpreter to be more accurate and precise. This view is in line with Haddad (2008) who embedded a memory training phase in her previous model (Haddad, 2006).

Finally, word order poses a serious problem to the inexperienced interpreter. This is in harmony with BeekMan & Callow (1986) who ascertained that the fact that languages differ in their phonological, grammatical and lexical structures.

5.2 Discussion of the Findings of Question Two

What are the reasons behind these challenges?

The first and the most important factor that affects interpretation in scientific field as elicited from the interpretation texts and interviews is the lack of specialization as well as the lack of training in such fields.

The results indicated that lack of communication may impede the performance of the interpreter, especially in the medical context , since it is very sensitive and can affect the life of a patient. Many people associate health care only with medical cure or drug therapy. This, in turn ignores the powerful and complementary role of verbal communication in medical procedures . Quality care can be seriously downgraded by inappropriate use of language or by inadequate verbal communication. This agrees with Jansen (1973) who argues that both medical practice and care are a matter of communication first of all. Without satisfactory interaction between the health professional, patient and community, any medical care system,

however well organized, will be a failure in the long term. In this regard, Crawford (1995, p.9) believes that the patient's story is an indispensable and easily accessible guide for the doctor who has to negotiate an understanding and treatment with which the patient will comply. Unfortunately, the patient's side of the conversation is not usually regarded as being equally important to the doctor's contribution. He argues that:

> The patient's story, her [or his] experience and construction of her [or his] illness, is not central to the medical interaction. There is an inevitable gap between the patient's version of an illness and the medical view, but medical training doesn't equip doctors to bridge that gap or indeed to see it as a central concern.

The results also revealed the importance of knowledge of the target culture. This agrees with Agar (1994) who argues that culture starts when you realize that you've got a problem with language, and the problem has to do with who you are. Culture happens in language, but the consciousness it inspires goes well beyond it. Hence, it could be argued that where interpreters and patients share a culture with patients, problems could be eased.

The existence of different cultural content plays a vital role in making the interpretation a hard task for interpreters in general and scientific ones in particular. This result agrees with the results of Al-Ghussain (2003) who

indicated the tendency of some students to reflect their own experiences, religion and culture in their translations.

Lack of institutional training for interpreters is a another major reason behind such challenges. This is similar to Balciunaite (2008) who referred the existence of various problems in interpreting to the lack of accredited institutions which train interpreters according to the international standards.

5.3 Discussion of the Findings of Question Three:

What can be done to ease these interpreting challenges?

In light of the interpreters' responses and professors' remarks and recommendations to this question and in accordance with interpreting literature reviewed here, the results of this question indicated that:

- specialization in the interpreting field is an inevitable and absolute necessity for interpreters to specialize . We are living in the age of specialization where people in the same discipline are specializing in sub-disciplines. This also can be projected on the field of interpreting, which is even now considered independent in itself from translation. Scholars of interpreting distinguish Interpreting Studies (IS) from Translation Studies (TS). This is in line with khuwaileh (2000) who suggested that the problematic side of vocabulary results from the

changing nature which can be due to the changing nature of language in general and to the scientific, industrial and technological advances. It also agrees with Finch (1969) who believed that scientific translation handles new methods and new methods. Different languages should evolve to fulfil the needs of users.

- Training also plays a pivotal role in bolstering the confidence of interpreters. This agrees with Haddad (2008) who suggested some techniques to bolster interpreters' confidence. She suggested that training should be gradual by carrying out three phases starting from the least up to the most complicated: the warm-up phase (sight translation), the intermediate phase (liaison and consecutive interpretation), and the advanced phase (simultaneous interpretation). She modified her previous model by incorporating some training stages from the Graduate Diploma Program at the University of Ottawa/Canada into her model and located the new stages appropriately in the new model, then specified the objective of every stage in the new model. This points out to the need of implementing intensive training courses for interpreters in specialized fields and state-of-the-art technological issues as well as current affairs to broaden their specific and general knowledge. This view is also in

harmony with Hobson (1996) who suggested that the use of trained interpreters in the medical context solves some problems that may arise.

