Chapter One

Introduction

1.0.   Overview:

Scientific translation is a daunting task particularly into Arabic simply because a translator always faced with new scientific concept. This requires a high level of both linguistic knowledge and scientific background. As a keen follower of the BBC World Service, I came across an interview featuring "A transplant face Patient" This interview indicates the fact that a translator does not only require the linguistic knowledge but also the knowledge of science which is always insufficient. So this makes the task of rendering such scientific discourse more difficult if not impossible.

As science and technology develop, new English words are used to express new concepts, techniques, and inventions that come into existence. This development has brought to Arabic serious linguistics problems of expressing this ever-expanding wave of newly-founded concepts and techniques for which no equivalents in Arabic exist (Al-Hassanawi, 2004).

Moreover, translating of full technical texts from English into Arabic still poses a major challenge (Nida, 1964: 233). It is interesting to note that Nida (ibid), in his discourse and scientific translation pointed to this challenge. He stated that:

"Translating scientific materials from a modern Indo-European language into a language largely outside the reach of Western science is extremely difficult. This is one of the really pressing problems confronting linguistics today. This is consistent with what has been stated earlier, that is, in the case of "Face transplant" where by a translator is required to be creative, that, is to say to have the ability of coining new words in his/her native language(i.e. mother tongue)."

Hajjaj (2001: 119) refers to technical language of science and technology: Physics, Chemistry, Biology, Medicine, Engineering and the like…the fact is that whatever applies to these disciplines also applies to any other special fields such as Business Administration Law , Linguistic,

History, Literature, Anthropology, etc. Each of these disciplines has its own special characteristics which belong to that particular genre.

Further, Fraghal (1999: 210) gives this description of scientific discourse:

Scientific discourses involve facts, figures, statistic, etc. The translation of scientific texts, therefore, should give priority to the subject-matter over style of the linguistic medium. Hence, specifity and exactness are a must; scientific expressions differ from those of other genres in that they are solely interested in denotative meanings. The language of scientific and technical discourses is characterized by non-emotive style, clarity, use of acronyms and simpler structures.[1]

1.1. Statement of the Problem:

There are various instances in which a translator with even a good command of English is faced with insufficient scientific knowledge which makes the process of rendering recent scientific discourse into Arabic more difficult if not impossible. Sometimes specialized scientific dictionaries may be rendered helpless. This scenario has prompted the researcher to investigate the problems that encounter translators in rendering recent scientific texts into Arabic. As scientific discourse s are known for their peculiar characteristics such as the presence of Latin words that makes the task of rendering scientific discourse more daunting.

1.2. Objectives of the Study:

This study is an attempt to investigate some lexical problems that comes as a result of bad translation. It will also highlight some problems pertaining to sentence structure building as far as translation of scientific texts is concerned finally, it will decide whether scientific background is significantly important or not for rendering recent scientific discourse in to Arabic.

1.3. Questions of the Study:

The study sets out to answer the following questions:

1- To what extent can a wrong lexical choice be problematic to translation of recent scientific discourse into Arabic?

2- To what extent can sentence structure building be problematic to translation of scientific discourse into Arabic?

3- To what extent is a scientific background of a translator significant in translation of scientific text into Arabic?

1.4. Hypotheses of the study:

This study sets out to test the following hypotheses:

1- A wrong lexical choice can be problematic to translation of recent scientific discourse into Arabic.

2- A sentence structure building can be problematic to translation of recent discourse into Arabic.

3- Sufficient scientific background is significant in rendering scientific discourse into Arabic.

1.5. Significance of the Study:

The importance of this research stems from the fact-that, the researcher must adopt linguistic tool to investigate the difficulties and problems that encounter Sudanese translators when rendering recent scientific texts into Arabic.

Hopefully, this study will also provides some insight sand practical help to students, translators and linguists who are engaged in the process of translation.

1.6. The Scope of the Study:

This study is narrowed down to investigate the linguistic problems that encounter Sudanese translators when rendering recent scientific discourse into Arabic. This study will be limited to students who are pursuing their MA degree in translation in Sudan University of Science and Technology, Collage of Languages. It is beyond the capacity of this thesis to go beyond all the scientific discourse, only a passing reference will be made to some relevant scientific discourse. Medical discourse will be the main concern of this study.

The study will draw its data from diagnostic test that will be administered to MA students of translation at (SUST).

1.7.   Methodology of the study:

In this study, the researcher will adopt descriptive analytical method to describe the problems that encounter Sudanese translators in rendering recent scientific texts into Arabic.

A Translation task in a form of a test will be administered to (50) MA students of translation. All of these students are assumed to be native speakers of Arabic. They hold a BA degree in English language; they have learnt English as a foreign language. These students are assumed to have a good command of both English and Arabic. The data of the study is limited to recent medical texts.

Also a questionnaire will be administered to (12) colleagues from Sudan University of Science and Technology.

Chapter Two

Literature Review

This chapter reviews relevant literature on the issue of in question, namely idiomatic expressions, and other related topics with some emphasis on the nature of reading comprehension. Important findings and arguments from opponents and proponents of an English-only teaching method will be discussed. The chapter is divided into two parts, the first one is on the theoretical framework, and the other is on previous studies.

Part one: Theoretical Framework

Part Two: Previous Related Work

2.1. Scientific Translation (Neologism):

As science and technology grew faster, new English words have to be introduced to name the product of the new technological devices which are the natural fruit of this scientific advancement. The last decades has witnessed the creation of new words and expressions technically referred to as neologisms, almost all relating to science and technology. This development has presented translators, particularly Arab translators with the need to provide the exact Arabic equivalent for the ever expanding technology. But while coinage, borrowing, transliteration and other means of transfer made for a huge bulk of English scientific terminology, translating of full technical texts from English into Arabic still poses a major intellectual challenge (Nida, 1964:223).

It goes without saying that there is no one particular language that has the privilege of hosting or having a store for all information and ideas. International scientific records that take care of scientific development demonstrated that 70% of the research indexed in 1970 in

the Science Abstract was in English and 30% were in Russian and other languages. This statistical fact clearly stresses the paramount importance of scientific translation. It is also observed that the need for this type of translation into Arabic is getting increasingly important because many Arab countries are currently undergoing a large-scale modernization process.

It is remarkable to pay attention to what Nida (ibid) says in this connection in his discourse on scientific translation, pointed to this challenge. He said:

If, however, the translation of scientific texts from one language to another participating in modern cultural development is not too difficult, it is not surprising that the converse is true- that translating scientific material from a modern Indo-European language into a language largely outside the reach of Western science is extremely difficult. This is one of the really pressing problems confronting linguists in Asia today.

Thus judging by the above Nida's words, scientific translation becomes a much dire requirement not only for the acquisition of technology, but to its introduction, installation, and operation as well. London Institute of Linguistics has laid down the rules and qualifications for all those wish to take up scientific translation as a profession. General principles of scientific translation can then be obtained by exploring and analyzing the rules of London Institute. The rules state that a translator should have:

- Broad knowledge of the subject-matter of the text to be translated;
- A well-developed imagination that enables the translator to visualize the equipment or process being described;
- Intelligence, to be able to fill in the missing links in the original text;

- A sense of discrimination, to be able to choose the most suitable equivalent term from the literature of the field or from dictionaries;

- The ability to use one's owns language with clarity, conciseness and precision; and

- Practical experience in translating from related fields. In short, to be technical translator one must be a scientist, or engineer, a linguist and a writer (cf. Gasagrade, 1954: 335-40; Giles, 1995; Latfipour, 1996).

2.1.2. Features of Scientific Translation:

Technical or scientific translation, as defined for the purpose of the present study, encompasses the translation of special language texts, i.e., texts written using Languages for Special Purposes (LSP). As such, technical translation (and "technical terminology" as well) includes not only the translation of texts in engineering or medicine, but also such disciplines as economics, psychology and law. These texts require not only a firm mastery of both the source and target languages, but also at least an informed layman's (or even journeyman's) understanding of the subject field treated by the text, coupled with the research skills needed to write like an expert on the leading edge of technical disciplines. Technical translators are typically either trained linguists who develop specialized research skills along with ancillary knowledge in selected technical areas, or engineers, scientists or other subject-area specialists who have developed a high degree of linguistic knowledge, which they apply to the translation of texts in their fields of specialization. Because of the diverse know-how demanded for producing high-quality technical translation, collaboration among linguists and subject specialists is not uncommon.

Consequently, scientific translation deals with scientific texts, while calling for a special knowledge. These texts require a solid command of the source and target languages, as well as a fully conversant person that understands the subjects properly. Scientific translators are often trained linguists that specialize in fields such as medicine, biology or chemistry. Sometimes they are scientists that have developed a high degree of linguistic knowledge, which they apply to the translation of texts in their field of expertise. Collaboration between linguists and subject specialists is really common in this case. In this article, we will explain you some of the best scientific translation techniques.

With reference to the six prerequisites as stated above, the first requirement deserve special consideration as it entails the formation of a theory of translation backed up by a background vigorously instituted on firm knowledge. This entails that whatever the nature of text may be, it has to be handled along the lines of the language in which it is written. This means that it is a theory which goes back to the old epistemological controversy over the objective and the subjective sides of reality, and which may imply, when extended to language varieties, a dichotomy between science and literature. According to Adams (ibid.) "it took more than a century to reorganize these two terms" properly as illustrated in the following columns:

Science	Literature
Denotative adequacy	Unbridled connotation
Logical expository and / or argumentative Progression	Lack of argumentative progression
Precision.	Vagueness
Intellect	Imagination or intuition
- Reason.	Emotion.
Truth to particular truth.	- Truth to the ideal and universal.

The above principles underlying both literary and technical scientific translation are compatible with Ilyas (1989:109) who describes the nature of scientific translation as shown below:

In scientific works, subject-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, hypothesis, etc. The reader of such scientific works does not read it for any sensuous pleasure which a reader of literary work usually seeks, but he is after the information it contains. All that is required in fact is that of verbal accuracy and lucidity of expression. This is applicable to the translator's language as well. Scientific words differ from ordinary and literary words since they do not accumulate emotional associations and implications. This explains why the translation of a scientific work is supposed to be more direct, freer from alternatives, and much less artistic than the other kinds of prose. The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.

Judging by what is demonstrated above; it is safely to state that Clarity and briefness are the main stylistic goals of scientific translation, which must convey the exact meaning of the original text. Ambiguities and unclear constructions are characteristics of the literary texts and must not be found anywhere in scientific translation. This is the hardest task in scientific translation. Finding the right words can be a struggle sometimes and it can also create repetitiveness in the text, as synonyms of

certain words can be rather ambiguous and more suitable for literary work. Avoiding repetitions can sometimes be extremely hard. This is why the translator must have a scientific background that allows her or him to play with the terminology without changing the meaning of the text.

What sets apart scientific translators from their other peers is their ability to correct the small mistakes in the original text, as they will be the persons that will read the document most attentively. Common errors in scientific work include: inconsistencies between numbers listed in tables, accompanying diagrams showing something else than they should or tables referred to by non-obvious symbols. In this case the translator is advised to correct such mistakes in brackets or footnotes.

If the syntactic and lexical features of the language differ, it is sometimes necessary to completely recast certain sentences. For instance, highly inflected languages such as Russian and German can string together long chain of independent and dependent clauses with many referents and antecedents and still keeping the whole meaning clear. On the other hand, this would be impossible in English for example. In this case, the translator will have some work to do in terms of structure and meaning. This is one of those times when keeping the sense of a sentence intact can be a real challenge. <u>One of the best techniques to use in these cases is paraphrasing</u>, namely a restatement of the meaning of a text or passage using other words.

2.1.3. Ardent Reader:

Science and technology are very rapidly developing and that countless neologistic terms are needed to meet the ever growing invention. So, in order to be able cope with these advancements, a

scientific translator needs to be an avid reader to be full conversant with the -state of the- art. In order to create a flawless scientific translation, the translator must be as informed as possible. Reading the latest books and academic journals helps you improve your translation skills. Firstly, you get used to the terminology and with the style of this type of work. Secondly, you will be up to date with the latest scientific researches and a discovery, which helps you understand more easily the concepts that you are supposed to translate. You can even create a blog about scientific translation, scientific researches and events. You can write articles or take existing articles and then translate them in the other languages that you know in order to gain more experience (remember to ask permission in order to avoid copyright infringements). This is a good idea particularly for beginners that want to specialize in scientific translation. Remember that the more you specialize in niches and sub-niches the easier it will be to research, write and become an expert.

In science you will come across a lot of numbers, formulas, diagrams and symbols, which must not be ignored in the process of translation. The sense of a whole page or even chapter can be altered if the translator adds the wrong number or symbol. To avoid this, he must understand very well the topic. Afterwards, he must pay a lot of attention to all the little things. This requires patience and analytical skills, qualities that are indispensable for a scientific translator. At the end of your translation, you should always proofread the texts yourself first and then ask a second translator to proofread your work as well. Ideally, ask other translators who have experience in the field. This way, all the mistakes that you did not notice will be corrected. In case some concepts from the original text are really unclear to you, you can communicate this

to the author (if possible) or with the client. It is always better to ask for clarifications, than leaving your work unclear.

2.1.4. Technical Translation Style:

There are certain stylistic goals that distinguish scientific translation from all other types of translation. Clarity, concision and correctness,   are simultaneously those of technical translation; an excellent technical translator is an excellent technical writer. Though in the past some translators have maintained that technical translation is solely a matter of correctly transferring technical content and that style is not the province of the technical translator. This part of the research explores and talks about some techniques to help achieve clarity, concision and correctness when translating technical documents from various languages into English. Included are breaking up the long sentences possible in inflected languages into the shorter sentences often required by uninflected English, substituting more specific or less specific English terminology for the more general or less general terms of other languages, and recasting the thought patterns of other languages into those of English. Also discussed is how a translator might deal with misstatements, incomprehensibilities and unknown words in the original. *S.E. Wright* demonstrates the need for translators to address their attention to questions of style at the situation, macro contextual, micro contextual and terminological unit levels in order to meet the differing expectations between the projected audiences for the source and target texts.

Taking as a point of departure, it is useful to define just what is meant by technical translation and how it differs from translation of other types. Burton Raffel divides translation into three basic categories according to the source text: nonliterary prose (including technical

material), literary prose, and poetry. According to Raffel, all three require the translator to produce "a comprehensible document" in the target language, to convey the context of the original document, and to grapple "with syntactical and lexical features of both" the source and target languages. Knowing and conveying the context of the original document is crucial. A translation of French *ballon* into English as "balloon," "football," or even the technical-sounding "flask" will not do if the word in context means a storage sphere (such as for pressurized natural gas).

All three of Raffel's categories imply a translation intended for an audience which will read only the translated version and not the original document, as opposed to ponies, trots and other versions intended to help an inexpert reader of the <u>original</u> text. No translation meant to stand on its own, even one of a technical document, can be literal in the word-for-word sense. A purposely far-fetched example will demonstrate this proposition.

A well-known German pun is *Der Mensch ist, was er ißt*. The literal meaning is "The human being (the masculine form connotes either male only or both sexes) is, what he eats." The pun arises because *ist* and *ißt*, translatable as "is" and "eats" in English, are pronounced identically in German. Ignore the pun for the moment, and consider the statement to be written in non-literary technical prose, perhaps at the conclusion of a paper on the incorporation of various nutrients into muscle tissue. A correct translation, if the muscle tissue of both sexes has been studied, is "Man is what he eats." Modern usage, however, prefers the more inclusive "A human being is what he or she eats," or the less awkward plural "Human beings are what they eat." None of these three translations is literal. In the first, German *der* (English "the") must be eliminated before "man" or the English statement, even for old-fashioned usage,

cannot apply to both sexes. In the second translation, the definite masculine *der* has been changed to the indefinite non-sexual "a" and the phrase "or she" added for clarity. In the third translation, the statement has been put into the plural form and *der* once again eliminated, which would not be allowed by German grammar even if the original had been plural {*der* would have been pluralized to *die,* but would not have been eliminated).

A translation of technical prose, though non-literal, should convey the exact meaning of the original text as directly as possible. Purposeful ambiguities, ungrammatical constructions and sound combinations which call attention to themselves are the province of literary translation.

2.1.5. Clarity:

If the syntactical and lexical features of the source and target languages differ, clarity often requires that the sentences in the target language be completely recast. For example, highly inflected languages such as Russian and, to a lesser extent, German can string together long chains of independent and dependent clauses, with many referents and antecedents, finite, infinitive and compound verbs, and still keep the whole meaning clear. English cannot. Consider a German sentence from a recent patent application:

Moreover occurs, that coatings from emulsion polymers well known on the basis of their content of emulsifiers and further water soluble auxiliary materials, which for the storage stability of these coating materials mostly necessary are, as thickening- and pigment dispersion media, a strong water swell ability retain.

Obtaining this English "sentence," unreadable as it is, still requires work on the part of the translator beyond merely looking up words in a

dictionary. The translator has already had to decide that *kommt,* usually translated "comes," here means "occurs"; that *Anstriche,* usually translated "paints," is better rendered here by the more general word "coatings"; that *aus,* usually translated "out," here means "from"; and that the first *die* is translated "which," while the second one is translated "the." But all these choices, necessary as they are, still do not allow the reader to determine with certainty what modifies and/or is the subject of what. The next step away from literality includes separating the compounds and recasting the grammar within each clause, but the result is still too literal for comprehensibility:

Moreover occurs, that coatings from emulsion polymers well known on the basis of their content of emulsifiers and further water soluble auxiliary materials, which are mostly necessary for the storage stability of these coating materials, as thickening and pigment dispersion media, retain strong water swellability.

The sentence now sounds as though it may mean something. It does not. Not yet. The main noun for meaning, "coatings," is too far away from the main verb for meaning, "retain." Putting the two words closer together generally means throwing some of the intervening material into a second sentence and making additional changes. There are several ways to do this. One is:

Moreover, coatings made from emulsion polymers retain a strong capability of swelling in water. These coatings are well known as thickening agents and pigment-dispersion media because they contain emulsifiers and additional water-soluble additives, both of which are necessary mainly to prolong shelf life.

Now the translation is comprehensible, but it is far from literal. In addition to splitting the single German sentence into two English sentences, the principal verb of the German sentence, *kommt* ("occurs")

has been eliminated entirely. It is irrelevant whether the use of *kommt* is good or bad German technical style, or whether it is necessary or optional by the rules of German grammar. Since it is superfluous in English, obscures the clarity (and diminishes the concision), it should be eliminated.

2.1.6. Current Science and Technological Development;

In today's world science and technological development have become so rapid in an unprecedented manner. This has the effect of thwarting or averting people from having access to that knowledge due to the language barriers. This situation was better reflected upon by Georgi Lozanov (2009)

The present-day rapid development of science and technology, as well as the continuous growth of cultural, economic, and political relations between nations, has confronted humanity with exceptional difficulties in the assimilation of useful and necessary information. No way has yet been found to solve the problems in overcoming language barriers and of accelerated assimilation of scientific and technological achievements by either the traditional or modern methods of teaching. A new approach to the process of teaching and learning is, therefore, required if the world is to meet the needs of today and tomorrow.

The study of translation and the training of professional translators is without question an integral part of the explosion of both intercultural relations and the transmission of scientific and technological knowledge; the need for a new approach to the process of teaching and learning is certainly felt in translator and interpreter training programs around the world as well. How best to bring student translators up to speed, in the literal sense of helping them to learn and to translate rapidly and effectively? How best to get them both to retain the linguistic and cultural knowledge and to master the learning and translation skills they will need to be effective professionals?

At present the prevailing pedagogical assumptions in translator training programs are (1) that there is no substitute for practical experience — to learn how to translate one must translate, translate, translate — and (2) that there is no way to accelerate that process without damaging students' ability to detect errors in their own work. Faster is generally better in the professional world, where faster translators — provided that they continue to translate accurately — earn more money; but it is generally not considered better in the pedagogical world, where faster learners are thought to be necessarily careless, sloppy, or superficial.

2.1.7. Translation as an art and science:

Since its beginning, translation has been considered as a multi-faceted and complicated activity or phenomenon, accordingly it acts a bridge to transfer knowledge between cultures and act as a means to join vary nations. Benjamin (1923), believes that the twentieth century has been called the age of 'reproduction', whereas Jumplet (1923) considers that era as *'the age of translation';* nevertheless, the argument that discusses whether consider translation is an art or science is a controversial issue.

In spite of the fact that translation currently plays a crucial role in the world's affair, it has always been considered as second-hand art. In this regard, Belloc (1931:6) demonstrates that, *"Translation has never been granted the dignity of the original work, and has suffered too much on the general judgment of letters."*

Savory (1957:49) thinks that it would almost be true to say that there are no universally accepted principles of translation, because the only people qualified to formulate them have never agreed among

themselves; therefore, he does not tend to consider translation as a science.