- The importance of holding meetings with other interpreters before any conference and prepare glossaries peculiar to such conference and referring to previous similar conferences. This agrees with Daniel (2002) who suggested holding preparation meetings. This suggestion was also stressed by the International Association of Conference Interpreters (AIIC, 2005) which included a clause about the provision of conference documents to interpreters for the purpose of preparation in the interpretation contract it recommends for use with clients. This idea is also in harmony with Jones (2002) who suggested the need for ad hoc glossary as indispensable way for better interpreting. This view is similar to Jiang (2013) who conducted a survey to gain a better understanding of the interpreter's glossary as an essential operational feature in the professional practice of interpreting. 62.5% of his sample generate a glossary for technical or purposes.
- The importance of note-taking technique which is an essential skill in consecutive interpreting. This agrees with Haddad (2006, p.225) who argues that "…note-taking is a very helpful technique. However,

overuse of this technique can be distracting, particularly for interpreter trainees."

- The significance of memory training which was embedded in Haddad's model by a phase prior to the warm-up phase in order to improve the novices' retentive memory, language command, and translation skills and prepare them for the coming phase.
- The importance of self training and enhancing interpreters' competency and own vocabularies to overcome various problems. This matches up with Awawdeh (1990) who suggested some guidelines to deal with broad categories of problems, such as, lexical, syntactic, morphological, cultural, metaphorical and cohesive problems. moreover, he suggested a number of ways to deal with these problems, such as emphasizing the translator's competency and standardizing scientific terminology on the national and regional levels.
- Some changes should sometimes be made to the original message by omission, addition, permutation (substitution) or summarization especially when interpreters encounter incoherent message.

5.4 Conclusions

The data obtained by means of the interpretation texts and interviews indicated that novice interpreters encountered many difficulties, both linguistic and non-linguistic, while interpreting scientific texts.

The major linguistic challenge encountered is handling terminology in specific fields. The rapid pace of technology and the emergence of new fields of science accompanied by their own terminology pose additional burden to the huge one that has already been incurred by interpreters, which raises the need for specialized interpreters. Moreover, the deficiency and lack of equivalence of some terminology, as some technical terms in English do not have equivalents in Arabic, require the interpreters to be fully aware of the best equivalence and synonym to be used, since scientific fields are more precise than others and any bad choice of equivalence may distort the whole meaning. Shortage of specialized dictionaries and resources is another problem that faces novice interpreters, since new fields and technologies emerge without interruption, which makes the task of such interpreters harder. Scientific language is characterized by the frequent use of acronyms and abbreviations necessitating that interpreters should be familiar with them. Numbers and figures are major challenge to interpreters in general.

However, they are frequently used in scientific language, since it depends on facts and statistics.

Regarding non-linguistic problems, they include lack of prior knowledge of the subject matter, speed of delivery, working memory, lack of time for preparation, loss of concentration, non-visibility of the speaker, number of attendees and attitudes towards the interpreters.

Students and professors elaborated on the reasons behind these difficulties and through their answers it was clear that peculiarity of the scientific disciplines, lack of experience and training of the interpreter, lack of adequate preparation, the emergence of new scientific fields and technological innovations, lack of communication which may enhance the process of interpreting through the use of body language technique, the existence of different cultures are some of the main causes of such problems. Almost all participants in the interviews had agreed that the need for specialization as well as interpreters' training and specific knowledge are the key solutions to these problems.

Professional interpreters as well as novice interpreters gave some suggestions that may enhance interpreting. They suggested conducting specialized training courses for novice interpreters and trainees, keeping up-

to-date with new innovations and being familiar with the language of scientific context, consulting specialized dictionaries and referring to scientific resources, providing additional information and explanation, when necessary, in the event the equivalent is unavailable, more proficiency in the mother tongue, continuous renewal of interpreting courses

5.5 Recommendations

This study recommends that at present the interpreters may not possess all necessary skills or possess them to a sufficient degree in order to be involved in scientific interpreting. Some interpreters tend to reject some conferences due to their high specialty.