According to Holmes (1979:23), there are two branches of translation studies, namely pure and applied. He points out that the aim of pure translation studies is to describe the phenomenon of translation and to investigate all related aspects of it; however, applied translation studies focus on the application of translation theories to such aspects of translation as translation practice, the teaching and learning of translation, as Figure (2) clearly shows:

Nevertheless, Chukovskii (1984:93) does not take translation into consideration as a science when he confirms that, "translation is not only an art, but a high art." Referring to translation as "a craft", Newmark (1988), believes that literal translation is, "the basic translation procedure,
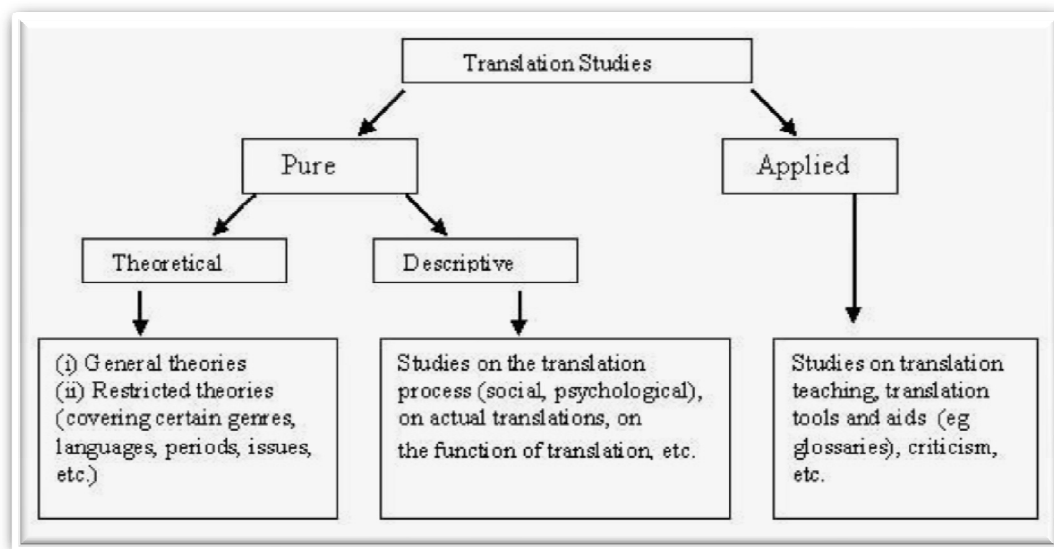
Figure (2) Holmes (1979:23): Branches of Translation Studies

both in communicative and semantic translation, in that translation starts from there," and he goes as far as to claim that literal translation above the word level is, "the only correct procedure if the SL and TL meanings

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correspond" (1988:70). Some scholars consider translation as a science. Miremadi (1991:39), for instance, writes that, "whether translation is considered an art or a science, it is, in its modern sense, a by-product of a long history of trials and errors, developments, improvements and innovations.". A similar idea is echoed by Zaixi (1997:339), who writes that

"*Translation is a process, an operation, an act of transferring. It is mainly a skill, a technology that can be acquired. In the meantime, it often involves using language in a creative manner so that it is also an art. However it is by no means a science*."

Consequently, translation studies, according to some scholars, can be regarded as a science. However, if the product of translation is taken into account, it seems normal to think of it as a craft or art. Whether translation is regarded as a science, art, or craft, it seems significant to note that a good translation should play the same role in the TL as the original do in the SL.

2.1.8. Cultural Consideration in Translation:

It has been long taken for granted that translation deals only with language. Cultural perception, on the other hand, has never taken into consideration. When defines translation, Catford, for example, concentrates on the replacement of textual material in one language by equivalent textual material in another language. According to this definition, the equivalent textual material is most important part in translation process. Yet, it is still blurred in terms of the type of equivalence in which culture is not taken into account.

Some scientists believe that translation is a process of transferring of thoughts and ideas from one language (source) to another (target),

whether the languages are in written or oral form; whether the languages have established orthographies or do not have such standardization or whether one or both languages is based on signs, as with sign languages of the deaf. Yet, there is no indication that culture is taken into account except in that of Nida and Taber.

Actually, Nida and Taber themselves do not mention this matter very explicitly. Following their explanation on *"closest natural equivalent"*, however, it can be inferred that cultural consideration is well thought-out. They maintain that the equivalent sought after in every effort of translating is the one that is so close to the meaning/message that is intended to be transferred.

It is obvious that out of the definitions of translation only one takes cultural aspects into account, that is, the one by Nida and Taber. As the content addresses all walks of life and culture plays an important role in human life, culture, therefore, should have more consideration.

2.1.9. Language and Culture:

Language and culture are inseparably connected. It is universally agreed that a language is a part of culture and culture is a part of language. Samovar Etal (1982:24) observes:

"Culture and communication are inseparable because culture does not mean only dictates who talks to whom about what and how the communication proceeds, it also helps to determine how people encode message, the meaning they have for message and the conditions and circumstances under which various messages may or may not be sent, noticed or interpreted–culture is the foundation of communication".

Culture in this regard is not only understood as the advanced intellectual development of humankind as reflected in the arts, but also it refers to all socially conditioned aspects of human life. According to Snell-Hornby (1988), culture means how to organize things, people, behavior, or emotions in a manner acceptable to the members of the societies and how do people deal with their circumstances.

A society's culture consists of whatever it is one has to know or believe in order to operate in a manner acceptable to its members, and do so in any role that they accept for any one of themselves. Culture, being what people have to learn as distinct from their biological heritage, must consist of the end product of learning: knowledge, in a most general, if relative, sense of the term. By definition, we should note that culture is not material phenomenon; it does not consist of things, people, behavior, or emotions. It is rather an organization of these things. It is the forms of things that people have in mind, their models of perceiving and dealing with their circumstances. To one who knows their culture, these things and events are also signs signifying the cultural forms or models of which they are material representation.

It can be summarized that this definition suggests three things: firstly, culture seen as a totality of knowledge and model for perceiving things, secondly, immediate connection between culture and behavior and events, thirdly culture's dependence on norms. It should be noted also that some other definitions claim that both *knowledge* and *material things* are parts of culture. (Koentjaraningrat, 1996: 80-81) and Hoijer (1967: 106).

According to Snell-Hornby (1988: 40), the connection between language and culture was first formally formulated by Wilhelm Von Humboldt. For this German philosopher, language was something

dynamic: it was an activity rather than a static inventory of items as the product of activity. At the same time language is an expression of culture and individuality of the speakers, who perceive the world through language. Related to Goodrulgh's idea on culture as the totality of knowledge, this present idea may see language as the knowledge representation in the mind.

Halliday and Hasan (1985: 5) state that there was the theory of context before the theory of text. In other words, context precedes text. Context here means context of situation and culture (Halliday and Hasan, 1985: 7). This context is necessary for adequate understanding of the text, which becomes the first requirement for translating. Thus, translating without understanding text is non-sense, and understanding text without understanding its culture is impossible.

Humboldt's idea, Sapir-Whorf hypothesis, and Halliday's idea have far-reaching implications for translation. In its extreme, the notion that language conditions thought and that language and thought is bound up with the individual culture of the given community would mean that translation is impossible. We cannot translate one's thought which is affected by and stated in language specific for a certain community to another different language because the system of thought in the two languages (cultures) must be different. Each language is unique. If it influences the thought and, therefore, the culture, it would mean that ultimate translation is impossible.

Another point of view, however, asserts the opposite. Ironically this also goes back to Humboldt's idea about inner and outer forms of language. Later it is developed into the concepts of deep structure and surface structure by Chomsky. Inner form and deep structure is what

generally known as idea. Following this concepts, all ideas are universal. What is different is only the surface structure, the outer form. If it is so, translation is only a change of surface structure to represent the universal deep structure. Accordingly, translation is theoretically always possible.

All in all, we are faced with two extremes. Which one is right? The answer, according to Snell-Hornby (1988: 41) lies not in choosing any of the two. If the extremes are put at the ends of a cline, the answer lies between the two. In brief, theoretically the degree of probability for perfect translation depends on how far the source language text (SLT) is embedded in its culture and the greater the distance between the culture in (SLT) and target language text (TLT), the higher is the degree of impossibility.

2.1.10. Culture and society:

Culture and society is not the same thing. While cultures are complexes of learned behavior patterns and perceptions, societies are groups of interacting organisms. People are not the only animals that have societies. Schools of fish, flocks of birds, and hives of bees are societies. In the case of humans, however, societies are groups of people who directly or indirectly interact with each other. People in human societies also generally perceive that their society is distinct from other societies in terms of shared traditions and expectations. While human societies and cultures are not the same thing, they are inextricably connected because culture is created and transmitted to others in a society. Cultures are not the product of lone individuals. They are the continuously evolving products of people interacting with each other. Cultural patterns such as language and politics make no sense except in terms of the interaction of

people. If you were the only human on earth, there would be no need for language or government.

2.1.11. Translation, culture and context:

Nowhere is this more apparent than in translation, where at every step decisions must be taken about when to provide explanation and extra detail, and how far to depart from the original. Even in the translation of a relatively simple business letter for example, there will be valid reasons not to use a literal translation but to mould what is said in one language to the conventions of another. 'Respected Gentleman Smith' may be the word-for-word translation of the Russian 'Uvazhayemy Gospodin Smith', but 'Dear Mr. Smith' is more appropriate in the context.

The study of translation now commonly referred to as 'translation studies'-has a far longer history than applied linguistics. Theories and practices of translation have changed but at their heart is a recurring debate, going back to classical times, about the degree to which a translator should attempt to render exactly what has been said, or intervene to make the new text flow more smoothly, or achieve a similar matter. Word-for-word translation is impossible if the aim is to make sense. This is clear even when translating the most straightforward utterances between closely related languages. Take, for example, the French 'Ca me plait'. Translated word for word into English it is 'That me pleases'. At least, this demands reordering to 'That pleases me' to become a possible English sentence. Yet, in most circumstances, a more appropriate rendering would be 'I like it'. The issue therefore is not *whether* one should depart from the original but *how much.* Of necessity, translators and interpreters must make such judgments all the time.

These may seem to be linguistic rather than cultural matters. Indeed, they beg the question of the relationship between language and culture, for translation, as conventionally defined, is between languages not cultures. Yet, as even a simple example will show, translation cannot be conducted at a purely linguistic level but must incorporate cultural and contextual factors too. Take, for example, the translation of the English pronoun 'you' into a language which has a distinction between an informal second-person pronoun and a formal one (*tu versus vous* in French for example). In every instance a decision must be made about which to choose, and it cannot be based upon linguistic equivalence alone.

In many cases translation decisions can be a major factor in cross-cultural understanding and international affairs. The difficulties of translating news stories between Arabic and English provide many examples. Decisions have to be made about whether to gloss emotive words such as 'martyrdom', which has quite different connotations from the Arabic 'shahaada', or simply to give up in difficult cases and import the original word, as in the case of 'jihad' and 'sharia', thus assuming in the reader a relevant background knowledge which they may not have. The importance of such decisions, playing as they do a role in each community's view of the other, cannot be underestimated.

'Traduttore traditore' – 'the translator is a traitor'. This Italian adage provides its own illustration, for translated into English it loses the almost exact echo of the two words. It illustrates, too, why despite many attempts across the centuries, there can never be foolproof rules for doing a translation or precise ways of measuring its success. In every translation something must be lost. One cannot keep the sound *and* the word order *and* the exact nature of the phrase. One cannot always make, in Hymes'

terms, the translation at once accurate, feasible and appropriate. Yet translation is-in the (loosely translated!) words of Goethe-'impossible but necessary', essential both in world affairs and in individual lives. It is work at the boundaries of possibility, and when subjected to scrutiny it inevitably attracts criticism, like applied linguistics itself. There are always judgments and compromises to be made, reflecting 'the translator's evaluations both of the original text and of the translation's audience. This, incidentally, is why *machine translation* by computer, though it may provide a rough guide to what has been said, does not challenge the need for human judgment.

2.1.12. Literary Language vs. Non-literary Language:

There is almost a consensus nowadays on taking up *the language of literature* as a major, and to some, sole criterion for defining literature and distinguishing between what is literature and what is not. Literary language has been assigned a special character since antiquity. It has been considered as sublime to, and distinctive from all other types of language, written or spoken, due to the special use of language that is deviant, or 'estranged' from ordinary, everyday, non-literary language. It breaks the common norms of language, including graphological, stylistic, grammatical, lexical, semantic and phonological norms.

The Formalists were the pioneers who examined the idea of deviance. They equated literary language with deviation, and claimed that it is used in a particular way and set off in contrast with the normal use of language. But they did not elaborate what the norm of language use could precisely be. Different terms were used by them to define deviation such as 'estranging of language', 'foregrounding', 'defamiliaization', and 'automatization' vs. 'de-automatization' of ordinary Language (Carter, 1979: Intro.; Ghazala, 1987 & 2011; Wales, 1989/2001 and Simpson,

2004). Among the obvious shortcomings of the formalists' perspective of literary language was that they identified it with poetry to the neglect of other types like prose and drama.

The American New Critics followed the formalists' suit and viewed literary language as a special kind of language use. Some modern stylists have viewed it in a way similar to the formalists. Yet, this does not mean that they have defined literary language in terms of deviation only. In fact, they have refuted that and argued with many other contemporary stylists and critics that it is not wise to draw a line between literary language and other types of language, and that the ordinary language has been used in literary texts and produced no less stylistic effects than the deviant language. Deviation to them is only one aspect of literary language, (Leech, 1969; Widdowson, 1975; Enkvist, 1973; Chapman, 1973 and others). Broadly speaking, this argument is true, especially of the language of poetry. However, in reality, it might not be quite applicable. Linguistic / stylistic deviation is required and fairly common in all literary genres for aesthetic, rhetorical and stylo-semantic reasons, whereas they are completely absent, or, at best, occasional in non-literary texts.

Non-literary language is a term which is always considered in conjunction, and in contrast with literary language. Controversy has been and is still going on in academic circles as to the validity of dividing language into these two different types. Traditionally, there has been such division between literature (especially poetry and fictional prose) and non- literature (other types of writing other than what is labeled as literature). The main line of argument is that literary language is emotional, rhetorical, rhythmical, deviant, aesthetic, expressive, symbolic, fictional and, therefore, sublime and superior to non-literary

language which is normal, expected, direct, and lacks all other literary characteristics, and, hence, inferior to literary language.

Recently, however, and in the past few years in particular, this view has been challenged by several writers. They claim that such polarization between literary and non-literary language does not exist because they overlap in many texts, and we can find literary features in non-literary texts, and non-literary features in literary texts, (Fish, 1980; Carter and Nash, 1983; Widdowson, 1975; Leech and Short, 1981; Simpson, 2004; Boase-Beier, 2006; Jeffries *et al*, 2010).

In fact, there is a point of truth in each of these two points of view. That is, the traditional one is right in its distinction between literature and non-literature, simply because it exists, whether we like it or not. Further, it has a strong linguistic and stylistic basis. The recent one, on the other hand, is true in rejecting the superiority of literature, for a certain social or linguistic context requires - not to say imposes - a certain type of language. For example, nobody is expected to talk or write to a doctor in verse, nor does anybody read a car leaflet or a list of instructions as to how to make a telephone call as a short story full of symbolism, rhetoric, irony and hyperbole. In the same way, no one can mistake a poem for a medical prescription, or a novel for a telephone directory.

The Formalists' argument about the 'specialty' of literary language (i.e. poetry to them), leans heavily on the special linguistic / stylistic features (or 'devices') of literary language, especially poetry, pointed out above. In other words, linguistic features of the form of a text are the decisive criterion to distinguish between literary and non-literary. On the other hand, the recent linguists and stylists who oppose polarization between literary and non-literary language rely in their argument on the

recurrence of non-literary features of language in literature, and the coincidence of literary features in non-literature.

Well, I would argue that both views fail to strike a balance between theory and practice. I mean to say that *the specialty of literary language is unquestionable*; yet, the linguistic features of the form, or the outer shape of the text are sometimes insufficient and might be elusive. By the same token, although features of literary language can recur in non-literary texts (like commercials, or political rhetoric), they do not change these texts into literature; nor these features are used for the same purpose, implication and function in literature.

2.1.13. The word in different languages:

As translators, we are primarily concerned with communicating the overall meaning of a stretch of language. To achieve this, we need to start by decoding the units and structures which carry that meaning. The smallest unit which we would expect to possess individual meaning is the word. Defined loosely, the word is 'the smallest unit of language that can be used by itself' (Bollinger and Sears, 1968: 43). For our present purposes, we can define the written word with more precision as any sequence of letters with an orthographic space on either side.

Many of us think of the word as the basic meaningful element in a language. This is not strictly accurate. Meaning can be carried by units smaller than the word. More often, however, it is carried by units much more complex than the single word and by various structures and linguistic devices.

2.1.14. Is there a one-to-one relationship between word and meaning?

If you consider a word such as rebuild, you will note that there are two distinct elements of meaning in it: re and build, i.e. 'to build again'.

The same applies to disbelieve which may be paraphrased as 'not to believe'. Elements of meaning which are represented by several orthographic words in one language, say English, and may be represented by one orthographic word in Turkish: tenisci; if it's cheap as one word in Japanese: yasukattara; but the verb type is rendered by three words in Spanish: pasar a maquina. This suggests that there is no one-to-one correspondence between orthographic words elements of meaning within or across languages.

2.1.15. Types of Translation:

Viewing translation from a classificatory standpoint one has to discuss types and methods of translation. According to Hatim and Mundey (2004), Jacobson in his seminal paper (1959/2000) distinguishes between three main types of written translation: Intra-lingual translation, inter-lingual translation, and inter-semiotic translation. Intra-lingual translation is the translation of textual materials within the same language and may include rewording or paraphrasing. Inter-lingual translation is to translate textual materials from one language into another. It is also referred to as the proper translation. Whereas inter-semiotic translation is the translation or the interpretation of the verbal signs by non verbal signs as translating ideas or emotions into a painting or in symphony of music.

In addition, each theorist looks at these types of translation differently and classifies them in different ways. For Ghazala (1995), for example, literal versus free translation is a sufficient classification. According to him, all the available typologies can be squeezed into these two types. All in all, the available typologies may include the following (Ghazala 1995:5)

1. Semantic versus communicative translation.
2. Formal versus dynamic translation.

3. Non-pragmatic versus pragmatic translation.

4. Non-creative versus creative translation.

Even though, Ghazala (1995) discussed only the literal and free translation, he started by literal translation which, according to him, is of two types:

1. Word-for-word translation;

2. Direct translation.

The first type aims at translating individual words only taking no consideration of the grammatical or other linguistic differences. Hence word-for-word translation involves extreme fidelity to the wording of the source text and forces the translator to set the exact equivalents. On the other hand, the second type, direct translation, considers the grammar and the linguistic differences.

2.1.16. Translation Strategies:

Strategies are sets of procedures that are used to translate; each one has a scale of facility that may be more helpful than the other. Bosco (1997) classified translation techniques or strategies into two types, direct and oblique.

2.1.17. Direct Translation Techniques:

Direct translation techniques are used when there are conceptual elements that can be transposed into the target language. Bosco (1997) classified those techniques as follows

(i) Borrowing

(ii) Claque

(iii) Literal translation

(i) Borrowing:

Bosco (1997) defines borrowing as the attempt to take words from one language and put them in another language alphabet. These words are naturalized to suit the grammar and the pronunciation of the target

language. Eventually these words become part of the lexicon system of the target language as in Arabic language. For example

1. Computer كمبيوتر

2. Microwave الميكرويف

Also the English language has borrowed numerous words from different languages. For example,

1. *Résumé* and *café passé* from French

2. *Kindergarten* and *hamburger* from German

(ii) Claque:

Claque or loan translation is the literal translation. It is to translate a phrase borrowed from another language literary, preserving the source language structure and the manner of expression which may not be familiar to the target language. For example, *champions' league*, *week-end* and *cool* are new borrowed expression used in French and Arabic.

2.1.18. Literal Translation:

Literal translation is to translate from the source language into the target language and to preserve the same effect and wording of the source text, only the language is changed. In literal translation, changes which may affect the source text structures are not allowed. This method usually works with languages from the same family as the following example shows.

1. J'ai parlé au parlement hier→ I gave a speech in the parliament yesterday

2.1.19. Oblique Translation Techniques:

As for oblique, Bosco (1997) claimed that these techniques are used when the translator cannot translate elements from the source language without

adjusting or changing the meaning, the grammatical and stylistic elements of the target language. Oblique translation includes:

(ii) Transposition

(iii) Modulation

(iii) Reformulation or equivalence

(iv) Adaptation

(v) Compensation

(i) **Transposition:**

Transposition is to involve changes at the parts speech order when translating, especially at the grammatical level. Zakhir (2008) said that this type is used frequently, because of the wide range of possibilities it offers for translators. Also, it is seen as a solution for *untranslatability.* For example:

1. A fast train قطار سريع ; A fierce dog →'. كلب شرس

2. Blue ball → boule bleue in French.

(ii) Modulation:

Modulation is a type of translation where the translator adds changes to the grammatical and semantic structure of the source language to suit the target language without affecting the meaning, because it has to convey the same idea of the source text, and yet it should not carry awkwardness to the reader of the target text. According to Zakhir (2008), Vinay and Darbelnet (1977)

Distinguished between two major types of modulation, *recorded modulation,* also called *standard modulation*, and *free modulation.*

Recorded modulation is usually used in bilingual dictionaries. Thus, it is a ready type to use. The elements translated by standard modulation are fixed, it is obligatory to keep them as they are. For example:

1. It is easy to understand→ افهم أن السهل من

It does not suit the Arabic language, and stylistically inappropriate to translate it as,من الصعب ان لا أفهم

Free modulation is considered to be more practical, because it has many possibilities to change the expression of the source language to suit the target language, for instance, translators can change the negative form into the positive form. For example, 1. It is difficult → Ce n'est pas facile.

2.1.20. Scientific Translation: Historical Perspective:

In this part of the chapter the different steps which were taken in the direction of formulating a technical and scientific theory of translation throughout the history will be considered. This operation will be dealt with in comparison with other research field. It was observe that concern for technical and scientific translation only appears in the 1950s, when obsession with canonical quality seems to decline somewhat within Translation Studies. A further finding is that consideration of this type of translation has been and remains mainly practical, with reflections on problems posed by terminological domains (mostly legal and, lagging far behind, medical, business and IT), teaching, documentation, the interpreting of technical discourse and professional issues as the favorite topics.

2.1.21. Theoretical Translation:

Technical and scientific translation has traditionally been the dogs body of theoretical discussions of translation. The underlying rationale when approaching this type of translation has usually been that literature involves a creative elaboration of language, requiring the translator to re-elaborate language in a similarly creative way, whereas translators of

technical and scientific texts only have to deal with a type of discourse where the vocabulary (terminology) is or at least tends to be univocal, having ready-made equivalents, and the use of language (style) is simple and straightforward. In other words, anyone with a reasonable command of a language and a high level of technical or scientific knowledge can write a good technical (or scientific) text, whereas very few can write a good poem or novel, even in their mother tongue - and the same would apply to translation. Thus, literary (including Bible) translation has always been in need of serious reflection, whereas **technical translating** only **needed good technical practitioners** who knew their terminology.

Classical authors in the literature on translation, like the much quoted Schleiermacher, even deny the title of translators to those who deal with non-literary or high scholarly texts (religious and philosophical, mainly), in a perfect representation of the traditional line of thought on this issue. Let me quote a not much known part of this author's famous text in an English translation:

The less the author himself appears in the original, the more he has merely acted as the perceiving organ of an object, and the more he has adhered to the order of space and time, the more the translation depends upon simple interpreting. Thus the translator of newspaper articles and the common literature of travel is, at first, in close proximity to the interpreter, and he risks becoming ridiculous when his work makes greater claims and he wants to be recognized as an artist. Alternatively, the more the author's particular way of seeing and shaping has been dominant in the representation, the more he has followed some freely chosen order, or an order defined by his impression, the more his work is part of the higher field of art."

As with respect to this dichotomy, therefore, the translator rises more and more above the interpreter, until he reaches his proper field, namely those mental products of scholarship and art in which the free

idiosyncratic combinatory powers of the author and the spirit of the language which is the repository of a system of observations and shades of moods are everything, in which the object no longer dominates in any way, but is dominated by thoughts and emotions, in which, indeed, the object has become object only through speech and is present only in conjunction with speech.

When, therefore, the speaker does not intentionally construct hidden indeterminacies, or make a mistake in order to deceive or because he is not paying attention, he can be understood by everyone who knows the language and the field, and at the most only unimportant differences appear in the use of language. [...] Translating in this field is, therefore, almost a mechanical activity [...] and in which there is little distinction between better and worse, as long as the obviously wrong is avoided. (Schleiermacher 1813).

So it follows from that those who translate scientific texts were not held high in respect as translators. Translating literary and philosophical texts was dominant respectable genre and translators were considered scholars.

However, one needs not resort to the 19th century to find this sort of considerations. The Spanish philosopher Ortega y Gasset wrote in 1937 that translating technical texts was conceivable (whereas translating literary texts was impossible) because technical texts were not written in natural languages, but were themselves a kind of translation into a more or less artificial language, by which he obviously meant terminology. If you want something more modern, the extraordinarily influential Encyclopedia Britannica (1974:22:583-4) says in its entry on translation that this is the only type of translation in which versions can be as good

as the original. Pushing this argument ad absurdum, it ends up saying that in literary texts, translations are **either inferior to the original or they are not "true" translations.**

Certainly, discussion of translation has traditionally been characterized, among other things (Franco Aixelá 2001), by its obsession with canonicity. Only the translation of the Bible and the great classical authors seemed worth discussing (the rest is just "mechanical") within a secondary activity, like translation, which was, to start with, hardly worth dealing with in any depth at all.

In conjunction with this idea, even now, when Unesco demands that the name of the translator should always be included, the name of technical translators is hardly ever to be found in any corner of their published work, especially in scientific journals. This fact reinforces the mechanical activity thesis, lowering the status of technical translators to that of mere technical support, a linguistic mirror with no special influence on the contents, outlook and effect of the published text, as long, of course, as they know their terminology.

Strangely enough, the contrary applies to payment, and technical translation is awarded much higher rates than its literary counterpart. The more or less explicit argument now (directly deduced from the law of supply and demand) is that there are very few who can understand and translate a complex technical text, whereas (almost) anyone can understand and, hence, translate a literary text (!!). Nevertheless, times seem to be slowly changing and lately (at least in the second half of the 20th century), it is possible to find some scholars and practitioners who try to justify the complexity of the technical translator's role, in an

attempt to account for this apparent contradiction. For instance, Jumpelt (1961:35) argues that:

The present study argues against the view that scientific prose can be perfectly or more easily translated [...] The contrary is true: the extremely high requirements set for scientific and technical translation mark it out clearly from other genres, making it into an independent research field in its own right. Over and above the ordinary desired qualities of a good translation, scientific translation additionally needs to respect both the referential function of language and the conventions of technical language to a degree that has no counterpart in other translation types as regards sheer precision of understanding of the surrounding world.

2.1.22. Technical Translation on Scale:

The truth is that technical translation has always represented the bulk of translated texts, and this is even more so now, at a time when the exchange of technical information and the need for community interpreters is a crucial and defining part of modern technologically advanced societies. This is finally being reflected in most BA degrees in Translation all around the world, which not only show an increasing weight given to technical translation in an effort to adapt to the needs of the market, but are starting to **push literary translation** into the background **as an optional** subject.

What's more, the recent dramatic upsurge of the academic study of language for specific purposes and, more importantly, of terminology as a branch of linguistics has brought about a new awareness of the complexity and structure of this type of texts and their translation. All in all, there seems to be a growing agreement that technical translation deserves much more attention, if only because it will be the main professional outlet for most of those enrolled in translation degrees and diplomas in our universities. Thus, it would make sense to explore the

state of the art, to discover how things have fared and how they still do in the minds of the researchers.

What I would like to do here, then, is to offer some information on the evolution of discussion of technical translation as manifested in specific publications throughout history. In other words, to quote Jumpelt, I want to see how and when technical and scientific translation came to be a "research field in its own right."

2.1.23. Scientific Translation: A global overview:

To start with, then, we have 1,905 publications (9.3%) on technical translation as compared with 4,314 entries (21%) on literary translation. This means that scholarly effort on the literary side of translation is 2.3 times higher than the discussion of technical texts. Even discussion of poetry, a distinctly minority genre, is comparable with that of technical texts, as it represents as much as two thirds of the figures for technically-oriented publications with 1,275 entries (6.2%). This backs up the idea mentioned above of the traditional focus of Translation Studies on canonicity. To quote Delabastita (1990:97) here:

The social sciences tend to select their objects of study on the basis of cultural prestige, rather than intrinsic interest. It is often thought more prestigious to study Shakespeare than to study popular literature or, for that matter derivative phenomenon such as translations. Those who do study translations would therefore, rather study translations of Shakespeare than translations of TV soap operas.

After analyzing in some detail the history of publications on technical and scientific translation, it seems to be clearly established that there are three basic periods as regards research in this field: up to 1950

(with virtually no appearance of discussion of technical translation), 1951-1990 (an average of 7.3%) and 1991 to the present (more than 10%), although the latter period is too short and requires confirmation in the coming decades for us to be completely sure of its statistical significance.

Up to 1950 it can be argued that this type of translation held no interest at all for scholars. Throughout those centuries, translation was considered a completely secondary activity, more a craft than a creative or influential task, and is hardly worth scholarly study. What little energy id did arouse was almost entirely devoted to the translation of canonical works (viz. the classics and the Bible), leaving virtually no space for the analysis of instrumental texts, where language was ancillary and considered to be univocal and, hence, to pose no problems apart from the necessary technical knowledge the translator must have.

Between the 1950s and the 1980s percentages show virtually no change at all (a difference between 6.3% and 7.7% is right now too small to be considered statistically significant), so that we can consider those 40 years of the second half of the 20th century as a second stage. This period after the Second World War can be considered that of the birth of the scientific approach to the theory of translation. The main difference between it and all the previous centuries is that researchers, mainly linguists at first, now tried to gain systematic insights into the core problems of translation instead of simply defending particular ways of translating. In the case of technical and scientific translation, there is a dramatic growth of reflection on this field, with figures rising from virtually 0% before 1950 to an average 7.3% in 1951-1980. This is still a very low percentage if we compare it with the 15-20% represented by entries on literary translation and if we consider that technical translating

represents up to 80-90% of the professional demand for translators. The high profile of publications on literature is probably a direct consequence of its high scholarly status, coupled with the philological and literary education of so many of the current authors who deal with translation. Conversely, the clear decline of discussions of Bible translation, which drops from a peak of 25% in the first half of the 20th century to 4% in the 1990s, shows that there has been a deep change in Translation Studies, which seems as a discipline to be on its way to leaving behind its traditional fixation on canonical works to devote much more attention to the questions actually facing *translators*. The academic status of technical texts, terminology and language for specific purposes is a very modern issue which is only now starting to be comparable to literature and "pure" linguistics.

To move on to more specific matters, it is distinctly worth noting the extraordinary role played by the journal Meta, published since 1956 by the Université de Montréal, in the field of technical and scientific translation. Out of the 543 technical entries collected in BITRA for 1966-1990, 231 (42.5%) were articles published in Meta, a fact which clearly deserves to be studied on its own. All the same, it is also important for Translation Studies to say that the influence of Meta has declined with the passage of time. This means that the interest in technical translation is not a mere fad created by this journal, but an aim increasingly shared by many authors, journals and books all around the world. In this connection, it is enough to say that figures for articles on technical translation published in Meta are 78/119 (65.5%) in the 1970s; 113/372 (30%) in the 1980s; and 75/1,067 (7%) in the 1990s. Obviously, the specific production of Meta has remained very much the same and,

simultaneously, the global production on technical and scientific translation has been growing all the time.

This brings us to the present, with what seems to be a clear growth of publications on technical and scientific translation, rising from 7.3% in 1950-1980 to 10.2% in the 1990s, although the general characteristics of the publications do not seem to change too much. As to the favourite topics dealt with in the reflections on technical and scientific translation, there are clearly four hegemonic domains in the 1950-2000 period: specific genres, teaching, documentation and professional issues, all of which show a clear trend towards the treating of practical matters to the detriment of highly theoretical insights. This can be clearly seen if we consider that the four text types with specific keywords in BITRA (legal, business, medicine and IT) represent 1,143 entries (60% of the total entries on technical translation) with many more on assorted technical fields, from social security to military affairs; whereas the teaching of technical translation accounts for 306 entries (16%), documentation has 200 entries (10.5%), interpreting technical discourse accounts for 10.3% with its 197 entries, and professional issues cover 147 entries (7.7%).

Regarding specific genres, legal (and administrative) translation is clearly the dominant topic of technical concern, with a steady growth over the years which has led to its almost representing a surprising third part (29%) of the total output devoted to analysis of technical and scientific translation. Thus, the totals of 552 entries devoted to this type of translation are proportionally distributed as follows: 10.5% in 1951-1960; 13.5% in 1961-1970; 26% in 1971-1980; 25.8% in 1981-1990; and 31.6% in 1991-2000. Medical translation, the other star text type within technical translation, attracts about half the interest of legal matters, with a global 299 entries (15.7%). Business (155 entries) and IT translation

(137) lag far behind, with the latter growing fast in the recent decades, thanks to the gradually increasing role of computers and to the dramatic emergence of localization.

2.1.24. Scientific Terminology:

Scientific terms are not simple words; they are special and complex ones. Scientific terms are the most significant feature in science, they discriminate it from other registers (literary).

These terms make scientific texts incomprehensible for lay people; they are directed to experts of the science. Thus scientists use them to dignify their written works, in that William Zinasser (1976) explained that each jargon has its own list of terms which lay people would not understand easily. He (1976:15) wrote "Every profession has its growing arsenal of jargon to fire at the lay man and hurls him back from its walls." Furthermore, Ilyas (1989:109) claimed that scientific terminology varies from the regular and literary words since 'they do not accumulate emotional associations and implications'.

Scientific translation is mainly about translating terms in the fields of science and technology of all kinds, medicine, physics, chemistry, mathematics, computer sciences...etc from one language into another (Ghazala 1995).

Scientific translations do not involve literary texts; they only deal with texts from the world of electronics, medicine, law, economics, engineering, chemistry, computer science, automotive engineering, geology, etc. The number of technical fields is infinitely large, and terminology is expanding and changing daily. The scientific translation is considered as one of the most important issues, as the world develops, new technology appears, and along with them emerge new terms to which finding an equivalent may pose a problem. As Nida (1964) said in this

point; it is not easy at all to translate scientific terms that emerged in western developed countries languages into a language of third world countries which are still having financial and social problems.

2.1.25. **The Broad Objectives of Scientific Translation:**

Byrne (2006) claims that, scientific translation primary goal is to deliver scientific information; it aims at presenting well expressed information, that may be used *easily, properly and effectively*. He referred to scientific translation as a *communicative service*, which offers new information for new audience, since scientific translation is regarded as communicative service; it certainly involves three main people, which are the author, the translator and the reader. He added also, that it is much more than just rendering source text language and style. Its main concern is to ensure delivering information accurately and correctly, in that it insures that the reader may use this information easily.

2.1. 26. Requirements of Scientific Translator:

Scientific translators are not like other ordinary translators. There are certain qualifications that they should have in order to accomplish a good translation of scientific texts as well as to deliver the exact information. This is because scientific translation is not just to transfer ideas or information, but rather to transfer technology and new invention that may help other countries. According to the biomedical writer Bethany Thivierge (2002:188) "The work of scientific translators is to achieve one primary goal: to write information in a clear, concise, and accurate manner". He claimed that there are nine requirements that a scientific translator should observe:

1. Work appropriate for the intended audience.

2. Respect for choices made by the author.

3. Respect for references.

4. Understanding of sciences.

5. Understanding of languages.

6. Constructive questions.

7. Work suitable for publication.

8. Familiarity with current practices.

9. Timely exchange of work.

Following the same sense, Al-Hassanawi (2010) also discriminated six characteristics –taken from the London Institute of Linguistics- that the scientific translator should have:

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

6. Practical experience in translating from related fields.

Byrne (ibid) also claimed that scientific translator is communicating via the translated texts, in that he should look further than the source text only to get more information from different sources, to ensure an effective target text which serves the communicative purpose. Consequently, the translator becomes according to Göpferich (1993) and Amman & Vermeer (1990:27) "the intercultural or cross-cultural scientific writer". Byrne (2006:17) goes further and claimed

… The need for translators to conduct research so as to understand not just the text but also the subject while at the same time ensuring, by means of revisions and corrections, that the text conforms to target language norms and target audience expectations.

2.1.27. English-Arabic Scientific Translation:

Translation of science from English into Arabic poses huge linguistic obstacles. One of these obstacles, yet a significant one, runs as follows: Translation of scientific terms is considered by Al-Hassnawi (2010) as a real *intellectual challenge*. It requires skills, intelligence, and mastery of both English and Arabic. Arabic suffers a serious shortage of vocabulary that covers the fields of technology and science; therefore, translators should consider this problem before anything else. Moreover, Esmail Seiny (1985) mentioned that Krollman (1978) stated that terminology is responsible for 40% to 60% of the technical translator's errors, and it takes up to 50% of his precious time to set the appropriate terms. Beeston (1970: 115) explained the importance of having new terminology for the scientific field as:

The need for a large new vocabulary dealing with technological and scientific matters is, however, the least interesting feature of the new lexical development; more fascinating, though more elusive, is the evolution of new words for intellectual concepts.

2.1.28. Terminology in Translation:

It is undeniable that terminology has a significant role in scientific translations, and it is a crucial feature in scientific texts. Byrne (2006:03) argued that "Terminology is, perhaps, the most immediately noticeable aspect of a technical text and indeed it gives the text the "fuel" it needs to convey the information". Following the same sense, Yowell and .Ladaiwish (2000) pointed out that terminology is considered to have a very crucial part in English-Arabic translation. Nowadays, the Arab world witnesses an important process of transferring new founded western terms. This process aims at finding an equivalent for the source language terms in the target language. In this sense, there are two types of technical terms.

2.1.29. Cross-Cultural Recognized Terms:

Cross-cultural recognized terms are known as universal terms, i.e., these terms do not belong to a specific culture. These are terms that are of scientific or technical nature just like national organizations which are not restricted to a specific culture or language. The cross cultural recognized terms do not impose serious translation problems. The equivalents for this type are easily achieved since the cultural gap between source language and target language is smaller, no difficulties will arise. For example:

1. The security council→ مجلس الأمن
2. Spaceship→ مركبة فضائية
3. AIDS→ مرض نقص المناعة المكتسبة

2.1.30. Misconceptions in Scientific Translation:

Yowell and Ladaiwish (2000) claimed that terminology could be one of the most serious obstacles that may face translators of scientific texts, especially, if the target language is Arabic. For that, some purists demand forcefully that the translators, before attempting to coin new terms, should look for old Arabic archaisms that may be set as an appropriate equivalents for the new foreigner terms. However, only if such an equivalent is not found then the translator is allowed to invent a new item. Yowell and Ladaiwish (ibid.126) discussed two misconceptions related to scientific translation. The first one is mainly concerned with the linguistic nature of the scientific term and the second is related to the nature of the language itself.

They argue first, the ineffectiveness of processing the search of old Arabic terms and classify it with modern concepts, to be exact equivalents for new foreign terms. They claim also, that it is worthless to waste time and energy looking for old Arabic terms. Besides any old

Arabic archaisms can be modernized and given a new concept since the relation between the term and the referent is basically arbitrary.

Second, they discuss the view that sees language as a product and not a dynamic process. This misconception relates to the nature of language and aims that the translator must not attempt to invent or coin new terms before looking thoroughly for vocabulary of the language. This view sees language as "a reservoir of words" that has ready equivalents for each new foreign term. Yet, this process is not always possible, since vocabulary is an *open ended component of language* .The only aspect that should be necessarily considered by the translator is the coinage of new terms that correspond to the phonological and morphological rules of the target language. Yowell and Ladaiwish (ibid.126) added: "The condition for a successful term is that it is accepted by the user of the language and thus it gradually becomes established."

2.1.31. Strategies of Translating English Technical Terms into Arabic:

Dealing with terminology requires specific skills in the form of some strategies that are likely to be fruitful and serve the target language. In this respect, numerous options are available for translators to translate scientific terms into Arabic. On the other hand, several Arabic agencies have devoted themselves officially or unofficially to produce new set of terminology for Arabic that may facilitate the translation process when it comes to introduce new terms from the source language. There are several methods of translating scientific terms into Arabic; each method differs from the other in the use and the results it produces. Those techniques will be discussed and "ordered from the poorest to the best" according to Ghazala (1995:163) point of view.

(I) Transcription:

Transcription or Arabization is one of the strategies widely used to translate scientific terms by introducing minor phonetic and morphological changes to the foreign term. It consists of writing the English scientific terms using the Arabic alphabet with no alteration to their pronunciation in the source language. Take the following examples:

1. Microwave→ ميكرويف,

2. Mega byte → ميجابايت

3. Tetra bite→ تيترابايت

The problem with transcription is that it does not give the meaning of the word in Arabic, besides the transcribed terms are not pure Arabic ones; they are just borrowed and shaped in Arabic letters. Using transcription neither serves the Arabic language nor enriches its vocabulary. In fact, it is just an offence to the Arabic language, because it implies that Arab translators are unable to invent new pure Arabic terms and prefer the easy way to translate scientific terms, thus, neglecting the significant statue of the Arabic language.

Following this line of thought, Ghazala (1995) argued that this method should be avoided except in the case where translators could not find equivalent for the term in Arabic language. For example:

1. Sandwich→ ساندويتش

Yet, if the terms have equivalent in Arabic, translators have to use them instead of transcription, for example:

1. Computer→ حاسب

2. Virus→ جرثومة

This method will be considered as a critical problem opposed to translators, if they use it for ordinary terms that have equivalents in Arabic as shown by the word 'email' *usually transcribed as* الاميل *and for which the phrase* الاكترونية الرسالة can be used.

(ii) Naturalization:

According to Ghazala (1995), naturalization is the attempt to adopt the English terms to the morphology of Arabic word structure and can be seen as evolution of the transcription method.

This method consists of adding new affixes to the foreign terms leaving their roots unchanged. The added affixes are to adjust the terms into the Arabic morphology as is the case of verbs, nouns, gender, adjectives and adverbs:

1. Technology → تكنولوجيا

a. Technologiste (n) → تكنولوجية. تكنولوجية

b. Technological (adj.) → تكنولوجي

2. Oxide→ اوكسيد

a. Oxidised (adj.) → مؤكسد

b. Oxidizer (n) → مؤكسد

3. Biology→ بيولوجيا

a. Biologist (n) → بيولوجي

b. Biological (adj.) → بيولوجي

Naturalization is considered by Ghazala (1995) better than transcription, although it is still not convenient. Thus it is not pure Arabic, the basic or the roots of terms remain

English even if they are naturalized. This method does not consider meaning; the lay reader, for example, would not know the meaning of the word مؤكسد. To avoid this type of problem, Ghazala (1995) supported another method that, in his opinion, would fulfill the appropriate translation of scientific terms and he simply suggested translating, i.e., taking the scientific English terms and transfer them by using pure Arabic vocabulary. For example:

1. Technology→ تقنية

2. Biology→ علم الأحياء

According to Baker (1987) transcription and naturalization have not received acceptance from the language purists because they threaten the identity of Arabic. Thus, translators are likely to come across a situation where they need to be more creative by following certain methods that may ensure the high quality and smoothness of translating scientific terms. In an attempt to get over this obstacle, Ghazala (1995) suggested that coinage is the best method for translating scientific terms.

As for Baker (1987); coining new terms is the only way that ensures the creation of new specialized glossaries for the Arabic language.

2.2. Previous-Related Studies:

A number of theses have been carried out in the area of scientific translation, but they have been directed to the known realm of science and technology. There are those who addressed medicine, engineering, communication and computer technology among others.

1.   The **first** study to be considered in the present thesis is the one conducted by **Al-Harby. M.** "ESP Target Situation Needs Analysis: The English Language Communicative Needs As Perceived By Health Professionals In The Riyadh Area", the Graduate Faculty of The University of Georgia 2005.The purpose of this study was to investigate the English language communicative needs of health professionals in the Riyadh area by investigating their language use in the workplace in order to provide empirical data serving Saudi ESP context.

The study used the framework of needs analysis to investigate the extent of English use in the careers of medical professionals, the required level of the reading, writing, listening and speaking skills in different

activities, and the perception of health professionals towards their English language preparation during their previous college study.

A questionnaire was constructed and distributed to three different hospitals in the Riyadh area representing five different medical sites. The sample population consisted of health professionals representing physicians, dentists, pharmacists, and applied medical technicians.

The findings of the study indicated that the English language is used extensively at the workplace and plays an important role in the careers of health professionals. However, physicians and dentists used English more often than pharmacists and applied medical specialists. The findings also indicated that the receptive skills (e.g. reading and listening) were perceived as more important than the productive skills (speaking and writing). However, the differences in percentages between receptive skills and productive skills were too close to make an affirmative judgment. Finally, the findings revealed that the English language courses that health professionals took at the college level were inadequate in relating the English language use to their medical needs.

2.   The **second** study to be cited here is developed by **AL-Wasilla. M.**"Designing syllabus for Medical Students in Sudan" Unpublished M.S thesis Gazira: Gazira University, Madani, Sudan 2005. This study was conducted to investigate an ESP syllabus in faculties of Medicines in the Sudanese's Universities and it has covered the same area of the recent study. The subjects participated in this study were one hundred students from four different universities. The tools used in this study are two questionnaires; One for the ESP teachers and the other for students. Each one consists of 48 questions covering five skills, reading, and writing, listening, speaking and translating.