It is also recommended that conference speakers should facilitate and ease their language so that the interpreter can convey the message fully, correctly and without any distortion. This includes simplification of vocabulary and explanations, the use of lay terminology rather than specialized terminology, if possible, and extensive use of explanation. When miscomprehension occurs, attempts are made to simplify or explain further. Medical context is different from other scientific aspect in the audience ; the conference audience tends to be fairly educated, generally has some knowledge of the subject under discussion, and is not seeking further

explanations. However, part of the audience, such as patients, is fairly uneducated, has little or no knowledge of the subject under discussion and seeks explanations of the information given in the consultation.

Furthermore, this study recommends conducting intensive training programs in different areas which could ease some of the problems that may occur during interpreting scientific fields and improve both general and specific knowledge and give interpreters the opportunity to analyze technical texts. These include conducting specialized technical courses in different scientific areas. This scientific knowledge seems to ease some of the problems during the interpretation process and aids comprehension. Interpreters with scientific knowledge seem to be better equipped with the necessary information that increase their confidence and refine their memory and allow them to produce a better output, which agrees with Haddad's (2008) model in bolstering the confidence of novice interpreters and stimulating their short term memory (STM) as well as long term memory (LTM).

Moreover, the study suggests the importance of carrying out gradual training, starting from the least and ending with the most demanding challenges, as an effective way to polish the faculty of interpreters. Novice interpreters need to improve their own vocabulary and establish their

glossaries to deal with specialized terminology and current events. Participation in ongoing conferences expose novice interpreters to real time situations and provide them with experience and additional training. It may also seem necessary that specialized interpreting should be carried out by the specialists themselves, i.e. doctors, engineers, economists, etc.

Finally, the study recommends investigating the feasibility and possibility of conducting specialized courses for training interpreters in Jordan and focus on various aspects of difficulties they encounter while interpreting these texts and the causes as well as the best solutions to overcome such difficulties.

REFERENCES

AIIC (2005) Practical guide for conference interpreting. Retrieved April 15, 2013 from http:///.aiic.net/ viewpage.cfm/articl21.htm

Agar, M. (1994). *Language shock: Understanding the culture of Conversation.* New York: William Morrow and Company.

Al-Dahesh, A. (2008). *Translating idiomatic English phrasal verbs into Arabic.* Unpublished PhD dissertation. University of Western Sydney, 2008. Available at: http://handle.uws.edu.au:8081/1959.7/26979

Al-Ghussain, R. (2003). *Areas of cultural and linguistic difficulty in English-Arabic translation*. Unpublished PhD dissertation, University of Durham, England. Retrieved from Dissertations & Theses: The Humanities and Social Sciences Collection. (Publication No. AAT U171358).

Al-Hasnawi, A. (2010). *Aspects* of *scientific translation: English into Arabic as a case study.* Retrieved March 15, 2013 from http://www. translationdirectory.com/article10.htm.

Al-Salman, S. & Al-Khanji, R. (2002). The native language factor in simultaneous interpretation in an Arabic/English context. *Meta: Translators' Journal*, 47(4), 607-626.

Awawdeh, A. (1990). *Major problems in scientific-technical translation from English into Arabic*. Unpublished M.A. Thesis. Yarmouk University, Jordan.

Baker, M. (2001). *Routledge encyclopedia of translation studies*. London: Routledge.

Bal, P. (1981). Communicating with non-English-speaking patients. *British Medical Journal* ,11(3), 283- 368.

Balciunaite, I. (2008). *Strategies of conference interpreting.* Unpublished Thesis, Vytautas Magnus University, Lithuania.

Bartlomiejczyk, M. (2006).Strategies of simultaneous interpreting and directionality. *Interpreting* 8 (2), 149–174.

BeekMan, J. & Callow J. (1986). *Translating the word of God.* Dallas: Summer Institute of Linguistics.

Buzzelli, G. (1969). General problems in scientific and technical translation. *Babel,* 15 (3), 140-146.

Chang, Ch. (2005). *Directionality in Chinese/English simultaneous interpreting: Impact on performance and strategy use*. Unpublished PhD. dissertation. The University of Texas at Austin,.

Crawford, A. (1995). At the heart of healing. *Bua*, 2(4), 8-12.