After analyzing the obtained data, the researcher has concluded that the students' command of the ESP skills is unsatisfactory. The students are not well motivated and they have little interest in using English. The students' standard when using English, which is related to their subject of study, is poor. Teaching materials produced recently by some staff members do not meet the requirements of students and staff and they are not able to compete successfully with materials published by expert publishing houses. English vocabulary items are not closely related to students' specialization. The students do not pay more attention to translating accurately medical terminology, technical passages and formal and informal letters, memos and notes from Arabic to English and vice versa. So all the studies carried in this respect are in the field of ESP

3.   The **third** study is conducted by **Braima. M .E.** "Investigating the role of English language post Arabicization", Department of Arts. University of Khartoum. Sudan 2004. In his study Braima used a questionnaire for the students selected from faculty of Art and faculty of science and instructed interview for the subject teachers and English instructors. In this study statement was put for three groups (students, English instructors and subject lectures) to investigate which of the four skills is most needed for the students to succeed at the university level.

The result concerning the students showed that; 35% of the students believe that reading is the most important skill. Other 35% of the students thought that speaking skill is the most important skill. Only 16% rank listening skill in the third position and 12% positioned writing in the last.

The results for the English instructors reveals that 55.6% of them rated reading skill as the most important skill, 22.2% ranked writing

second, while listening and speaking shared the third position with 11% for each.

On other hand, the subject lecturers also support to the instructors' rating as 60% of them believed that reading is the most important skill, while 27% of them ranked listening in the second position and 13% placed writing in the third position.

Chapter Three

Methodology of the Research

3. 0. Introduction:

The term "research" involves certain activities that aim at finding out facts or opinions to either support pre-established ideas, to discover rules and regulations that govern a phenomenon or to explore relationships between variables. Such activities may vary from one topic to another and from a person to another. This variation in activities is due to the nature of each topic and the nature of the data required for investigating each topic. These activities are collectively called the research method.

In this study, the researcher will adopt the descriptive analytical method to describe the problems that encounter Sudanese translators in rendering recent texts into Arabic.

Gay (1981) portrays the descriptive method as a useful method for investigating a verity of educational problems. Descriptive research, however aims at collecting data objectively through questionnaires, interviews and observation; coding data collected numerically to describe relationships that are discoverable in phenomena themselves.

3. 1. The Subject of the Study:

This study aims to investigate linguistic problems encountering translators when rendering emerging scientific discourse into Arabic.

This study is an attempt to investigate some lexical problems that come as a result of bad translation. It will also highlight some problems pertaining to sentence structure building as far as translation of scientific texts is concerned. Finally, it will decide whether scientific background is significantly important or not for rendering recent scientific discourse into Arabic.

3. 2. Tools of Data collection:

A research might not be called a research unless it involves collecting data to achieve its purpose, answer its questions and support or reject its hypotheses. Data are the information obtained, analyzed and

discussed for the sake of drawing conclusions to develop, support or reject certain points of view about a phenomenon.

This study will collect data through two ways: a test and a questionnaire. The test divides into two: a pre-test to examine the sample and a post-test: an assignment on translation.

The sample contains of 20 (M.A) students of translation at Sudan University of Science and Technology, College of Languages. Medical discourse will be the main concern of this study All of these students are assumed to be native Arabic speakers. They hold a (B.A) degree in English language; they have learned English as a foreign language.

3. 2. 1.   Students` Test:

A Pre-Test

Question one: Put the verbs or adverbs between brackets in their correct form and places:

1. The situation is likely (get)……………. worse before it gets better.
2. Anti-US protests (end)……………. in violence.
3. What time are we (leave)……………for the airport.
4. Their daughter is only three, but she can write her own name. (already).
5. My mother being prescribed antibiotics.(still)
6. Several people (injure)……….in the explosion.
7. We were both very tired by the time we drew up to the hotel.(indeed)
8. They say that it (can)……….snow this year.
9. It was obvious from the state of the lock that someone (have try)……………… to open it.
10. I've (be try)…………………to phone you.

Post-Test

Question two: Read the text and answer the following questions:

Scientist breach brain test barrier to treat sick patient

For the first time, doctors have breached the human brain's protective layer to deliver cancer-fighting drugs.

The Canadian team used tiny gas-filled bubbles, injected into the bloodstream of a patient, to punch temporary holes in the blood-brain barrier. A beam of focused ultrasound waves applied to the skull made the bubbles vibrate and push their way through, along with chemotherapy drugs. Six to ten more patients will undergo the same procedure as part of a trial.

Experts said the experimental technique used at Sunnybrook Health Sciences Centre was exciting because it meant doctors might be able to give cancer patients potent drugs that otherwise would not work. The same non-invasive method could also be used for other brain diseases, such as dementia and Parkinson's.

But many more safety studies are needed, they say. Animal trials have produced some results, but it is not clear whether the treatment would work or have side-effects.

The blood-brain barrier keeps pathogens and toxins away from the central nervous system. But tightly packed layer of cells, which separates the brain from its blood vessels, can be a hindrance if you want to deliver drugs into the brain.

Lead researcher and neurosurgeon Dr Todd Mainprize said:"The results are preliminary at this point because we don't have the level of chemotherapy – but based on the MRI scan, we were clearly able to open up the blood-brain barrier non-invasively, reversibly and it appears quite safely.

Prof Gail Ter Haar, an expert in ultrasound technology at the Institute of Cancer Research, London, said:"This is an exciting clinical step. "Opening the blood-barrier using focused ultrasound beams has been a goal of researchers for about a decade".

"The use of ultrasound for enhancing the local delivery of drugs to a number of different targets in the body is being investigated by a number of centers around the world, including the UK, and shows particular promise in the field of cancer chemotherapy."

Answer the following questions:

1. Which method the Canadian team used to treat patients?

………………………………………………………………………………
……………..

2. What other brain diseases could this method used for?

………………………………………………………………………………
……………………

3. Is it safe to use this method?

………………………………………………………………………………
……………………

4. Could the blood-brain barrier be a hindrance if you want to deliver drugs into the brain? …………………………………………………

………………………………………………………………………… …………………………

5. What is the goal of researchers for a decade?

………………………………………………………………………… …………………………

6. What are the meanings of these words according to the text?

a. Potent drug:

………………………………………………………………………

b. Pathogens:

…………………………………………………………………………..

c. Non-invasive:

………………………………………………………………………..

d. Chemotherapy:

…………………………………………………………………………..

Translation Task

Brain and Nervous System

What kind of supercomputer can write stories, do math problems, draw pictures, play games, see through eyes, hear someone talking, talk back, and network with devices that make snacks in the microwave oven? Your brain and nervous system can do all these things. Do you think a computer will ever be as powerful as your brain?

You think with your brain. Your brain also sends signals through a network called your nervous system. It tells your legs to walk and run. It tells your hands and arms to put popcorn in the microwave. You don't even have to think about many of the things your brain does. Your brain tells your heart to beat. It tells your lungs to breathe in and out, even when you are sleeping.

Your brain also controls your feelings. Such feelings as joy, sadness, love, anger, and fear all come from your brain. Your brain is made of about 100 billion nerve cells. It looks like a lump of pinkish-gray jelly. The surface of the brain is wrinkled, and deep grooves divide it into sections. A network of blood vessels brings oxygen and food to your brain cells and carries away wastes. Your brain is protected by bone called your skull. Liquid and skin-like tissues also protect your brain.

When you were born, your brain weighed about • pounds (about 0.35 kilograms). Your brain keeps on growing while you grow up. By the time you reach the age of 20, your brain will weigh about 3 pounds (1.3 kilograms).

Your brain has three main parts. The parts are called the cerebrum, the cerebellum, and the brain stem. The cerebrum makes up the largest part of the brain. The cerebellum is underneath the back part of the cerebrum. The brain stem connects with the spinal cord at the bottom of the brain. Your cerebrum and cerebellum are divided into two parts. These parts are called the right brain and the left brain. The right side of your brain controls the left side of your body. The left side of your brain controls the right side of your body. Nerves from the right and left side of your body cross over when they enter your brain.

Your cerebrum makes up most of your brain. Your cerebrum solves problems and makes wishes. All of your thinking goes on in your cerebrum. Speech, language, and emotions come from your cerebrum, especially your cerebral cortex. The cerebral cortex is the outer part of the cerebrum.

Your cerebrum also gets signals from your senses. Nerves carry the signals. Nerves from your eyes and ears go to parts of the cerebrum that let you see and hear. Nerves carry signals to your cerebrum that let you feel, smell, and taste.

Your cerebrum sends messages out along nerves. The messages tell your legs to walk or run. They tell your arm and hand to wave when you see a friend across the street. Your cerebellum coordinates and fine-tunes your body movements. Your cerebrum might tell your hands and arms to hit a baseball. Your cerebellum controls how you swing the bat and make contact with the ball.

Your cerebellum helps your fingers play the piano, guitar, or violin. It helps you keep your balance when you run, jump rope, or walk along a curb.

Your brain stem takes care of all the things that you do but don't need to think about doing. It keeps your heart pumping blood. It keeps your lungs breathing air. It makes your eyes blink. It pulls your hand back really fast if you touch a hot pot on the stove. Your nervous system consists of the brain, spinal cord, and nerves that run throughout your body. The nervous system carries messages to your muscles and organs. These messages tell your body what to do.

Your spinal cord is made of bundles of nerves. It starts in your neck and goes down your back. Nerves go out from the spinal cord to other parts of your body. Nerves from the spinal cord extend to the tips of your fingers and toes. Your spine, or backbone, protects your spinal cord.

Direct solution of question one:

1. to get
2. ends
3. leaving
4. Already (at the beginning, or in the middle, or at the end).
5. Still being.
6. Were injured.
7. Very tired.
8. Could, may, might.
9. Had tried.
10. Been trying.

3. 2. 2. Teachers` Questionnaire:

Dear colleagues,

Would you please spare a few minutes of your valuable time to fill in this questionnaire. We highly appreciate your help.

Instruction: Put a Tick mark (✓) beside the statements which are most close to your opinions:

(Mark the appropriate box.)	Strongly Agree	Agree	Not sure	Disagree	Strongly disagree
1- There is a vast gap between source and target cultures` version of the world.					
2 - In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.					
3-Unexpected organization of the language tends to render a text in coherent to its readers.					
4- Translation was often the conduit through which innovation and change can be initiated.					
5- There are some lexical problems that come as a result of bad translation.					
6- Where scientific text translation is concerned there are some problems pertaining to sentence structure building.					
7 - Scientific background is significaly important for rendering recent scientific discourse into Arabic.					
8- Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.					
9-In scientific works, subject-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.					
10- The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.					

11- Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.					
12- Translating of technical texts from English into Arabic still poses a major intellectual challenge.					
13- Science does not have its own syntax only but also its own terminology.					
14- In scientific translation it is common to find collaboration between linguistics and subject specialist.					
15- Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.					

N.B: Add any comments or your impression about the subject of the research.

…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………
………………………………………………………………………

Thank you

Igbal Adlan Ali Mohamed

Chapter Four

Data analysis, Results and Discussion

4. 0.   Introduction:

This chapter presents the analysis of the test, which administered to (50) students of M.A degree and also analyzing the questionnaire which administered to (12) colleagues from Sudan University of Science and Technology, College of language.

4. 1.   **Analyzing the Students` Test:**

The responses to the written diagnostic test of the 50 students were tabulated and computed. The following is an analytical interpretation and discussion of the findings regarding different points related to the objectives and hypotheses of the study.

Each statement in the test is analyzed statistically and discussed. The following table will support the discussion.

Statistical Reliability and validity for student's test

The reliability coefficient was calculated for the measurement, which was used in the test using Alpha - Cronbach coefficient Equation as the following:

For calculating the validity and the reliability of the test from the above equation, the researcher distributed the attest to respondents to calculate the reliability coefficient using the Alpha-Cronbach coefficient the results have been showed in the following table :

	Reliability	*validity*	*N*
ALPH – CRONBACH	0.89	0.93	

Validity = $\sqrt{\text{Reliability}}$.

From the above table its shown that the validity of the test is very high (0.93). This indicates that if we repeat the test we are sure with 93% that it's going to give us the same results.

Hypothesis One:

Question One: *Put the verbs or adverbs between brackets in their correct form and places:*

Table (4-1) shows the frequency and percentage distribution of the answers according to part (1):

Valid	Frequency	Percentage
Pass	15	30%
Failure	35	70%
Total	50	100
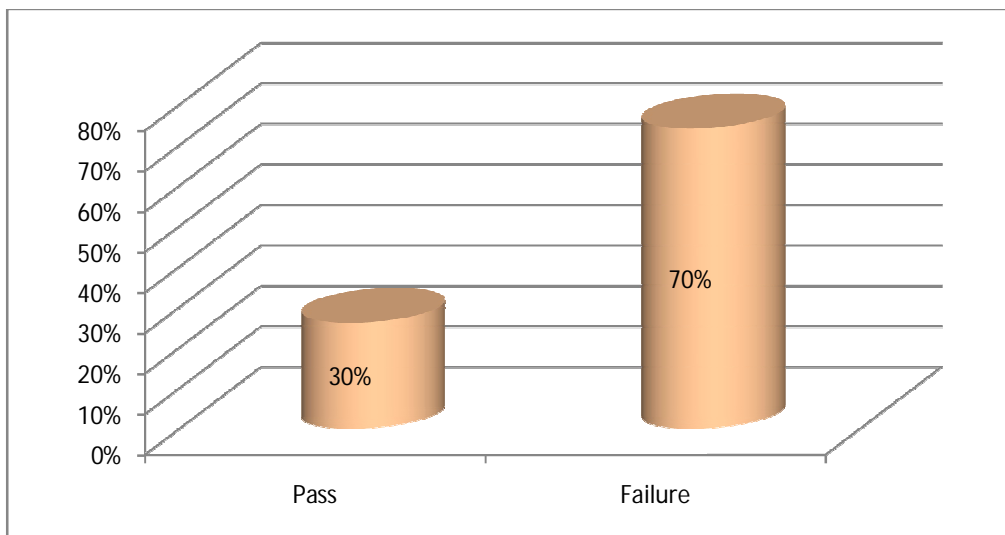
The above table and figure illustrate the percentage and frequency of the answers of the study sample that concern with the questions and shows that most of the sample answers were failure which are represented by the percentage (70%). This justifies that students need to be given adequate   activities on vocabulary that focus heavily on written academic texts.

Question Two: *Read the text and answer the following questions:*

Table (4-2) shows the frequency and percentage distribution of the answers according to part (2)

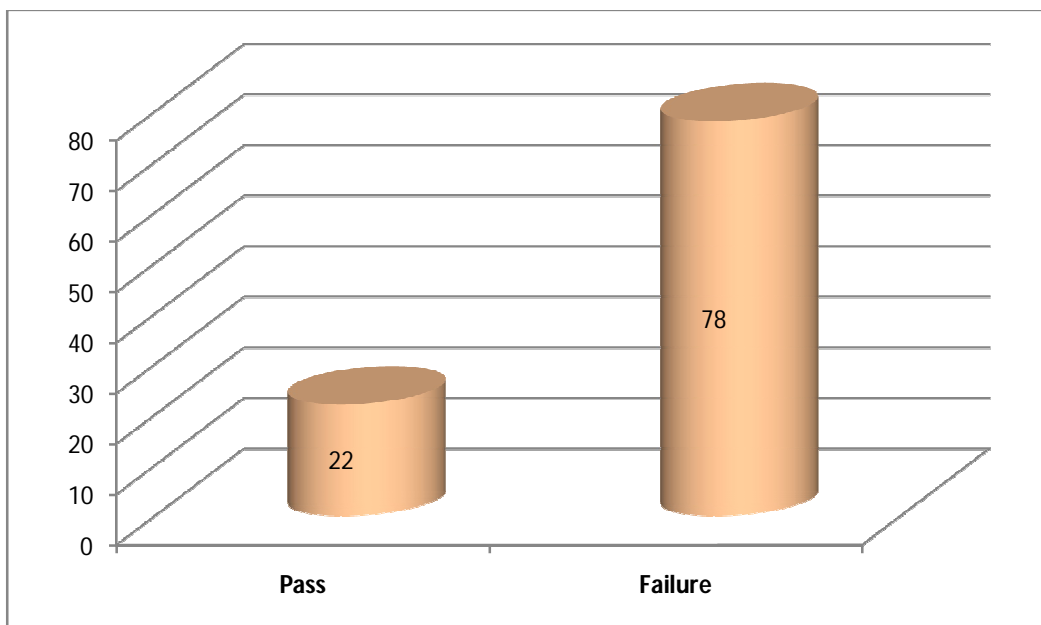| Valid	Frequency	Percentage
Pass	11	22
Failure	39	78
Total	50	100

The above table and figure illustrate the percentage and frequency of the answers of the study sample that concern with the questions and shows that most of the sample answers were failure which are represented by the percentage (78%). This justifies that students need to be trained and developed in understanding written academic texts.

Table No (4-3) The Frequency Distribution and decisions for the Respondent's Answers of all questions:

	Pass		Failure		
	frequency	*Percentage*	*frequency*	*Percentage*	
Question 1	13	26	35	70	**Accept**
Question 2	11	22	39	78	**Accept**

This table No. (3) Shows the summary of the results. For the **question one,** it's clear that the number of students who failed in the question one is greater than the number of students who pass the question (70%) so the hypothesis of the study related to question one is accepted.

This table No; (3) it's shown the summary of the results. For the **question two,** it's clear that the number of students who failed in the question two is greater than the number of students who pass the question (78%) so the hypothesis of the study related to question 2 is accepted.

Table (4-4) one sample T-TEST for the questions of the study

Question s	N	SD	t-value	DF	p-value
1	49	7.5	19	49	0.001
2	49	9.55	15	49	0.00
For all	49	8.6	14	49	0.00

The calculated value of T – TEST for the significance of the differences for the respondent's answers in the question No (1) was (19) which is greater than the tabulated value of T – TEST at the degree of freedom (49) and the significant value level (0.05%) which was (6.54). This indicates that, there are no statistically significant differences at the level (0.05 %) among the answers of the respondents. this mean that our first hypothesis is accepted.

The calculated value of T – TEST for the significance of the differences for the respondent's answers in the question No (2) was (15) which is greater than the tabulated value of T – TEST at the degree of freedom (49) and the significant value level (0.05%) which was (6.54). This indicates that, there are statistically significant differences at the level (0.05 %) among the answers of the respondents. This means that our second hypothesis is accepted.

4. 2. **Analyzing the Questionnaire:**

The responses to the questionnaire of the (12) colleagues were tabulated and computed. The following is an analytical interpretation and discussion of the findings regarding different points related to the objectives and hypotheses of the study.

Each item in the questionnaire is analyzed statistically and discussed. The following tables will support the discussion.

The researcher distributed the questionnaire on determined study sample (12), and constructed the required tables for collected data. This step consists transformation of the qualitative (nominal) variables (strongly disagree, disagree, Undetermined, agree, and strongly agree) to quantitative variables (1, 2, 3, 4, 5) respectively, also the graphical representations were used for this purpose.

4. 3. **Statistical Reliability and Validity:**

Reliability refers to the reliability of any test, to obtaining the same results if the same measurement is used more than one time under the same conditions. In addition, the reliability means when a certain test was applied on a number of individuals and the marks of every one were counted; then the same test applied another time on the same group and the same marks were obtained; then we can describe this test as reliable. In addition, reliability is defined as the degree of the accuracy of the data that the test measures. Here are some of the most used methods for calculating the reliability: (Alpha-Cronbach coefficient).

On the other hand, validity also is a measure used to identify the validity degree among the respondents according to their answers on certain criterion. The validity is counted by a number of methods, among them is the validity using the square root of the (reliability coefficient). The value of the reliability and the validity lies in the range between (0-1). The validity of the questionnaire is that the tool should measure the exact aim, which it has been designed for.

In this study the validity calculated by using the following equation:

$$\text{Validity} = \sqrt{\text{Reliability}}$$

The reliability coefficient was calculated for the measurement, which was used in the questionnaire using Alpha-Cronbach coefficient Equation as the following:

For calculating the validity and the reliability of the questionnaire from the above equation, the researcher distributed (12) questionnaires to respondents to calculate the reliability coefficient using the Alpha-Cronbach coefficient; the results have been showed in the following table:

Reliability Statistics

Cronbach`s Alpha	No of Items
0.90	15

Statement No (4-1): There is a vast gap between source and target cultures` version of the world.

Table No (4-1) The Frequency Distribution for the Respondents` Answers of Statement No. (1)

Valid	Frequency	Percentage%
Strongly agree	36	30.0
Agree	28	23.3
Neutral	31	25.8
Disagree	17	14.2
Strongly disagree	8	6.7
Total	120	100

fig (1)
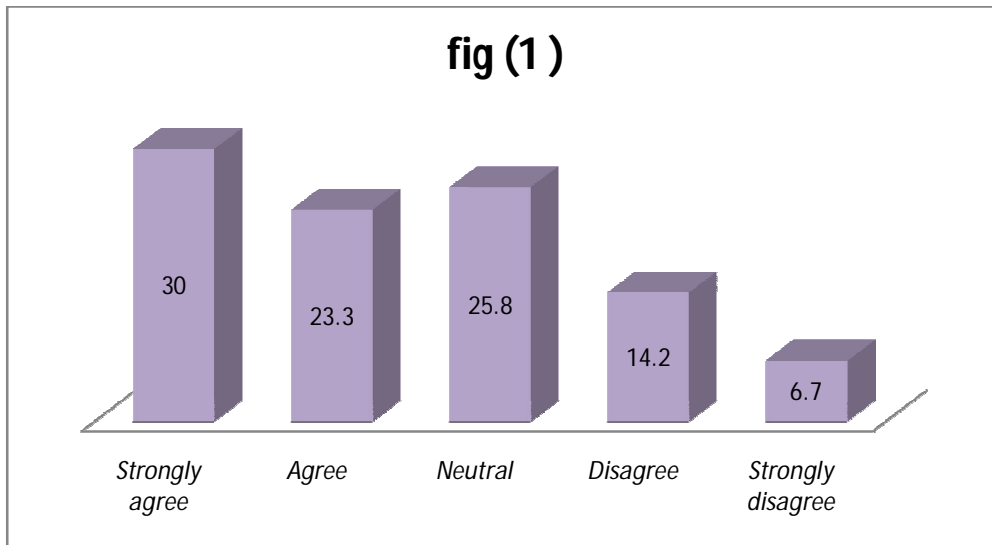
It is clear from the above table No.(1) and figure No (1) that there are (36) persons in the study's sample with percentage (30.0%) strongly agreed with " There is a vast gap between source and target cultures` version of the world. ". There are (28) persons with percentage (23.3%) agreed with that, and (31) persons with percentage (25.8%) were not sure that, and (17) persons with percentage (14.2%) disagreed. and (8) persons with16.7% are strongly disagree.

Statement No.(4-2): In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.

Table No (4-2) The Frequency Distribution for the Respondents` Answers of Statement No. (2)

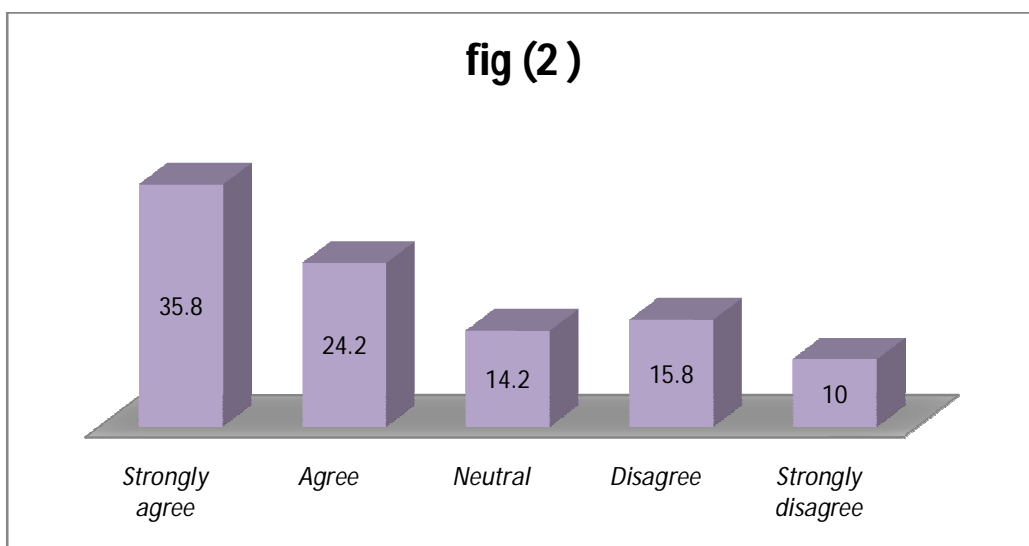| Valid	Frequency	Percentage%
Strongly agree	43	35.8
Agree	29	24.2
Neutral	17	14.2
Disagree	19	15.8
Strongly disagree	12	10
Total	**120**	**100**

71

fig (2)

It is clear from the above table No.(2) and figure No (2) that there are (43) persons in the study's sample with percentage (35.8%) strongly agreed with " In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.   ". There are (29) persons with percentage (24.2%) agreed with that, and (17) persons with percentage (14.2%) were not sure that, and (19) persons with percentage (15.8%) disagreed. and (12) persons with110.0% are strongly disagree.

Statement No (4-3): I Unexpected organization of the language tends to render a text in coherent to its readers.

Table No (4-3) The Frequency Distribution for the Respondents' Answers of Statement No. (3)

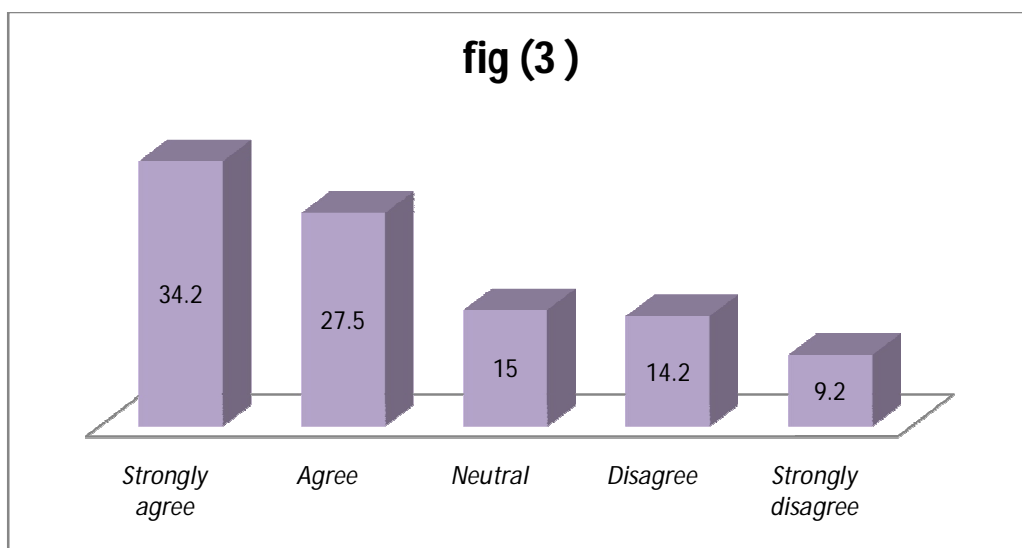| Valid	Frequency	Percentage%
Strongly agree	41	34.2
Agree	33	27.5
Neutral	18	15.0
Disagree	17	14.2
Strongly disagree	11	9.2
Total	**120**	**100**

fig (3)

It is clear from the above table No.(3) and figure No (3) that there are (41) persons in the study's sample with percentage (34.2%) strongly agreed with " Unexpected organization of the language tends to render a text in coherent to its readers. ". There are (33) persons with percentage (27.5%) agreed with that, and (18) persons with percentage (15.0%) were not sure that, and (17) persons with percentage (14.2%) disagreed. and (11) persons with19.2% are strongly disagree.

Statement No (4-4): Translation was often the conduit through which innovation and change can be initiated.

Table No (4-4) The Frequency Distribution for the Respondents' Answers of Statement No. (4)

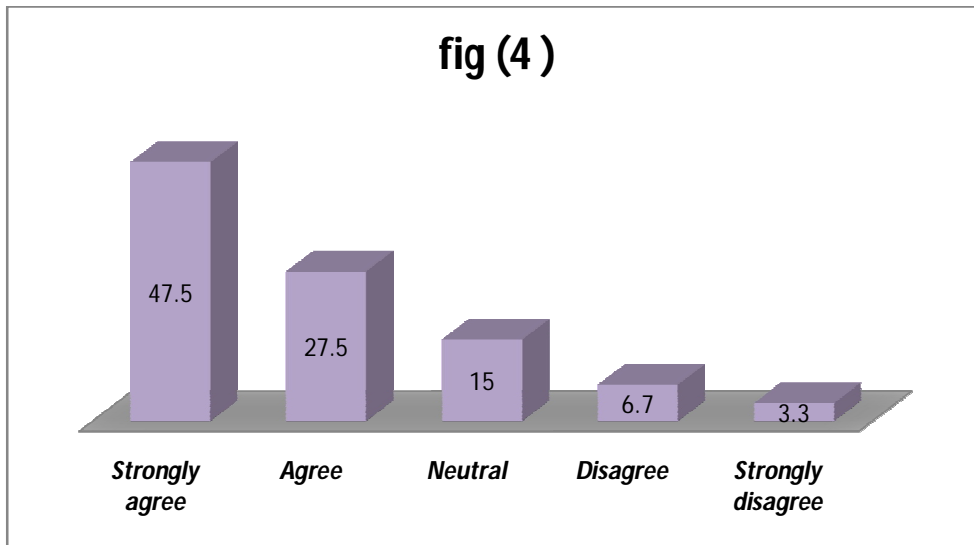| Valid	Frequency	Percentage%
Strongly agree	57	47.5
Agree	33	27.5
Neutral	18	15.0
Disagree	8	6.7
Strongly disagree	4	3.3
Total	**120**	**100**

fig (4)

It is clear from the above table No (4) and figure No (4) that there are (57) persons in the study's sample with percentage (47.54%) strongly agreed with "Translation was often the conduit through which innovation and change can be initiated. ". There are (33) persons with percentage (27.5%) agreed with that, and (18) persons with percentage (15.0%) were not sure that, and (8) persons with percentage (6.7%) disagreed. and (4) persons with13.3% are strongly disagree.

Statement No (4-5): There are some lexical problems that come as a result of bad translation.

Table No (4-5) the Frequency Distribution for the Respondents` Answers of Statement No (5)

Valid	Frequency	Percentage%
Strongly agree	39	32.5
Agree	39	32.5
Neutral	17	14.2
Disagree	10	8.3
Strongly disagree	15	12.5
Total	120	100

fig (5)
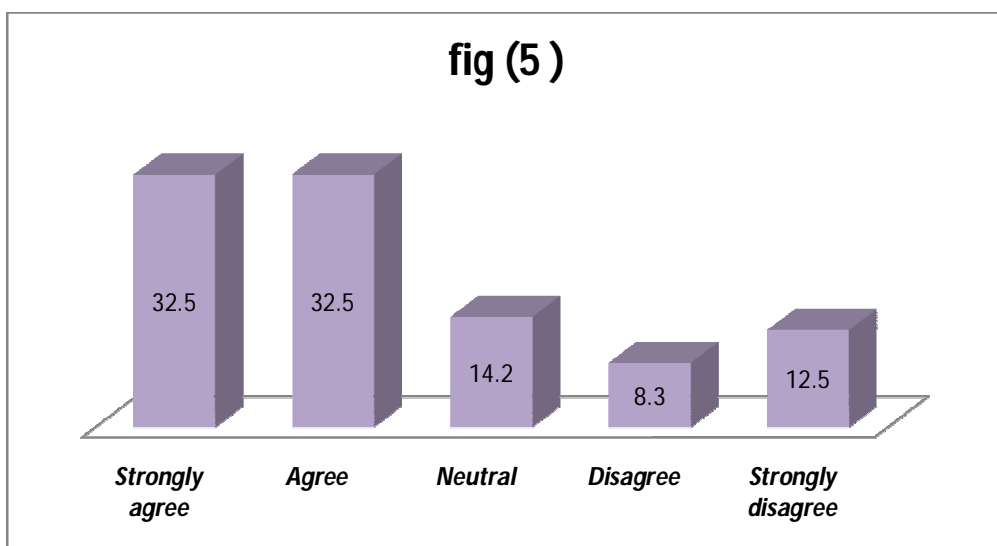
It is clear from the above table No.(5) and figure No (5) that there are (39) persons in the study's sample with percentage (32.5%) strongly agreed with There are some lexical problems that come as a result of bad translation. ". There are (39) persons with percentage (32.5%) agreed with that, and (17) persons with percentage (14.5%) were not sure that, and (10) persons with percentage (8.3%) disagreed. and (15) persons with112.3% are strongly disagree.

Statement No.(4-6): Where scientific text translation is concerned there are some problems pertaining to sentence structure building.

Table No (4-6) The Frequency Distribution for the Respondents` Answers of Statement No. (6)

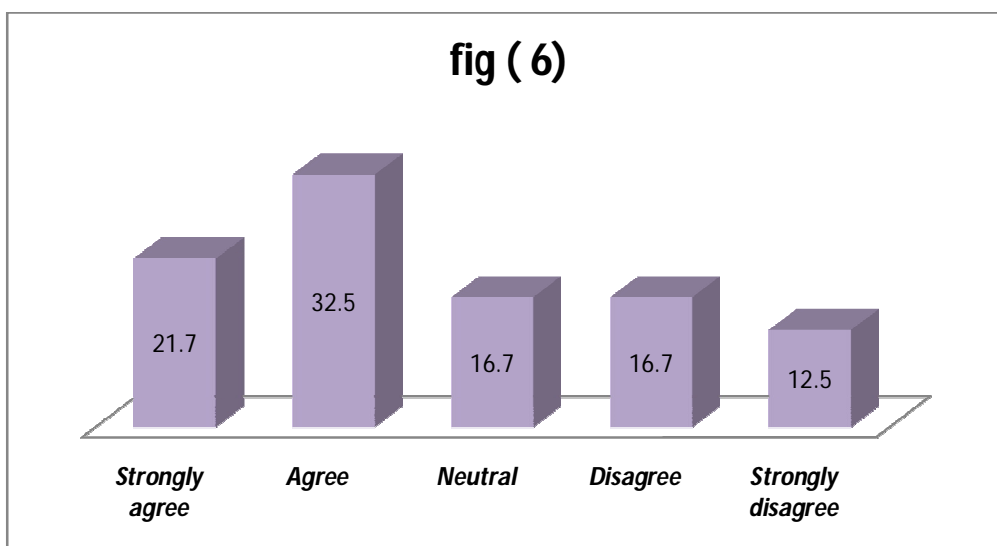| Valid	Frequency	Percentage%
Strongly agree	26	21.7
Agree	39	32.5
Neutral	20	16.7
Disagree	20	16.7
Strongly disagree	15	12.5
Total	120	100

fig (6)

It is clear from the above table No.(6) and figure No (6) that there are (26) persons in the study's sample with percentage (21.7%) strongly agreed with " Where scientific text translation is concerned there are some problems pertaining to sentence structure building. ". There are (29) persons with percentage (32.5%) agreed with that, and (20) persons with percentage (16.7%) were not sure that, and (20) persons with percentage (16.7%) disagreed. and (15) persons with112.7% are strongly disagree.

Statement No (4-7): Scientific background is significantly important for rendering recent scientific discourse into Arabic.

Table No (4-7) The Frequency Distribution for the Respondents` Answers of Statement No. (7)

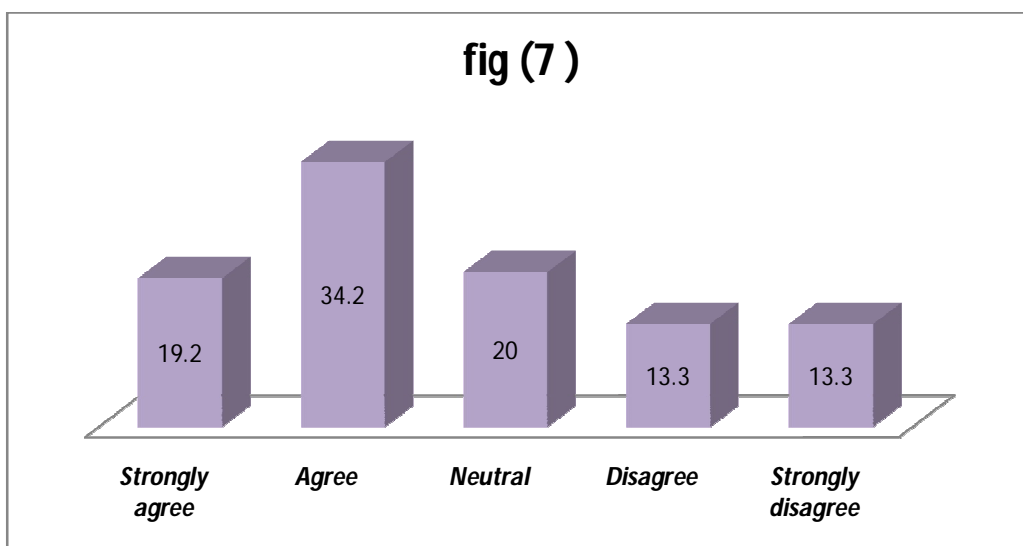| Valid	Frequency	Percentage%
Strongly agree	23	19.2
Agree	41	34.2
Neutral	24	20.0
Disagree	16	13.3
Strongly disagree	16	13.3
Total	120	100

fig (7)

It is clear from the above table No.(7) and figure No (7) that there are (23) persons in the study's sample with percentage (19.2%) strongly agreed with " Scientific background is significantly important for rendering recent scientific discourse into Arabic. ". There are (41) persons with percentage (34.2%) agreed with that, and (24) persons with percentage (20.0%) were not sure that, and (16) persons with percentage (13.3%) disagreed. and (16) persons with113.3% are strongly disagree.

Statement No. (4-8): Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.

Table No (4-8) The Frequency Distribution for the Respondents` Answers of Statement No. (8)

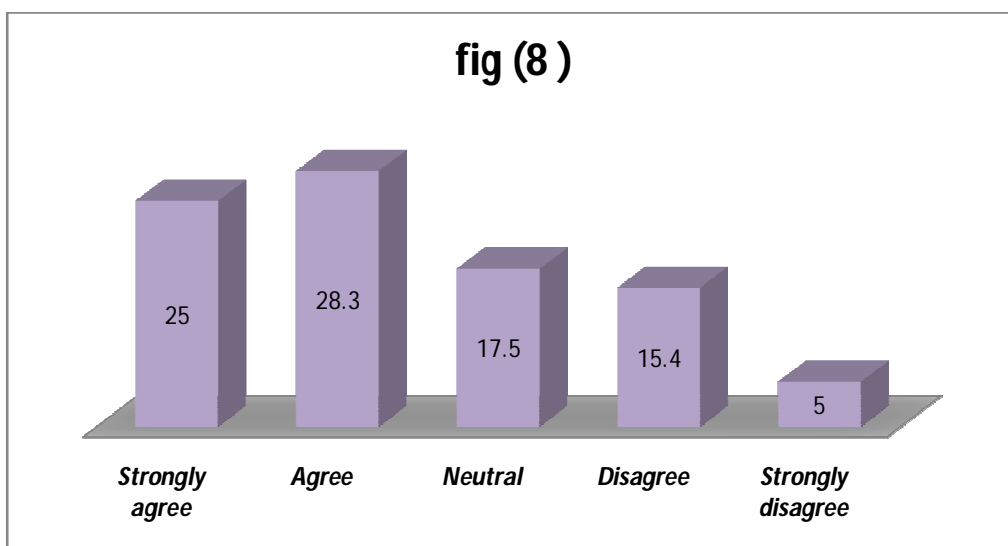| Valid	Frequency	Percentage%
Strongly agree	30	25.0
Agree	34	28.3
Neutral	21	17.5
Disagree	19	15.4
Strongly disagree	6	5
Total	**120**	**100**

fig (8)

It is clear from the above table No.(8) and figure No (8) that there are (30) persons in the study's sample with percentage (25.0%) strongly agreed with " Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose. ". There are (34) persons with percentage (28.3%) agreed with that, and (21) persons   with percentage (17.5%) were not sure that, and (19) persons with percentage (15.4%) disagreed. and (6) persons with15.0% are strongly disagree.

Statement No (4-9): In scientific works, subjects-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.

**Table No (4-9) The Frequency Distribution for the Respondents`
Answers of Statement No. (9)**

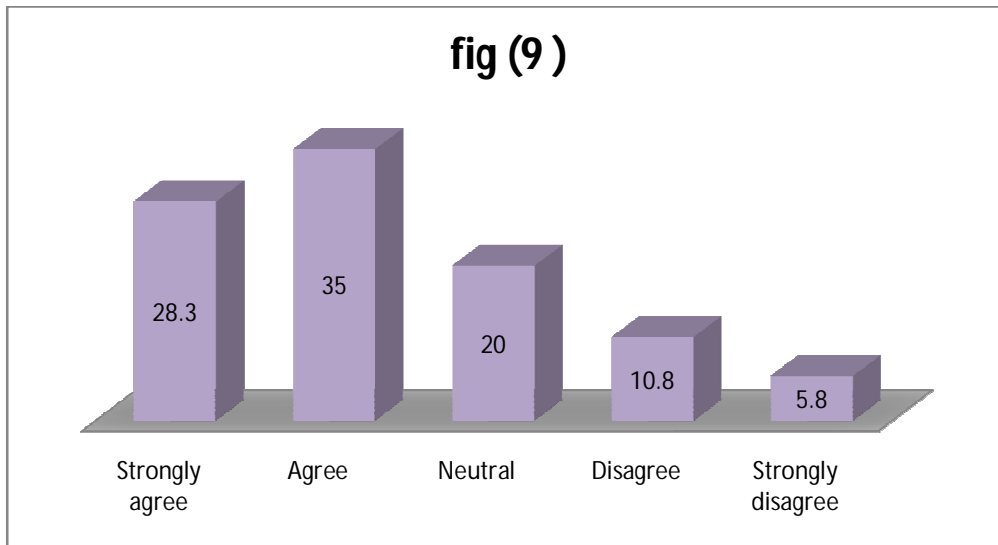| Valid	Frequency	Percentage%
Strongly agree	34	28.3
Agree	42	35.0
Neutral	24	20.0
Disagree	13	10.8
Strongly disagree	7	5.8
Total	**120**	**100**

78

fig (9)

It is clear from the above table No.(9) and figure No (9) that there are (34) persons in the study's sample with percentage (28.3%) strongly agreed with " In scientific works, subjects-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis. ". There are (42) persons with percentage (35.0%) agreed with that, and (24) persons   with percentage (20.0%) were not sure that, and (13) persons with percentage (10.8%) disagreed. and (7) persons with15.8% are strongly disagree.

Statement No (4-10): The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.

Table No (4-10) the Frequency Distribution for the Respondents` Answers of Statement No (10)

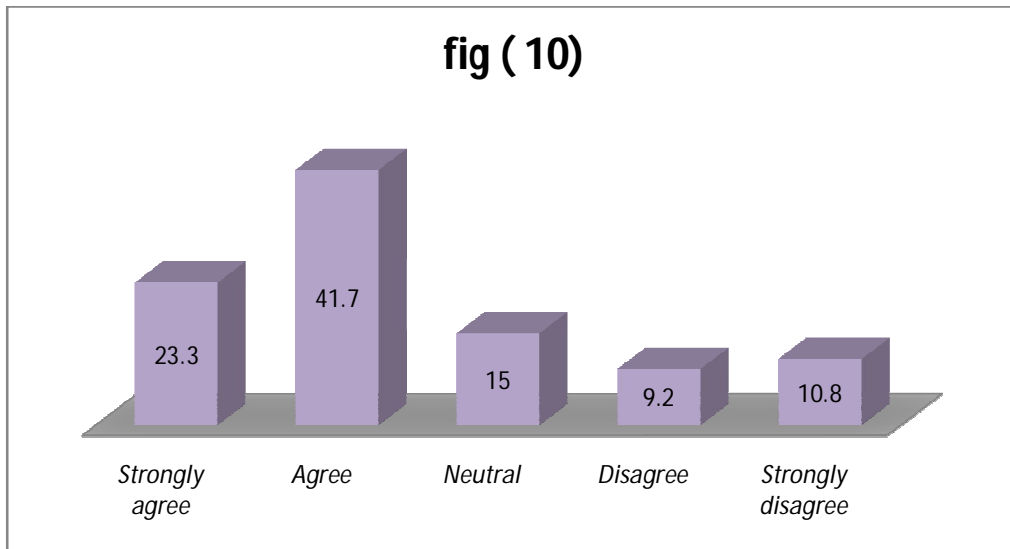| Valid	Frequency	Percentage%
Strongly agree	28	23.3
Agree	50	41.7
Neutral	18	15.0
Disagree	11	9.2
Strongly disagree	13	10.8
Total	**120**	**100**

fig (10)

It is clear from the above table No.(10) and figure No (10) that there are (28) persons in the study's sample with percentage (23.3%) strongly agreed with " The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity. ". There are (50) persons with percentage (41.7%) agreed with that, and (18) persons   with percentage (15.0%) were not sure that, and (11) persons with percentage (9.2%) disagreed. and (13) persons with10.8% are strongly disagree.