Darò, V., Lambert, S., & Fabbro, F. (1996). Conscious monitoring of attention during simultaneous interpretation. *Interpreting,* 1, 101–124.

Daniel, G. (2002). *Basic concepts and models for interpreter and translator training*. Amsterdam & Philadelphia: John Benjamins.

Didaoui, M. (1999).Translators as terminologists. *Al-Lisan Al-Arabi*, 47, 3-4.

Farghal, M. & Shunnaq, A.(1999).*Translation with reference to Arabic and English: A practical guide*. Jordan: Dar Al-Hilal for Translation.

Finch, C. (1969). *An approach to technical translation.* Oxford: Pergamon Press.

Frauenfelder, U. H., & Schriefers, H. (1997). A psycholinguistic perspective on simultaneous interpretation. *Interpreting, 2*, 55–89.

Gaiba, F.(1998). *The origins of simultaneous interpretation: The Nuremberg Trial*. Canada: University of Ottawa Press.

Gauton, R., Taljard, E. &De Schryver, G. Proceedings from TAMA (2003). *Towards strategies for translating terminology into all South African languages: A corpus-based approach.* South Africa: (SF) Press.

Gerver, D. (1972). *Simultaneous and consecutive interpretation and human information processing: Research report HR*. London: Social Science Research Council.

Gerver et al. (1989). Selection tests for trainee conference interpreters. *Meta: Translators' Journal*, 34 (4), 724-735.

Gile, D. (1990). Scientific research vs. personal theories in the investigation of interpreting. In L. Gran & T. Christopher (Eds.) *Aspects of applied and experimental research on conference interpretation* (pp. 28-41). Udine: Campanotto Editore.

Gile, D. (1995). *Basic concepts and models for interpreter and translator training*. Amsterdam: John Benjamins.

Gile, D. (1998). Conference and simultaneous interpreting. In M. Baker (Ed.), *Routledge encyclopedia of translation studies* (pp. 40–45). London: Routledge.

Gile, D. (2002). The interpreter's preparation for technical conferences: Methodological questions in investigating the topic. *Conference Interpretation and Translation*, 4 (2), 7–27.

Haddad**,** S**.** (2006). *Interpreting: Confidence-building strategies*. Damascus: Damascus University Publications.

Haddad, S. (2008). Training interpreters: No easy task. *Damascus University Journal,* 24(2), 31-46.

Halloush, L. (2000). *The Arabicization of medical terms in light of language and terminology planning*. Unpublished M.A thesis. Yarmouk University, Jordan.

Hamidi, M. & Pochhacker, F.(2007). Simultaneous consecutive interpreting: A new technique put to the test. *Meta: Translators' Journal*, 52(2),276-289.

Hobson, C. B.(1996). *The role of interpreters in medical communication In the Eastern Cape*. Unpublished Master's thesis. Rhodes University, South Africa.

Holmstrom, J. (1955). How translators can contribute to improving scientific terminology. *Babel,* 1 (2), 73-80.

House, J. (1997). *Translation quality assessment: A model revisited*. Tübingen: Gunter Narr.

House, J. (1998). Quality of translation. In M. Baker (Ed.), *Routledge encyclopedia of translation studies* (pp. 197–200). London: Routledge.

Ivanova, A. (1999). *Discourse processing during simultaneous interpreting: An expertise approach*. Unpublished Dissertation, University of Cambridge, UK.

Ivanova, A. (2000). The use of retrospection in research on simultaneous interpreting. In S. Tirkkonen-Condit & R. Jääskeläinen (Eds.), *Tapping and mapping the processes of translation and interpreting. Outlooks on empirical research.* (pp. 27–50). Amsterdam/Philadelphia: John Benjamins.

Jansen, G. (1973). *The doctor-patient relationship in an African tribal society*. Assen: Van Gorcum and Company.

Jiang, H. (2013). The interpreter's glossary in simultaneous interpreting. *Interpreting*, 15 (1), 74–93. John Benjamins Publishing Company.

Jones, R. (2002). *Conference interpreting explained.* Manchester: St Jerome.

Jumplet, R. (1957). Science translated. *Babel,* 3 (4), 207-208.

Just, M. & Carpenter, P. (1992). A capacity theory of comprehension: Individual differences in working memory. *Psychological Review* , 99, 122-149.

Khuwaileh, A. (2000). Vocabulary in LSP: A Case study of phrases and collocations. *Babel,* 46 (2), 97-111.

Limaye, S. (1955). Scientific translation in India: Some basic aspects. *Babel,* 1 (1), 13-16.

Liu, M. (2001). *Expertise in simultaneous interpreting: A working memory analysis.* Unpublished doctoral dissertation, The University of Texas at Austin.

Mazza , M. (2001). Numbers in simultaneous interpretation. *Interpreters' Newsletter.* Retrieved March 15, 2013 from: http://www.openstarts.units.it/dspace/bitstream/10077/2450/1/05.pdf

Mengzhi, F. (1999). Sci-tech translation and its research in China. *Meta,* 44 (l), 185-197.

Moser-Mercer, B. (1992). Banking on terminology conference interpreters in the electronic age. *Meta: Translators' Journal*, 37 (3), 507-522.

Newmark, P. (1988). *A textbook of translation.* London: Prentice Hall International.

Petite**, C.** (2005). Evidence of repair mechanisms in simultaneous interpreting: A corpus-based analysis. *Interpreting* 7(1), 27-49.

Picht, H. (1987). Terms and their LSP environment-LSP phraseology. *Meta,* 32 (2), 149-155.

Pinchuk, I. (1977). *Scientific and Technical Translation*. London: Andre Deutsch

Pöchhacker, F& Shlesinger, M. (2002). *The interpreting studies reader*. Great Britain: TJ International Ltd.

Pöchhacker, F. (2004). *Introducing interpreting studies*. London and New York: Routledge.

Setton, R. (1999). *Simultaneous interpretation: A cognitive-pragmatic analysis*. Amsterdam: John Benjamins.

Trask, R. (1994). *Language change.* London and New York: Routledge.

Tommola, J., & Heleva, M. (1998). Language direction and source text complexity: Effects on trainee performance in simultaneous interpreting.

In L. Bowker & M. Cronin & D. Kenny & J. Pearson (Eds.), *Unity in diversity?: Current trends in translation studies*. (pp. 177-186). Manchester: St. Jerome.

Weisberg, R. W. (1988). Problem solving and creativity. In R. J. Sternberg (Ed.), *The nature of creativity: Contemporary psychological perspectives*. (pp. 148–176). Cambridge: Cambridge University Press.

Wickens, C. D. (2002). Multiple resources and performance prediction. *Theoretical Issues in Ergonomics Science*, 3, 159–177.

Appendix A Panel of Experts			
Name	**Rank**	**Specialization**	**Place of Work**
Abdullah Shunnaq	Professor	Translation	Yarmouk University
Riyad F. Hussein	Professor	Linguistics	Jordan University
Advocate Dr. Adel Azzam Saqf Al Hait	Doctor	International Humanitarian Law, Reliable Legal Interpreter & Translator for Jordanian Regular Courts	Honour & Legal Consultant, Leading Bureau for Authorized Translation
Ibrahim Al-Omari	Assistant professor	TEFL	Freelance Interpreter
Maisa S. Suleiman	Lecturer	Translation and Interpretation	MEU & Freelance Interpreter

Appendix B

Students' Information Sheet

Dear students,

I am Ibrahim A. Alhiyari, a student in Middle East University Department of English Language and Literature. I am conducting my research about **"Challenges that Interpreters encounter in Interpreting Scientific Texts from English into Arabic"** as per the degree requirement. I would like to thank you for taking part in filling out this questionnaire.

This questionnaire aims to investigate the problems that interpreters encounter when interpreting from English into Arabic. I value your opinions and feedback. All responses will be kept confidential. Thank you again for taking part.

Please fill in the information below:

Age: ( )

Gender: 1- Male ( ) 2- Female ( )

Level of Education: 1-Secondary level( ) 2- BA level( )
3- M.A level( ) 4- Other ( )

Years of experience in interpreting, if any ( )

Years spent in English – speaking countries ( ). Where, and for how many years?