Statement No (4-11): Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.

Table No (4-11) The Frequency Distribution for the Respondents`
Answers of Statement No. (4-11)

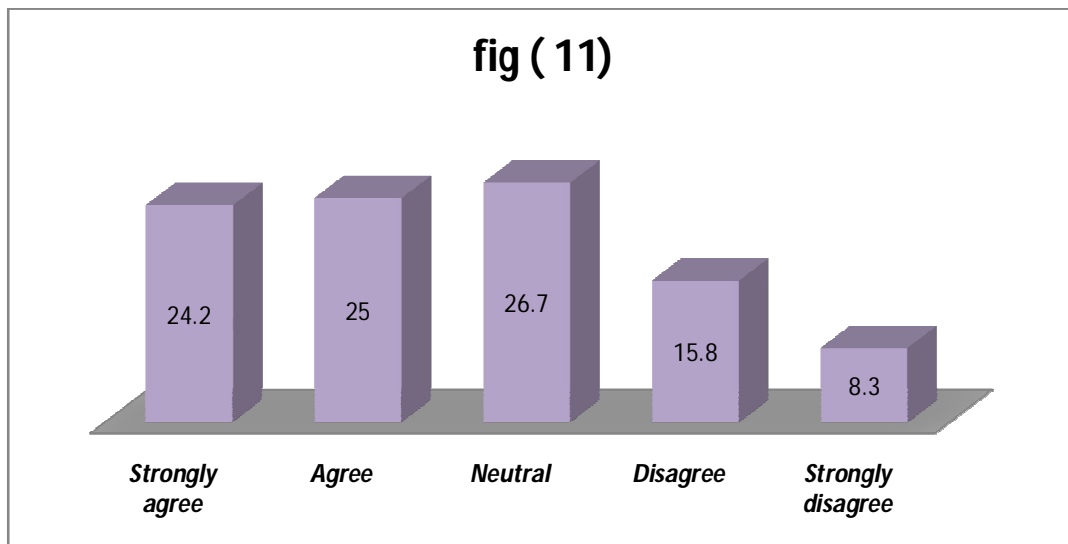| Valid	Frequency	Percentage%
Strongly agree	29	24.2
Agree	30	25.0
Neutral	32	26.7
Disagree	19	15.8
Strongly disagree	10	8.3
Total	120	100

fig (11)

It is clear from the above table No.(11) and figure No (11) that there are (29) persons in the study's sample with percentage (24.2%) strongly agreed with " Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue. ". There are (30) persons with percentage (26.7%) agreed with that, and (32) persons with percentage (15.8%) were not sure that, and (19) persons with percentage (9.2%) disagreed. and (10) persons with18.3% are strongly disagree.

Statement No. (4-12): Translating of technical texts from English into Arabic still poses a major intellectual challenge.

Table No (4-12) The Frequency Distribution for the Respondents` Answers of Statement No. (12)

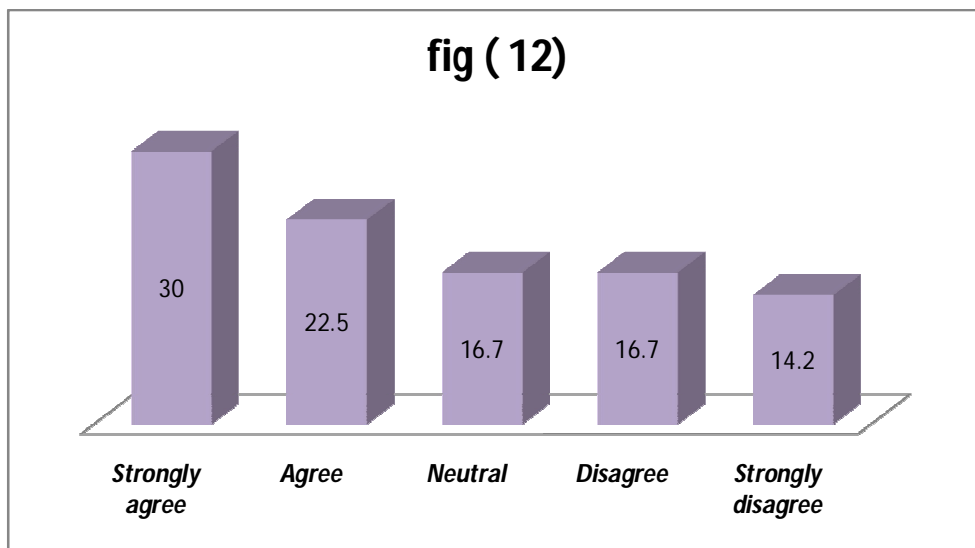| Valid	Frequency	Percentage%
Strongly agree	36	30.0
Agree	27	22.5
Neutral	20	16.7
Disagree	20	16.7
Strongly disagree	17	14.2
Total	120	100

It is clear from the above table No.(12) and figure No (12) that there are (36) persons in the study's sample with percentage (30.0%) strongly agreed with " Translating of technical texts from English into Arabic still poses a major intellectual challenge. ". There are (27) persons with percentage (22.5%) agreed with that, and (20) persons   with percentage (16.7%) were not sure that, and (20) persons with percentage (17.7%) disagreed. and (17) persons with114.2% are strongly disagree.

Statement No (4-13): Science does not have its own syntax only but also its own terminology.

Table No (4-13) The Frequency Distribution for the Respondents` Answers of Statement No. (13)

Valid	Frequency	Percentage%
Strongly agree	37	30.8
Agree	35	29.2
Neutral	17	14.2
Disagree	15	12.5
Strongly disagree	16	13.3
Total	120	100

fig (13)
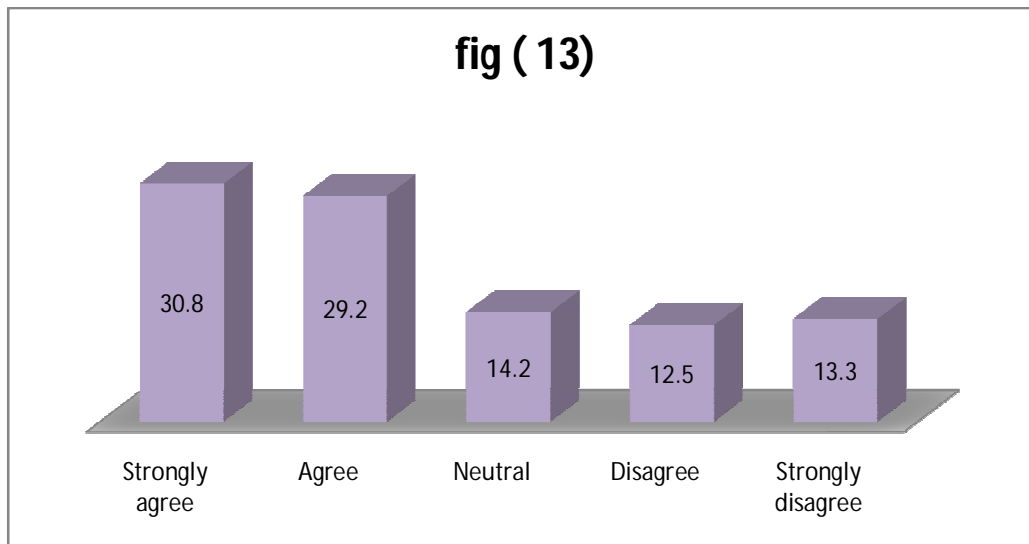
It is clear from the above table No (13) and figure No (13) that there are (37) persons in the study's sample with percentage (30.8%) strongly agreed with "Science does not have its own syntax only but also its own terminology." There are (35) persons with percentage (29.2%) agreed with that, and (17) persons with percentage (14.2%) were not sure that, and (15) persons with percentage (12.2%) disagreed. and (16) persons with113.3% are strongly disagree.

Statement No (4-14): In scientific translation it is common to find collaboration between linguistics and subject specialist.

Table No (4-14) The Frequency Distribution for the Respondents` Answers of Statement No. (14)

| Valid	Frequency	Percentage%
Strongly agree	54	45.0
Agree	33	27.5
Neutral	18	15.0
Disagree	11	9.2
Strongly disagree	4	3.3
Total	120	100

fig (14)
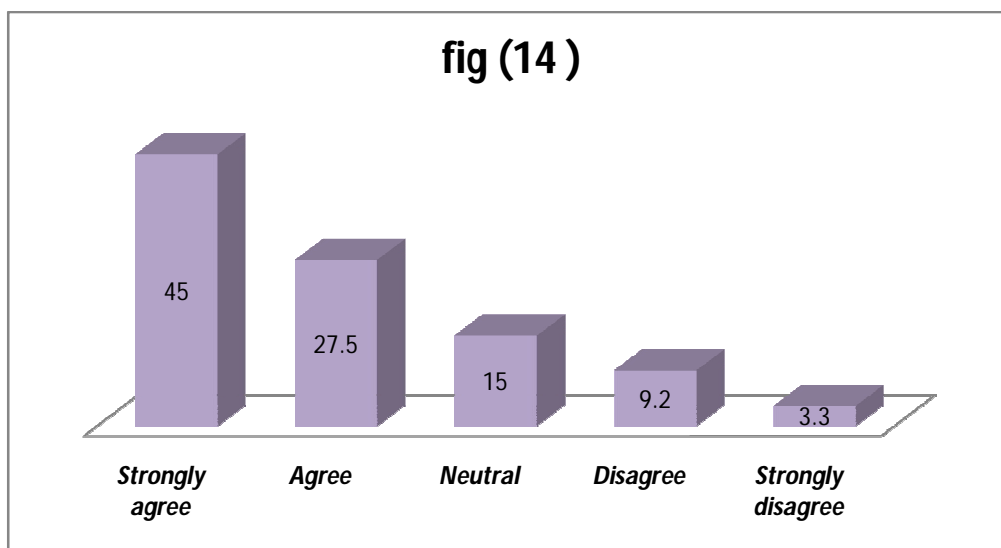
It is clear from the above table No.(14) and figure No (14) that there are (54) persons in the study's sample with percentage (45.0%) strongly agreed with " In scientific translation it is common to find collaboration between linguistics and subject specialist. ". There are (33) persons with percentage (27.5%) agreed with that, and (18) persons   with percentage (15.0%) were not sure that, and (11) persons with percentage (9.2%) disagreed. and (4) persons with13.3% are strongly disagree.

Statement No (4-15): Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.

Table No (4-15) the Frequency Distribution for the Respondents` Answers of Statement No (15)

| Valid	Frequency	Percentage%
Strongly agree	48	40.0
Agree	35	29.2
Neutral	15	12.5
Disagree	10	8.3
Strongly disagree	12	10.0
Total	**120**	**100**

fig (15)
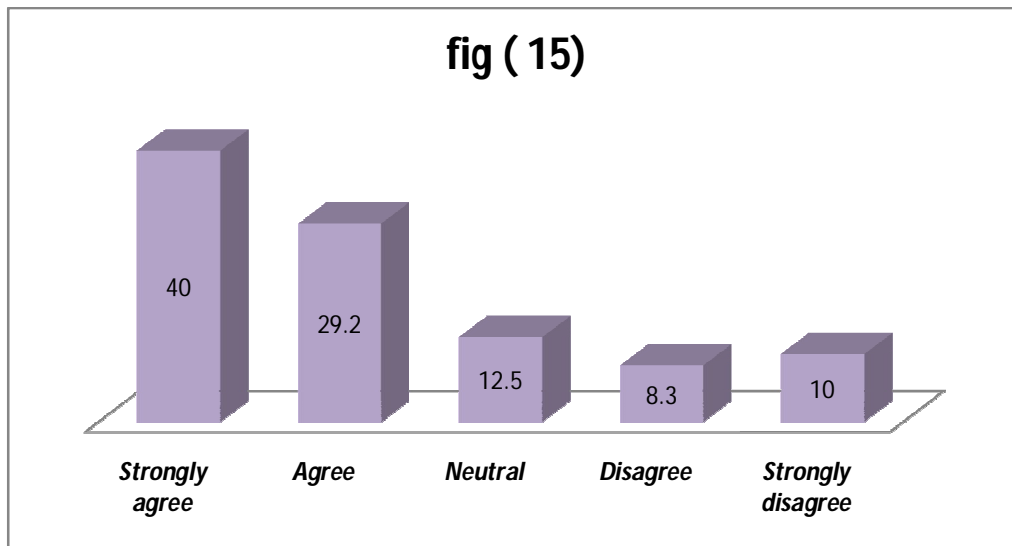
It is clear from the above table No.(15) and figure No (15) that there are (48) persons in the study's sample with percentage (40.0%) strongly agreed with " Scientific and technical texts are produced in response to demand for information of a scientific or technical nature. ". There are (35) persons with percentage (29.2%) agreed with that, and (15) persons with percentage (12.5%) were not sure that, and (10) persons with percentage (8.3%) disagreed. and (12) persons with110.0% are strongly disagree.

Hypotheses testing by using chi-square test

Chi – square test formula

$$X^2 = \sum_{i=1}^{n} \frac{(O_i - E)^2}{Ei}$$

Where:

Oi = sample frequencies

Ei = expected frequencies

$\sum_{i=1}^{n}$ = the summation

n = the number of the sample individuals

i = 1 .2 .3 … n

this is the calculated chi- square value which we always compare it with tabulated value at the specific significance level and degree of freedom And then the significant values determinate if there is statistically differences between the sample frequencies and sample frequencies that by comparing the probability value with the significance value (0.05) . and if the probability value is smaller than the significance value 0.05 this indicate that there is statistically differences between the sample frequencies and sample frequencies and then we compare the real mean with the hypothesized mean of the statement and find out if its less than hypothesized mean this is enough evidence for the no acceptance of the respondents to the statement and if its greater this indicate that most of the respondents are agree with the statement

Table No (4-16) Chi-Square Test Results for Respondents' Answers of the Questions of the Hypothesis:

Nom	Statement	mean	SD	Chi square	p-value
1	1- There is a vast gap between source and target cultures` version of the world.	2.8	0.9	22	0.00
2	2 - In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.	3.1	0.6	23	0.00
3	3-Unexpected organization of the language tends to render a text in coherent to its readers.	2.8	0.7	24	0.00
4	4- Translation was often the conduit through which innovation and change can be initiated.	2.5	0.8	22	0.00
5	5- There are some lexical problems that come as a result of bad translation.	2.7	0.4	25	0.00
6	6- Where scientific text translation is concerned there are some problems pertaining to sentence structure building.	3.0	0.7	26	0.00
7	7 - Scientific background is significally important for rendering recent scientific discourse into Arabic.	2.7	0.6	29	0.00
8	8- Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.	2.5	0.4	27	0.00
9	9-In scientific works, subjects-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.	2.7	0.4	25	0.00

10	10- The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.	3.0	0.9	29	0.00
	11- Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.	2.3	0.6	26	0.00
	12- Translating of technical texts from English into Arabic still poses a major intellectual challenge.	3.0	0.8	27	0.00
	13- Science does not have its own syntax only but also its own terminology.	2.6	0.7	24	0.00
	14- In scientific translation it is common to find collaboration between linguistics and subject specialist.	2.6	0.9	22	0.00
	15- Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.	2.5	0.4	25	0.00

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (1) question was (22) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "There is a vast gap between source and target cultures` version of the world..

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (2) question was (23) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "In order to convey an

intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.

calculated value of chi-square for the significance of the differences for the respondents' answers in the No (3) question was (24) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Unexpected organization of the language tends to render a text in coherent to its readers.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (4) question was (22) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement Translation was often the conduit through which innovation and change can be initiated.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (5) question was (25) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement There are some lexical problems that come as a result of bad translation.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (6) question was (26) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Where scientific text

translation is concerned there are some problems pertaining to sentence structure building.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (7) question was (27) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Scientific background is significally important for rendering recent scientific discourse into Arabic.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (8) question was (27) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (9) question was (25) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "In scientific works, subjects-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (10) question was (25) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the

respondent who agreed with the statement The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (11) question was (26) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (12) question was (27) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Translating of technical texts from English into Arabic still poses a major intellectual challenge.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (13) question was (24) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Science does not have its own syntax only but also its own terminology.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (14) question was (22) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "In scientific translation it is common to find collaboration between linguistics and subject specialist.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the No (15) question was (25) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (5%) which was (13). this indicates that, there are statistically significant differences at the level (5%) among the answers of the respondents, which support the respondent who agreed with the statement "Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.

4. 4. Verification of the study Hypotheses:

In the light of the final finishing's, it was found that the first hypothesis which was: a wrong lexical choice can be problematic, to translation of recent scientific discourse into Arabic, and the second hypothesis which was: a sentence structure building can be problematic to translation of recent scientific discourse into Arabic, and the third hypothesis which was: sufficient scientific background is highly significant in rendering scientific discourse into Arabic, accepted by both tools of the study.

Chapter Five

Summary, Conclusion, Recommendations

5. 0.   Introduction:

This last chapter of the research summaries what the researcher has come up to along the process of conducting the study.

5. 1   Summary of the study:

This study was conducted to investigate Linguistic problems faced by translators when rendering emerging scientific discourse into Arabic.

The study is an attempt to investigate some lexical problems that come as a result of bad translation. It also highlights some problems pertaining to sentence structure building as far as translation of scientific texts is concerned. Finally, it will decide whether scientific background is significally important or not for rendering recent scientific discourses into Arabic.

The study sets out to answer the following questions:

- To what extent wrong lexical choice can be problematic to translation of recent scientific discourses into Arabic?
- To what extent sentence structure building can be problematic to translation of scientific discourses into Arabic.
- To what extent can a scientific background of a translator be significant in translation of scientific texts into Arabic?

This study sets out to tests the following hypotheses:
- A wrong lexical choice can be problematic to translation of recent scientific discourses into Arabic.
- A sentence structure building can be problematic to translation of recent scientific discourses into Arabic.
- Sufficient scientific background is highly significant in rendering scientific discourses into Arabic.
  The methodology that the researcher adopts was consisting of a translation task in a form of a test administered to (50) M.A students of translation, the test consisted of a pre-test to examine

the sample, a post-test and a task on translation. All of these students are assumed to be native speakers of Arabic. They hold a B.A degree in English language; they have learnt English as a second language. These students are assumed to have a good command of both English and Arabic; the data of the study is limited to recent medical texts. Also a questionnaire administered to (12) colleagues from Sudan University of Science and Technology College of languages.

5. 2. **Conclusion**:

After the responses to the written test and questionnaire were tabulated and computed, the researcher comes to a conclusion:

1. Wrong lexical choice can be problematic to translation of recent scientific discourses into Arabic, that due to the fact that Arabic language lacks equivalent scientific terminology, as scientific discourses are known for their peculiar characteristics such as the presence of Latin words.

2. Sentence structure building can be problematic; this is because translators tend to confuse between Arabic sentence structure building and English sentence.

3. It is found that scientific background is significant in translation of scientific texts into Arabic; the translator must have a scientific background to avoid repetition and to allow him to play with terminology without changing the meaning of the text and need to be an avid reader, full conversant with the- state of the- art.

Recommendations:

1. A Scientific translator must have a scientific background to avoid repetition.

2. A Scientific translator needs to be an avid reader, full conversant with the- state of the- art.

3. Translator must have practical experience in translating from related fields.

4. Translator must have a firm mastery of both the source and target languages and must develop a high degree of linguistic knowledge.

5. There must be collaboration among linguists and subject specialist to produce high- quality technical translation.

References

- Al-Hassanawi, (2010), Buckingham Journal of Language and linguistics, vol3, 207-230.

- Al-Harby. M. (2005), The English Language Communicative Needs, University of Georgia.

- Al-Wasilla. M. (2005), Designing Syllabus for Medical students in Sudan, unpublished M.S thesis, Gazira University, Sudan.

- Bethany Thivierge, (2002:210), Scientific Texts, Council of Science Editors.

- Braima .M.E (2004).Investigating the role of English Language Post Arabicization, University of Khartoum, Sudan.

- Can Med Assoc. G. (1960, Aug 13; 83(7); 329-330.

- Duff (1981:14), the Third Language: Recurrent Problems of Translation into English. Pergamon Press, Oxford.

- Encyclopedia Britannica (1974:22:583:4).

- Fraghal, M. et al.(1999). Translation with Reference to English and Arabic. Dar Al-Hilal for Translation, Jordan, Irbid.

- Ghazala. Ilyas, (1989: 109), Theories of Translation, Mowsil: University of Mowsil.

- Georgi Lozanov, (2009), Rout ledge.

- Hajjaj, A.et al. (2001), Translation 11.Alguds Open University. Jordan.

- Jacobson, Seminar Paper (1959).

- Nida, E, (1964). Towards a scientific Translation. Leiden: E: J. Brui, Netherland.

- London Institute of Linguistics.

- WWW.Sheenservices, com Translation of Scientific and Technical Texts.

Appendices

Students` Test:

A Pre-Test

Question one: Put the verbs or adverbs between brackets in their correct form and places:

1. The situation is likely (get)……………. worse before it gets better.
2. Anti-US protests (end)……………. in violence.
3. What time are we (leave)……………for the airport.
4. Their daughter is only three, but she can write her own name. (already).
5. My mother being prescribed antibiotics.(still)
6. Several people (injure)……….in the explosion.
7. We were both very tired by the time we drew up to the hotel.(indeed)
8. They say that it (can)……….snow this year.
9. It was obvious from the state of the lock that someone (have try)……………… to open it.
10.. I've (be try)…………………to phone you.