……
……

Languages you speak. And how long have you been speaking them?

……
……

How have you learned each of these languages?
……
……

How many years have you learned your second language?
……

How proficient are you in the second language skills?
Reading ( ) Writing ( )
Listening ( ) Speaking ( )
(Note: rate as: 1- Excellent 2- V. good 3- Good
4- Acceptable 5- Weak)

• Do you have any problems when using Arabic for daily communication and academic purposes? If there is any, give some examples.
……
……
……

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

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

• Have you ever received interpreting training before? If yes, where , when, and how?
……
……
……

……

• If you have ever worked in interpreting, please include difficulties you face while interpreting .

…….....
……
……

• Do you believe that professional interpreting, especially in scientific fields, entails special requirements, i.e. specialization, or otherwise? Explain your opinion.

……
……

• What do you expect to achieve through this interpreting training course?

……
……

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

……
……

• In your opinion, what is the role of scientific interpreters?

……
……

• In your opinion, what are the functions of scientific interpreters?

……
……

Appendix C

Open-Ended Interview Questions-for Experts

Dear professor / interpreter,

I would be grateful if you could answer the following three questions:

1. In your capacity as an expert in interpreting, what are the main difficulties that novice interpreters may encounter while interpreting scientific materials from English into Arabic?
2. In your opinion, what reasons stand behind such difficulties?
3. What suggestions do you recommend to address these difficulties and promote interpreting quality for novice interpreters?

Appendix D

Open-Ended Interview Questions-for Novice Interpreters

Dear participants,

Please answer the following three questions:

1. In your opinion, what are the main difficulties that novice interpreters may encounter while interpreting scientific materials from English into Arabic?

2. What reasons stand behind such difficulties?

3. What suggestions do you recommend to address these difficulties and promote interpreting quality for novice interpreters?

Appendix E

Scientific Interpreting Text 1

Dear student,

These interpreting texts will only be used in writing my M.A thesis titled "challenges that Novice Interpreters Encounter in Interpreting Scientific Texts". Your participation is highly appreciated.

Upper gastrointestinal endoscopy: its effects on patient management

C. D. Holdsworth, K. D. Bardhan, G. V. Bahnfimk, R. A. Dixon, G. E. Sladen

SUMMARY AND CONCLUSIONS

Out of 95 patients referred for upper gastrointestinal endoscopy after a barium-meal examination, 44 underwent a change in management. Some changes were minor but in 12 patients a decision on surgery was required. Seven of these patients were among a group of 13 for whom the referring consultant would have recommended laparotomy had endoscopy not been available, while the other five were subjected to an unplanned laparotomy.

These findings support the practice of performing endoscopy on patients whose symptoms are not fully explained by barium-meal examination, especially patients aged over 45. In such cases the procedure also seems to be cost-effective.

INTRODUCTION

Fibreoptic endoscopy is now widely used to investigate suspected upper gastrointestinal tract disease. In our four districts some 2500 examinations are done yearly, which represents a considerable load; thus an examination of the usefulness or otherwise of the technique seemed long overdue. Its value in 15 acute upper gastrointestinal haemorrhage has been assessed but it has not been evaluated objectively in other conditions. Thus to determine the real rather than imagined value of endoscopy we have studied prospectively a consecutive series of patients referred for the procedure after having undergone a barium-meal examination.

Appendix F

Scientific Interpreting Text 2

Performance of some diagnostic systems in examinations for small occlusal carious lesions.

Verdonschot EH, Bronkhorst EM, Burgersdijk RC, König KG, Schaeken MJ, Truin GJ.

Abstract

The objective of this study was to compare the performance in occlusal caries diagnosis of various available diagnostic systems when applied to the same teeth. The sample investigated consisted of 13 children for whom 4 premolar and 19 molar teeth were judged to require a sealant. The indication was based on the criteria 'fissure discoloration', 'enamel decalcification' and 'absence of dentinal decay'. For predefined locations within these occlusal fissures a diagnosis was obtained by the following diagnostic systems: clinical examination, examination on fiber-optic transillumination (FOTI), fissure discoloration, electrical resistance measurement, radiographic examination and ratings of fissure morphology. Tooth material was removed until no (more) carious enamel or dentin was left. Two dentists then jointly decided on the status of decay for each of the

defined locations within the fissure. These ratings served as the 'gold standard' diagnoses.