Post-Test

Question two: Read the text and answer the following questions:

Scientist breach brain test barrier to treat sick patient

For the first time, doctors have breached the human brain's protective layer to deliver cancer-fighting drugs.

The Canadian team used tiny gas-filled bubbles, injected into the bloodstream of a patient, to punch temporary holes in the blood-brain barrier. A beam of focused ultrasound waves applied to the skull made the bubbles vibrate and push their way through, along with chemotherapy drugs. Six to ten more patients will undergo the same procedure as part of a trial.

Experts said the experimental technique used at Sunnybrook Health Sciences Centre was exciting because it meant doctors might be able to give cancer patients potent drugs that otherwise would not work. The same non-invasive method could also be used for other brain diseases, such as dementia and Parkinson's.

But many more safety studies are needed, they say. Animal trials have produced some results, but it is not clear whether the treatment would work or have side-effects.

The blood-brain barrier keeps pathogens and toxins away from the central nervous system. But tightly packed layer of cells, which separates the brain from its blood vessels, can be a hindrance if you want to deliver drugs into the brain.

Lead researcher and neurosurgeon Dr Todd Mainprize said:"The results are preliminary at this point because we don't have the level of chemotherapy – but based on the MRI scan, we were clearly able to open up the blood-brain barrier non-invasively, reversibly and it appears quite safely.

Prof Gail Ter Haar, an expert in ultrasound technology at the Institute of Cancer Research, London, said:"This is an exciting clinical step. "Opening the blood-barrier using focused ultrasound beams has been a goal of researchers for about a decade".

"The use of ultrasound for enhancing the local delivery of drugs to a number of different targets in the body is being investigated by a number of centers around the world, including the UK, and shows particular promise in the field of cancer chemotherapy."

Answer the following questions:

1. Which method the Canadian team used to treat patients?

………………………………………………………………………
……………..

2. What other brain diseases could this method used for?

………………………………………………………………………
……………………

3. Is it safe to use this method?

…………………………………………………………………………………
……………………

4. Could the blood-brain barrier be a hindrance if you want to deliver drugs into the brain? ……………………………………………………

…………………………………………………………………………………
……………………

5. What is the goal of researchers for a decade?

…………………………………………………………………………………
……………………

6. What are the meanings of these words according to the text?

a. Potent drug:
………………………………………………………………………

b. Pathogens:
………………………………………………………………………..

c. Non-invasive:
………………………………………………………………………..

d. Chemotherapy:
………………………………………………………………………..

Translation Task

Brain and Nervous System

What kind of supercomputer can write stories, do math problems, draw pictures, play games, see through eyes, hear someone talking, talk back, and network with devices that make snacks in the microwave oven? Your brain and nervous system can do all these things. Do you think a computer will ever be as powerful as your brain?

You think with your brain. Your brain also sends signals through a network called your nervous system. It tells your legs to walk and run. It tells your hands and arms to put popcorn in the microwave. You don't

even have to think about many of the things your brain does. Your brain tells your heart to beat. It tells your lungs to breathe in and out, even when you are sleeping.

Your brain also controls your feelings. Such feelings as joy, sadness, love, anger, and fear all come from your brain. Your brain is made of about 100 billion nerve cells. It looks like a lump of pinkish-gray jelly. The surface of the brain is wrinkled, and deep grooves divide it into sections. A network of blood vessels brings oxygen and food to your brain cells and carries away wastes. Your brain is protected by bone called your skull. Liquid and skin-like tissues also protect your brain.

When you were born, your brain weighed about • pounds (about 0.35 kilograms). Your brain keeps on growing while you grow up. By the time you reach the age of 20, your brain will weigh about 3 pounds (1.3 kilograms).

Your brain has three main parts. The parts are called the cerebrum, the cerebellum, and the brain stem. The cerebrum makes up the largest part of the brain. The cerebellum is underneath the back part of the cerebrum. The brain stem connects with the spinal cord at the bottom of the brain. Your cerebrum and cerebellum are divided into two parts. These parts are called the right brain and the left brain. The right side of your brain controls the left side of your body. The left side of your brain controls the right side of your body. Nerves from the right and left side of your body cross over when they enter your brain.

Your cerebrum makes up most of your brain. Your cerebrum solves problems and makes wishes. All of your thinking goes on in your cerebrum. Speech, language, and emotions come from your cerebrum, especially your cerebral cortex. The cerebral cortex is the outer part of the cerebrum.

Your cerebrum also gets signals from your senses. Nerves carry the signals. Nerves from your eyes and ears go to parts of the cerebrum that let you see and hear. Nerves carry signals to your cerebrum that let you feel, smell, and taste.

Your cerebrum sends messages out along nerves. The messages tell your legs to walk or run. They tell your arm and hand to wave when you see a friend across the street. Your cerebellum coordinates and fine-tunes your body movements. Your cerebrum might tell your hands and arms to

hit a baseball. Your cerebellum controls how you swing the bat and make contact with the ball.

Your cerebellum helps your fingers play the piano, guitar, or violin. It helps you keep your balance when you run, jump rope, or walk along a curb.

Your brain stem takes care of all the things that you do but don't need to think about doing. It keeps your heart pumping blood. It keeps your lungs breathing air. It makes your eyes blink. It pulls your hand back really fast if you touch a hot pot on the stove. Your nervous system consists of the brain, spinal cord, and nerves that run throughout your body. The nervous system carries messages to your muscles and organs. These messages tell your body what to do.

Your spinal cord is made of bundles of nerves. It starts in your neck and goes down your back. Nerves go out from the spinal cord to other parts of your body. Nerves from the spinal cord extend to the tips of your fingers and toes. Your spine, or backbone, protects your spinal cord.

Direct solution of question one:

11. to get
12. ends
13. leaving
14. Already (at the beginning, or in the middle, or at the end).
15. Still being.
16. Were injured.
17. Very tired.
18. Could, may, might.
19. Had tried.
20. Been trying.

Teachers` Questionnaire:

Dear colleagues,

Would you please spare a few minutes of your valuable time to fill in this questionnaire. We highly appreciate your help.

Instruction: Put a Tick mark (✓) beside the statements which are most close to your opinions:

(Mark the appropriate box.)	Strongly Agree	Agree	Not sure	Disagree	Strongly disagree
1- There is a vast gap between source and target cultures` version of the world.					
2 - In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.					
3-Unexpected organization of the language tends to render a text in coherent to its readers.					
4- Translation was often the conduit through which innovation and change can be initiated.					
5- There are some lexical problems that come as a result of bad translation.					
6- Where scientific text translation is concerned there are some problems pertaining to sentence structure building.					
7 - Scientific background is significaly important for rendering recent scientific discourse into Arabic.					
8- Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.					
9-In scientific works, subject-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.					
10- The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.					

11- Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.					
12- Translating of technical texts from English into Arabic still poses a major intellectual challenge.					
13- Science does not have its own syntax only but also its own terminology.					
14- In scientific translation it is common to find collaboration between linguistics and subject specialist.					
15- Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.					

N.B: Add any comments or your impression about the subject of the research.

……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
……………………………………………………………………………
…………………………………………………………………

Thank you

Igbal Adlan Ali Mohamed

Table (4-1) shows the frequency and percentage distribution of the answers according to part (1) :(the Test)

Valid	Frequency	Percentage
Pass	15	30%
Failure	35	70%
Total	50	100

Table (4-2) shows the frequency and percentage distribution of the answers according to part (2) : (the Test)

Valid	Frequency	Percentage
Pass	11	22
Failure	39	78
Total	50	100

Table No (4-3) The Frequency Distribution and decisions for the Respondents` Answers of all questions: (the Test)

	Pass		Failure		
	frequency	*Percentage*	*frequency*	*Percentage*	
Question 1	13	26	35	70	**Accept**
Question 2	11	22	39	78	**Accept**

Table (4-4) one sample T-TEST for the questions of the study

(The Test)

Question s	N	SD	t-value	DF	p-value
1	49	7.5	19	49	0.001
2	49	9.55	15	49	0.00
For all	49	8.6	14	49	0.00

**Table No (4-1) The Frequency Distribution for the Respondents`
Answers of Statement No. (1)**

Valid	Frequency	Percentage%
Strongly agree	36	30.0
Agree	28	23.3
Neutral	31	25.8
Disagree	17	14.2
Strongly disagree	8	6.7
Total	120	100

**Table No (4-2) the Frequency Distribution for the Respondents`
Answers of Statement No. (2)**

Valid	Frequency	Percentage%
Strongly agree	43	35.8
Agree	29	24.2
Neutral	17	14.2
Disagree	19	15.8
Strongly disagree	12	10
Total	120	100

Table No (4-3) The Frequency Distribution for the Respondents `Answers of Statement No. (3)

Valid	Frequency	Percentage%
Strongly agree	41	34.2
Agree	33	27.5
Neutral	18	15.0
Disagree	17	14.2
Strongly disagree	11	9.2
Total	120	100

Table No (4-4) The Frequency Distribution for the Respondents` Answers of Statement No. (4)

Valid	Frequency	Percentage%
Strongly agree	57	47.5
Agree	33	27.5
Neutral	18	15.0
Disagree	8	6.7
Strongly disagree	4	3.3
Total	120	100

Table No (4-5) the Frequency Distribution for the Respondents`
Answers of Statement No (5)

Valid	Frequency	Percentage%
Strongly agree	39	32.5
Agree	39	32.5
Neutral	17	14.2
Disagree	10	8.3
Strongly disagree	15	12.5
Total	120	100

Table No (4-6) The Frequency Distribution for the Respondents`
Answers of Statement No. (6)

Valid	Frequency	Percentage%
Strongly agree	26	21.7
Agree	39	32.5
Neutral	20	16.7
Disagree	20	16.7
Strongly disagree	15	12.5
Total	120	100

Table No (4-7) The Frequency Distribution for the Respondents`
Answers of Statement No. (7)

Valid	Frequency	Percentage%
Strongly agree	23	19.2
Agree	41	34.2
Neutral	24	20.0
Disagree	16	13.3
Strongly disagree	16	13.3
Total	120	100

Table No (4-8) The Frequency Distribution for the Respondents'
Answers of Statement No. (8)

Valid	Frequency	Percentage%
Strongly agree	30	25.0
Agree	34	28.3
Neutral	21	17.5
Disagree	19	15.4
Strongly disagree	6	5
Total	120	100

Table No (4-9) The Frequency Distribution for the Respondents`
Answers of Statement No. (9)

Valid	Frequency	Percentage%
Strongly agree	34	28.3
Agree	42	35.0
Neutral	24	20.0
Disagree	13	10.8
Strongly disagree	7	5.8
Total	120	100

Table No (4-10) the Frequency Distribution for the Respondents`
Answers of Statement No (10)

Valid	Frequency	Percentage%
Strongly agree	28	23.3
Agree	50	41.7
Neutral	18	15.0
Disagree	11	9.2
Strongly disagree	13	10.8
Total	120	100

Table No (4-11) The Frequency Distribution for the Respondents'
Answers of Statement No. (11)

Valid	Frequency	Percentage%
Strongly agree	29	24.2
Agree	30	25.0
Neutral	32	26.7
Disagree	19	15.8
Strongly disagree	10	8.3

Table No (4-12) The Frequency Distribution for the Respondents`
Answers of Statement No. (12)

Valid	Frequency	Percentage%
Strongly agree	36	30.0
Agree	27	22.5
Neutral	20	16.7
Disagree	20	16.7
Strongly disagree	17	14.2
Total	120	100

Table No (4-13) The Frequency Distribution for the Respondents`
Answers of Statement No. (13)

Valid	Frequency	Percentage%
Strongly agree	37	30.8
Agree	35	29.2
Neutral	17	14.2
Disagree	15	12.5
Strongly disagree	16	13.3
Total	120	100

Table No (4-14) The Frequency Distribution for the Respondents`
Answers of Statement No. (14)

Valid	Frequency	Percentage%
Strongly agree	54	45.0
Agree	33	27.5
Neutral	18	15.0
Disagree	11	9.2
Strongly disagree	4	3.3
Total	120	100

Table No (4-15) the Frequency Distribution for the Respondents'
Answers of Statement No (15)

Valid	Frequency	Percentage%
Strongly agree	48	40.0
Agree	35	29.2
Neutral	15	12.5
Disagree	10	8.3
Strongly disagree	12	10.0

Table No (4-16) Chi-Square Test Results for Respondents' Answers of the Questions of the Hypothesis:

Nom	Statement	mean	SD	Chi square	p-value
1	1- There is a vast gap between source and target cultures` version of the world.	2.8	0.9	22	0.00
2	2 - In order to convey an intended meaning, the speaker / writer must be able to assume that the hearer / reader has an access to all the necessary background information, features of the context.	3.1	0.6	23	0.00
3	3-Unexpected organization of the language tends to render a text in coherent to its readers.	2.8	0.7	24	0.00
4	4- Translation was often the conduit through which innovation and change can be initiated.	2.5	0.8	22	0.00
5	5- There are some lexical problems that come as a result of bad translation.	2.7	0.4	25	0.00
6	6- Where scientific text translation is concerned there are some problems pertaining to sentence structure building.	3.0	0.7	26	0.00
7	7 - Scientific background is significally important for rendering recent scientific discourse into Arabic.	2.7	0.6	29	0.00
8	8- Translation of scientific work is supposed to be more direct, free of alternatives, and much less artistic than the other kinds of prose.	2.5	0.4	27	0.00
9	9-In scientific works, subjects-matter takes priority over the style of the linguistic medium which aims at expressing facts, experiments, and hypothesis.	2.7	0.4	25	0.00

10	10- The language of scientific and technical language is characterized by impersonal style, simpler syntax, use of acronyms, and clarity.	3.0	0.9	29	0.00
	11- Translation was and still is used as a tool for language learning and is often the first experience of a foreign tongue.	2.3	0.6	26	0.00
	12- Translating of technical texts from English into Arabic still poses a major intellectual challenge.	3.0	0.8	27	0.00
	13- Science does not have its own syntax only but also its own terminology.	2.6	0.7	24	0.00
	14- In scientific translation it is common to find collaboration between linguistics and subject specialist.	2.6	0.9	22	0.00
	15- Scientific and technical texts are produced in response to demand for information of a scientific or technical nature.	2.5	0.4	25	0.00

Figure (4-1) shows the frequency and percentage distribution of the answers according to part (1) :(the Test)
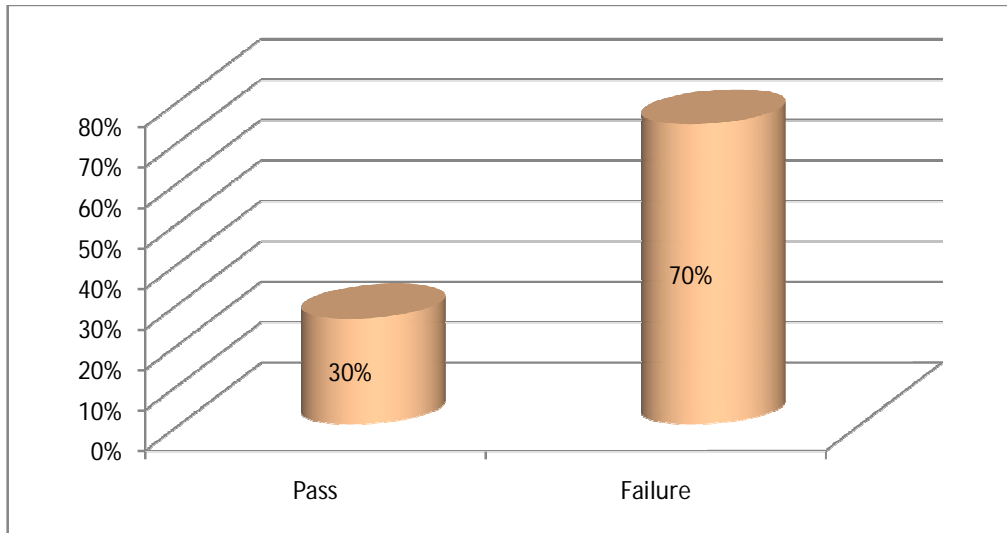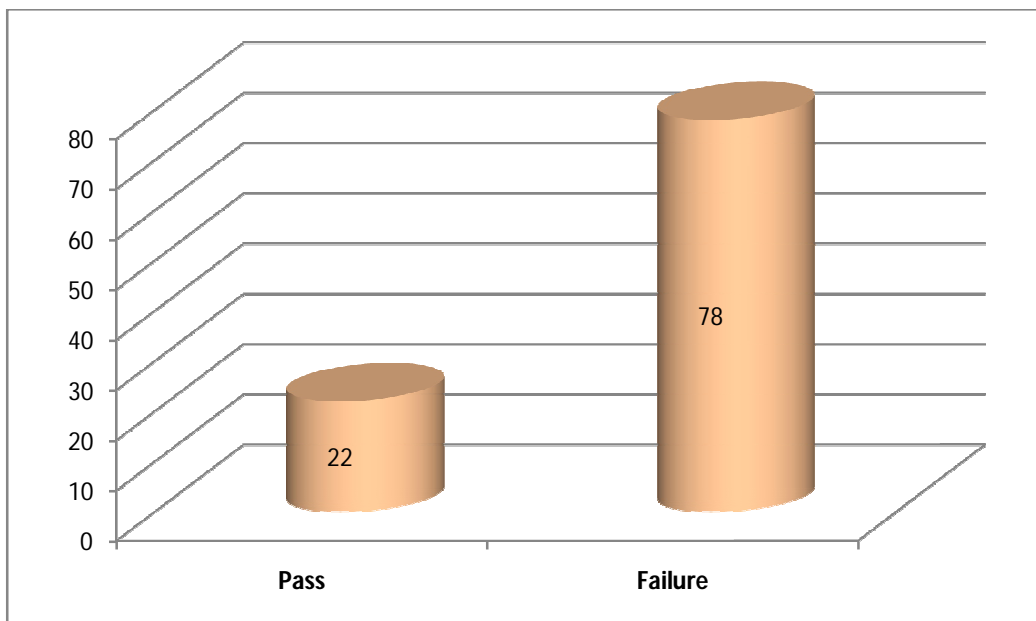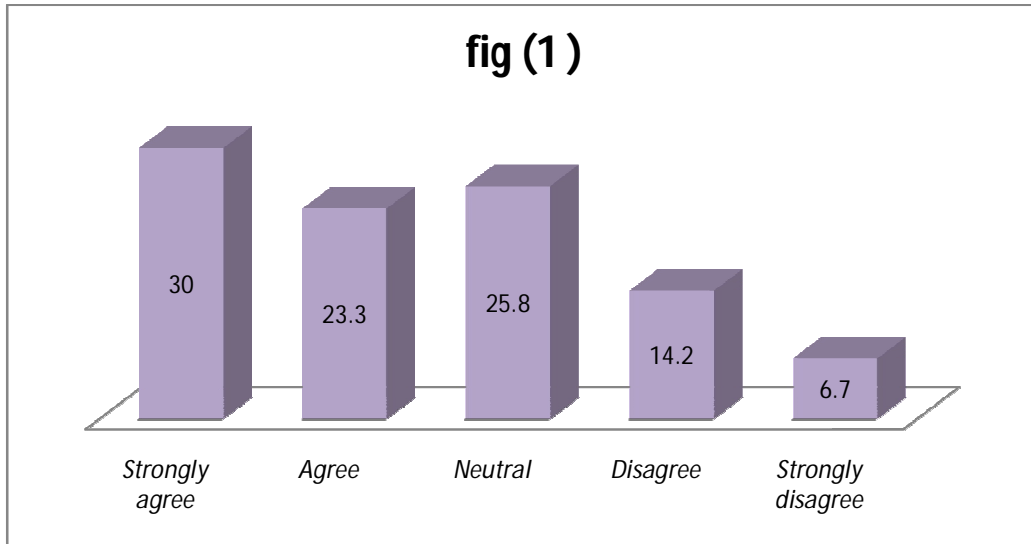

Figure (4-2) shows the frequency and percentage distribution of the answers according to part (2): (the Test)

**Figure No (4-1) The Frequency Distribution for the Respondents`
Answers of Statement No. (1)**

fig (1)

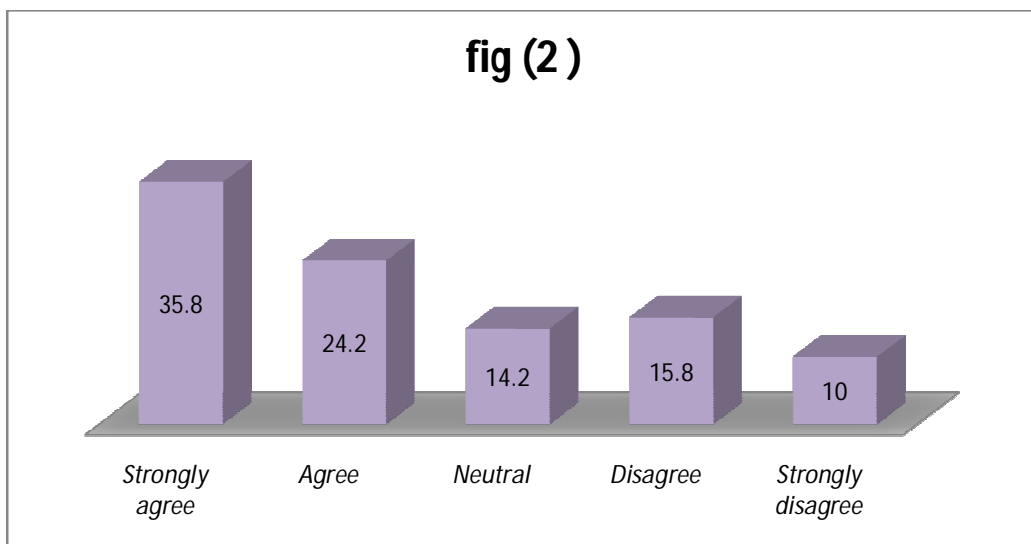| Strongly agree	Agree	Neutral	Disagree	Strongly disagree
30	23.3	25.8	14.2	6.7

**Figure No (4-2) the Frequency Distribution for the Respondents`
Answers of Statement No. (2)**

fig (2)

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
35.8	24.2	14.2	15.8	10

Figure No (4-3) The Frequency Distribution for the Respondents' Answers of Statement No. (3)

fig (3)

34.2	27.5	15	14.2	9.2
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
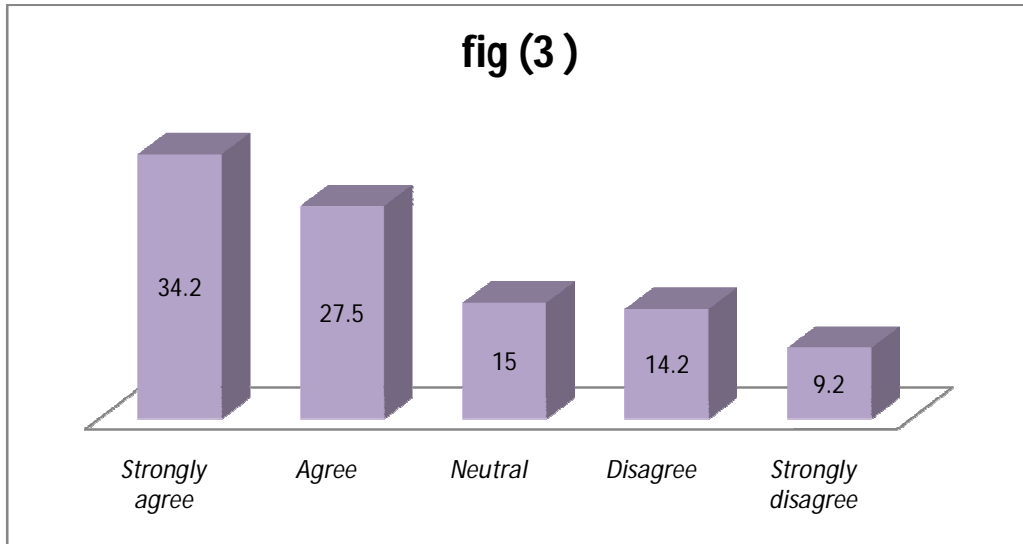
Figure No (4-4) The Frequency Distribution for the Respondents' Answers of Statement No. (4)

fig (4)

47.5	27.5	15	6.7	3.3
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
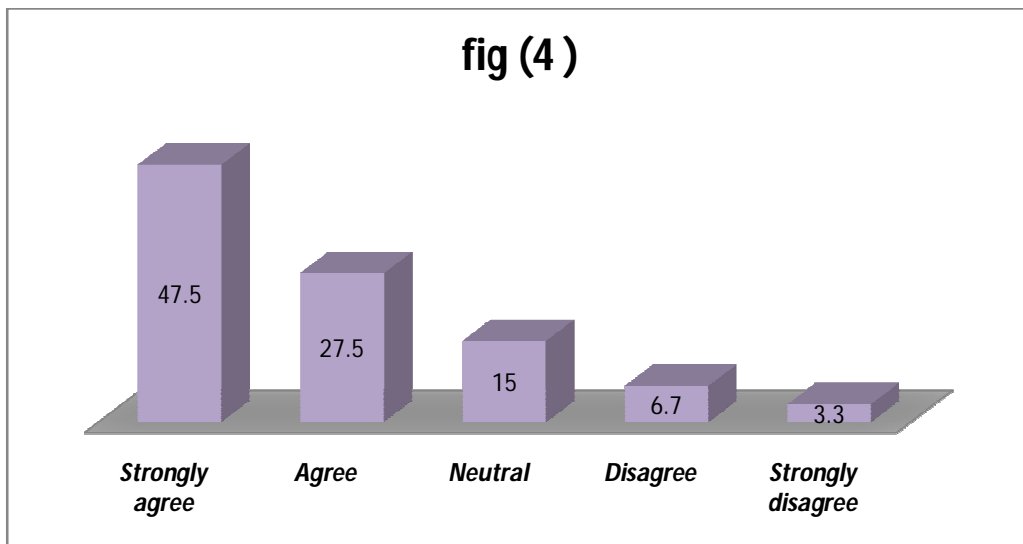
**Figure No (4-5) the Frequency Distribution for the Respondents`
Answers of Statement No (5)**

fig (5)

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
32.5	32.5	14.2	8.3	12.5
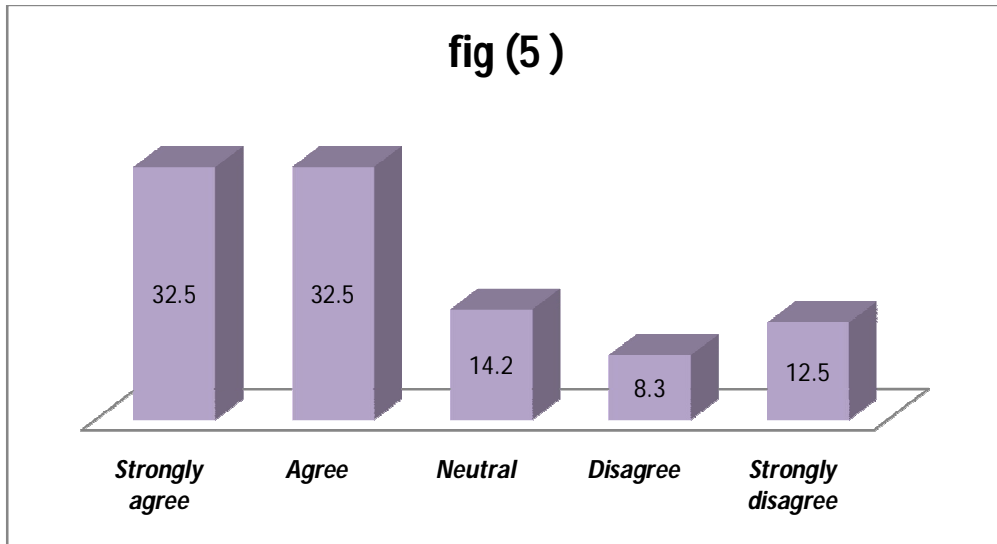
**Figure No (4-6) The Frequency Distribution for the Respondents`
Answers of Statement No. (6)**

fig (6)

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
21.7	32.5	16.7	16.7	12.5
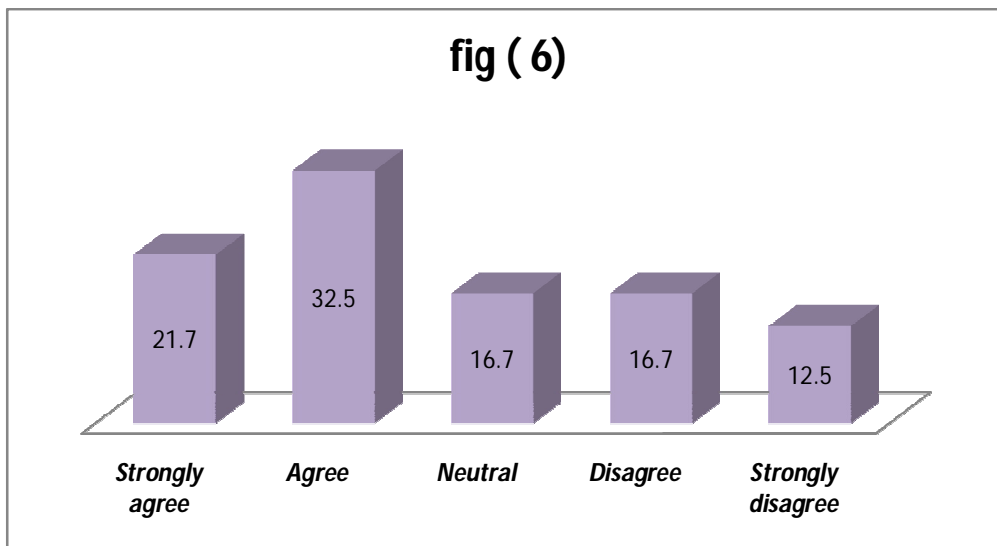
Figure No (4-7) The Frequency Distribution for the Respondents`
Answers of Statement No. (7)

fig (7)

	34.2			
19.2		20	13.3	13.3

Strongly agree — *Agree* — *Neutral* — *Disagree* — *Strongly disagree*
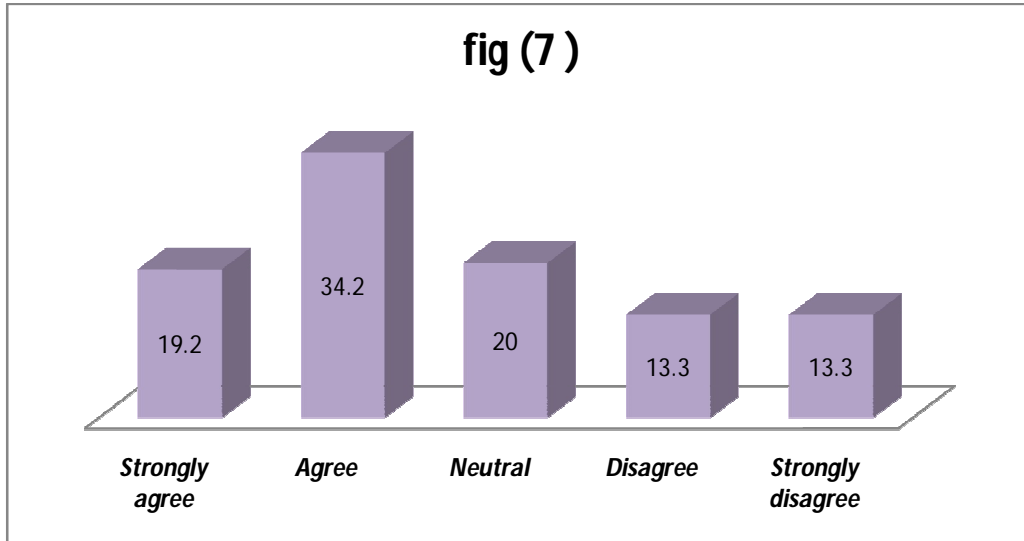
Figure No (4-8) The Frequency Distribution for the Respondents`
Answers of Statement No. (8)

fig (8)

25	28.3	17.5	15.4	5

Strongly agree — *Agree* — *Neutral* — *Disagree* — *Strongly disagree*
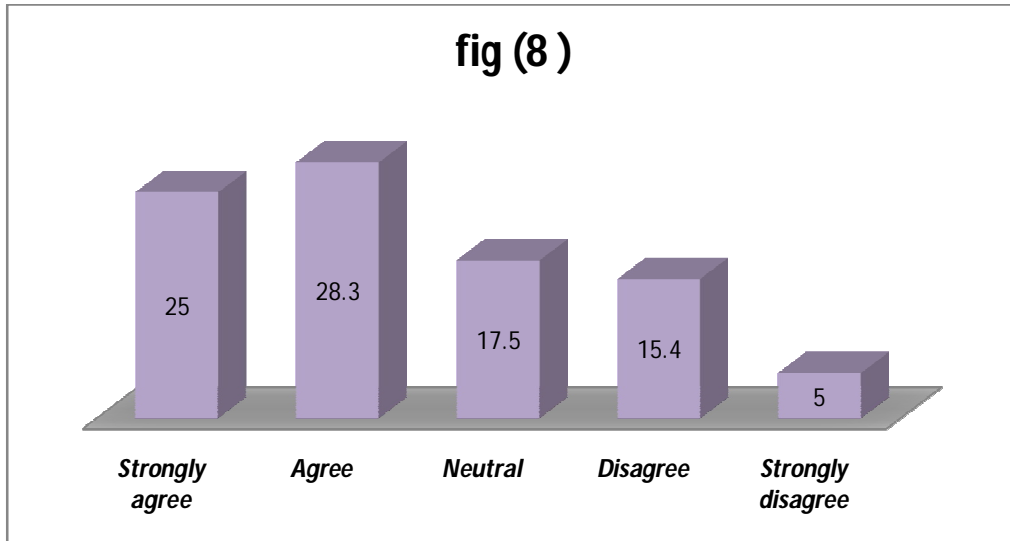
Figure No (4-9) The Frequency Distribution for the Respondents`
Answers of Statement No. (9)

fig (9)

Strongly agree	28.3
Agree	35
Neutral	20
Disagree	10.8
Strongly disagree	5.8
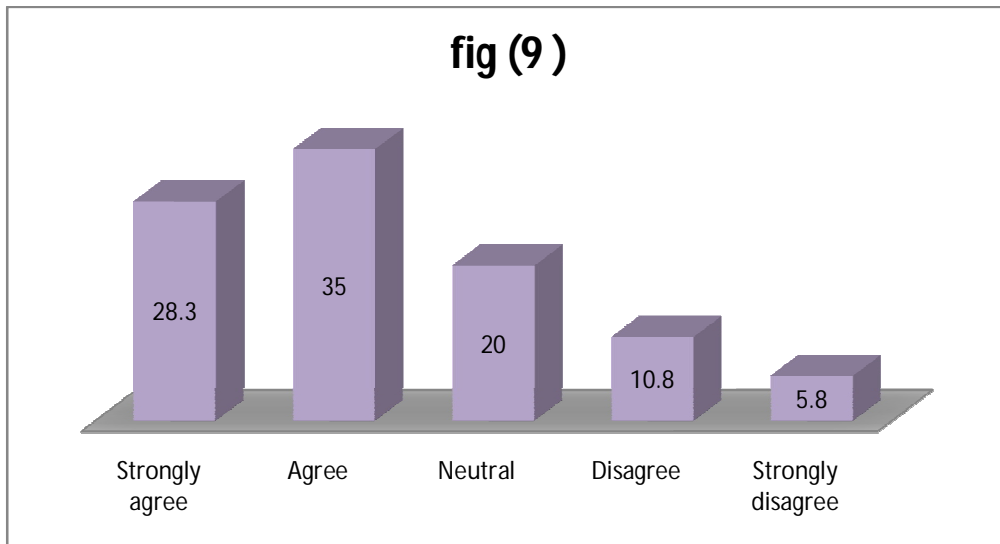
Figure No (4-10) The Frequency Distribution for the Respondents`
Answers of Statement No (10)

fig (10)

Strongly agree	23.3
Agree	41.7
Neutral	15
Disagree	9.2
Strongly disagree	10.8
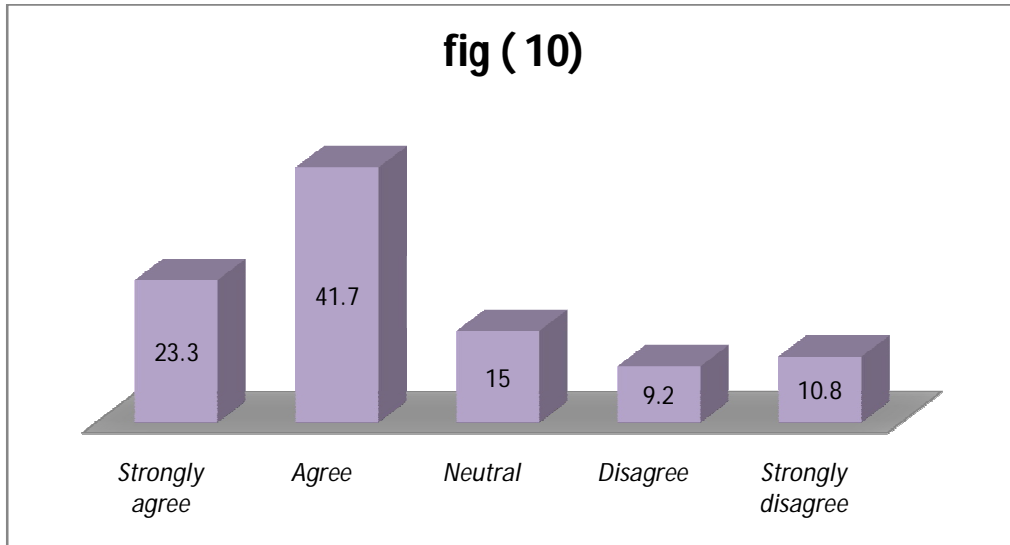
Figure No (4-11) The Frequency Distribution for the Respondents'
Answers of Statement No. (11)

fig (11)

24.2	25	26.7	15.8	8.3
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
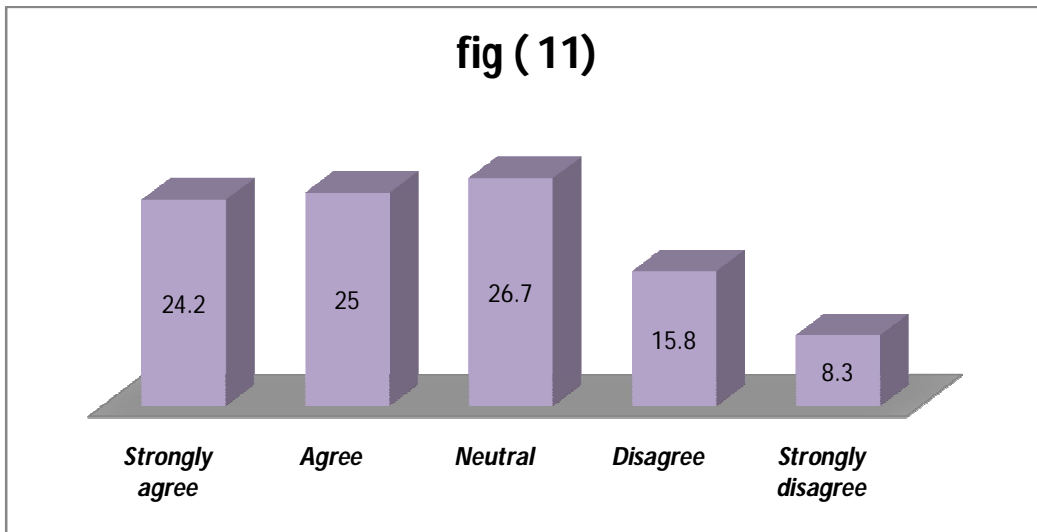
Figure No (4-12) The Frequency Distribution for the Respondents`
Answers of Statement No. (12)

fig (12)

30	22.5	16.7	16.7	14.2
Strongly agree	Agree	Neutral	Disagree	Strongly disagree
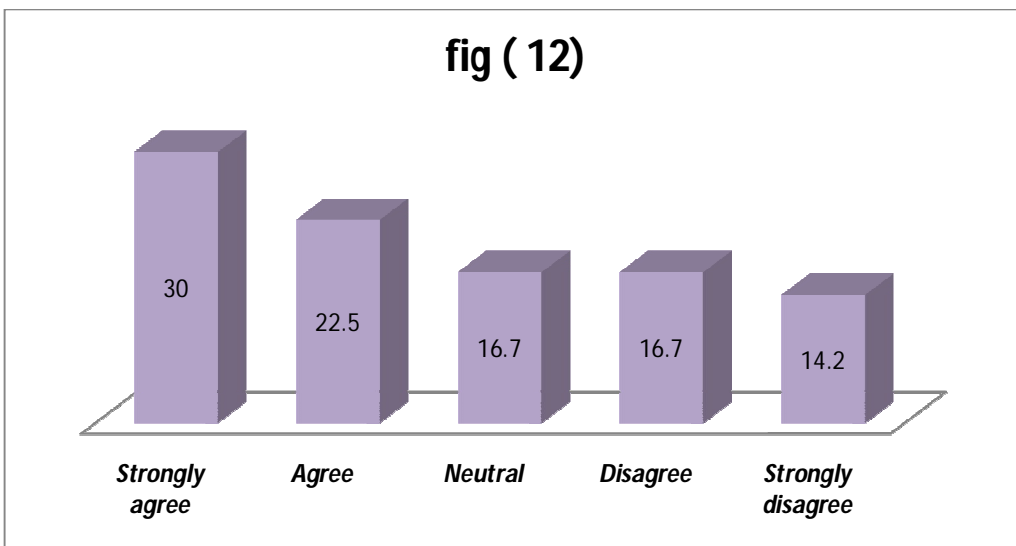
**Figure No (4-13) The Frequency Distribution for the Respondents'
Answers of Statement No. (13)**

fig (13)

30.8	Strongly agree
29.2	Agree
14.2	Neutral
12.5	Disagree
13.3	Strongly disagree
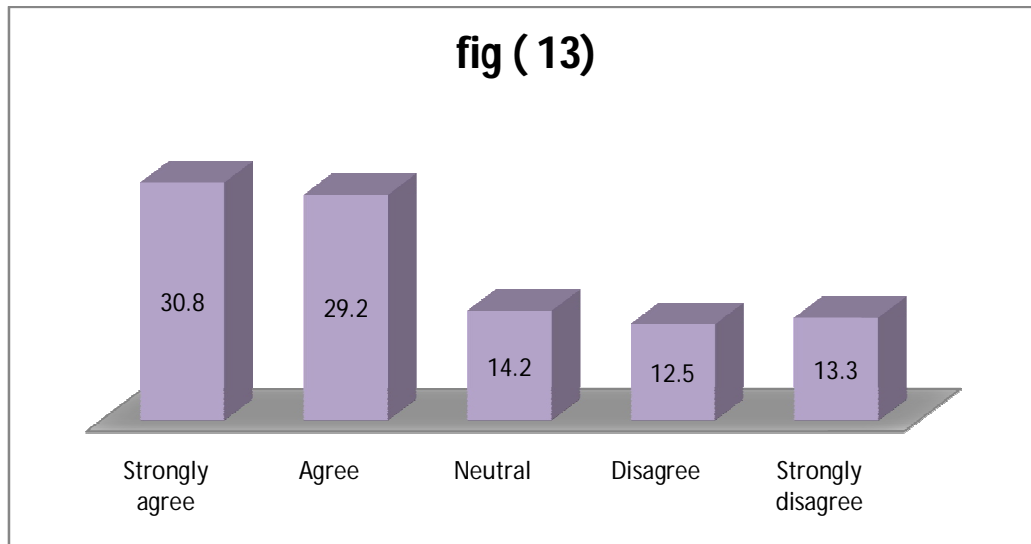
**Figure No (4-14) The Frequency Distribution for the Respondents`
Answers of Statement No. (14)**

fig (14)

45	Strongly agree
27.5	Agree
15	Neutral
9.2	Disagree
3.3	Strongly disagree

**Figure No (4-15) The Frequency Distribution for the Respondents`
Answers of Statement No. (15)**

fig (15)

Category	Value
Strongly agree	40
Agree	29.2
Neutral	12.5
Disagree	8.3
Strongly disagree	10