Appendix G

Model Interpreting of Text 1

تنظير الجهاز الهضمي العلوي: آثاره على علاج المريض

الملخص والاستنتاجات

تم تغيير طرق العلاج لـ 44 مريضا من أصل 95 مريضا تمت إحالتهم لإجراء تنظير الجهاز الهضمي العلوي وذلك بعد خضوعهم لفحص وجبة الباريوم، حيث كانت بعض هذه التغيرات طفيفة، في حين كانت الحاجة ملحة لاتخاذ قرار جراحي لـ 12 مريضا منهم. سبعة من هؤلاء المرضى - من أصل 13 مريضا ممن أوصى لهم الاستشاري بإجراء جراحة في البطن وخضعوا لتنظير الجهاز الهضمي- لم يحضروا لإجراء العملية، في حين أجريت عملية جراحية طارئة لبقية المرضى الخمسة. تؤكد هذه النتائج ضرورة إجراء عملية التنظير للمرضى الذين لم يتم تفسير أعراضهم بالشكل الصحيح من خلال فحص وجبة الباريوم، ولا سيما المرضى الذين تزيد أعمارهم عن 45 عاما، كما تبدو عملية التنظير في مثل هذه الحالات ذات تكلفة معقولة.

مقدمة

يستخدم التنظير بواسطة الألياف الضوئية حاليا على نطاق واسع للتحقق من أمراض الجهاز الهضمي العلوي المشتبه بها حيث يتم إجراء نحو 2500 فحص سنويا في مناطقنا الأربع ، مما يشكل عبئا كبيرا، لذلك تبدو دراسة الجدوى أو غير ذلك من الإجراءات الطبية أمرا متأخرا للغاية، وقد تم تقييم أهمية التنظير في 15حالة تعرضت لنزيف حاد في الجهاز الهضمي العلوي غير أنه لم يتم تقييمها بموضوعية في حالات مرضية أخرى. وبالتالي لتحديد الأهمية والقيمة الحقيقية للتنظير- خلافا لغير الواقعية- قمنا بإجراء دراسة مرتقبة على سلسلة متتالية من المرضى الذين تم تحويلهم لإجراء العملية وذلك بعد أن خضعوا لفحص جرعة الباريوم.

Appendix H

Model Interpreting of Text 2

أداء بعض الأنظمة التشخيصية في الكشف عن آفات التسوس السطحي الصغيرة

الخلاصة

هدفت هذه الدراسة إلى مقارنة أداء أنظمة التشخيص المتاحة المختلفة في تشخيص التسوس السطحي عند تطبيقها على الأسنان ذاتها، و شملت العينة موضوع الدراسة ثلاثة عشر طفلا ثبت حاجتهم إلى وضع حشوات سدادة لأربع ضواحك و تسع عشرة رحى. وقد استند الاستطباب إلى المعايير التالية: تغير لون الميازيب، وزوال الكلس عن طبقة المينا، وعدم وجود تسوس في الطبقة العاجية للسن. جرى تشخيص المواضع التي تم تحديدها مسبقا في الميازيب السطحية باستخدام أنظمة التشخيص التالية: الفحص السريري، والفحص باستخدام الجهاز الضوئي النافذ (FOTI)، وتغير لون الميازيب، وقياس المقاومة الكهربائية، والفحص الإشعاعي، وتقييم تشكل الميازيب. تم تطبيق النقاط التي يبدأ عندها تنفيذ القرار كما هو موضح في الجدول رقم (1). وقد تمت إزالة أجزاء من السن بحيث لم يتبق أي تسوس في كل من طبقة المينا أو الطبقة العاجية للسن، كما قام طبيبا أسنان بالمشاركة في تحديد حالة التسوس للمناطق التي تم تحديدها داخل الميازيب، وكان هذا التقييم بمثابة تشخيص نموذجي (النموذج الذهبي).