Problematic Areas in Scientific and Technical Translation

إشكاليات الترجمة العلمية والتقنية

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Abstract:

Like any other kind of translation, technical translation requires from the translator, the scientist and the field expert a good command of at least two languages of the published material. In case the translator is concerned, it is crucial to have sufficient knowledge of the science and technology he/she is supposed to deal with. Translation plays a central role in the process of transferring science and technology from one language community to another. However, translators generally fail to carry the exact message to the target reader due to the complexity of some highly specialized written material. This study sets out to examine some of the difficulties involved in establishing equivalence between the source language (SL) and target language (TL) in the context of technical translation. One of the main objectives of this paper is to investigate the basis on which the translator can build up a text in the target language that carries over a clear message intended by the writer of the source language. Our analysis and discussion will be limited to the translation of scientific and technical information from English into Arabic.

Keywords: Technical translation, Equivalence, Syntactic, Lexical, Stylistic, Formal and Dynamic Equivalence

ملخص البحث :

الترجمة العلمية والتقنية كغيرها من أنواع الترجمة تتطلب من المترجم والعالم والخبير الميداني إتقان جيد للغتين على الأقل من لغات المواد التي يتم نشرها، ومن الضروري أن يكون لدى المترجم معرفة كافية بالعلم والتكنولوجيا التي من المفترض أن يتعامل معها، وتلعب الترجمة دورا محوريا في عملية نقل العلوم والتكنولوجيا من مجتمع لغوي إلى آخر، غير أن المترجمين عادة ما يفشلون في نقل الرسالة بدقة إلى القارئ المستهدف نظرا لتعقيد بعض المواد المكتوبة والمعنة في التخصص، وتهدف هذه الورقة إلى دراسة بعض الصعوبات التي ينطوي عليها تحديد التكافؤ بين لغة الأصل أو المصدر واللغة المستهدفة أو المترجم إليها وذلك في سياق الترجمة التقنية، وأحد الأهداف الرئيسية لهذه الورقة هو البحث في الأساس الذي عليه يمكن للمترجم بناء نص في اللغة المستهدفة ينقل تلك الرسالة الواضحة التي يقصدها الكاتب الأصلي، وسوف يقتصر تحليلنا ومناقشتنا على ترجمة المعلومات العلمية والتقنية من اللغة الإنجليزية إلى اللغة العربية.

1. Introduction:

Translation in the fields of science and technology, termed as technical translation, is always considered as concerned only with translating the various kinds and specifications of materials, equipment and processes. Those who have this view might have ignored the fact that technical translation also deals with how, when and where to use or deal with these materials, equipment and processes …etc. It is apparent that when a writer introduces a new technology, for example, he/she will primarily describe it and then show how it works or functions, how it is assembled, connected, maintained etc. In addition to all that, it might be necessary to inform the reader about such a technology or device's advantages, disadvantages, hazards or precautions. By providing all relevant information, the writer might intend to insure that his target reader would observe all handling and operational directions as well as any safety precautions. That is to say, that the reader should understand and accordingly behave in the way the original writer intended. Normally, any misunderstanding of the writer's message, or ignoring any part of it, may lead to serious damage or even fatal consequences. Therefore, it is the responsibility of the translator to ensure that he/she transferred the exact message to his reader. This message in turn has to carry the effect the original writer intended for his audience. This paper will attempt to highlight the sources of difficulty in finding or rendering equivalence in translating scientific and highly technical texts, focusing mainly on the fields of oil and chemical industries that occupy a major importance as sources of power and energy in and for the whole world.

2. Translation Equivalence

One of the essential issues in the theory of translation has been the concept of equivalence. Translation equivalence between SL and TL has been and still the most controversial element. That is to say, many attempts have been made to define such a concept, but have ended up with many contradictory and confusing statements. Sickinger (2017) believes that a thorough revision of what we mean by equivalence and how we envision its role in the process leading from source texts to target texts is a necessary stepping-stone for translation studies as a whole to advance (ibid: 214). Leonardi (2005) states that the term equivalence has caused, and it seems quite probable that

it will continue to cause, heated debates within the field of translation studies. Vinay and Darbelnet(1995) view equivalence-oriented translation as a procedure which 'replicates the same situation as in the original, whilst using completely different wording' (ibid: 342).According to Catford (1965), defining the nature and conditions of translation equivalence is the central task of translation theory where the definition of equivalence represents the central problem. However, he defines translation as "the replacement of textual material in one language SL by equivalent textual material in another language TL (p:20). In trying to tackle the problem of equivalence, Eugene Nida (1964) calls for seeking to find the closest possible equivalent, since there is no such thing as identical equivalents. He distinguishes two types of equivalence, formal and dynamic. Formal equivalence focuses attention on the message itself on both form and content. In other words, such a formal equivalence is source oriented and is intended to reveal as much as possible of the form and content of the original message. Dynamic equivalence, on the other hand, based on the notion of equivalent effect, is an attempt to produce the same effect on the reader of the target language as the original produced on the reader of the source message. MeGuire (1988) criticizes Nida's two types of translation equivalence arguing that, "the weakness of Nida's loosely defined types can clearly be seen. The principle of equivalent effect which has enjoyed great popularity in certain cultures at certain times involves us in areas of speculations and at times can lead to very dubious conclusions" (p:26).

MeGuire (1988) argues that sameness should not be considered as a basis for searching for equivalence in the TL, because sameness might not be found even between two TL versions of the same translated SL text. This argument seems to agree with Holmes (1988) who sees the use of the term equivalence as perverse, since according to him, to ask for sameness is to ask too much. Along the same line, Peter Newmark (1988), talks about semantic and communicative translation. He states that the term formal equivalence is somehow extreme. That is why he termed it as semantic translation being the closest semantic and syntactic rendering of a source text. Newmark (1988) views translation as a communicative process and he holds the view of the equivalent effect which he describes as being "the desirable result, rather than the aim of any translation" (p:48). Hatim and Mason (1990) argue that all translation is, in a sense, communicative. They postulate that it is difficult to gauge the actual effect on the readers of a text. Accordingly, they prefer to

deal with the issue of effects in terms of intended effect. It can be argued that such an intended effect is essential and should be clearly seen, grasped and assessed in the translation of instructions, notices and publicity.

Baker (1992) suggests a more detailed list of conditions according to which the concept of equivalence can be defined. She distinguishes between four levels, namely:

a) Word level, that is to consider words as single units in order to find a direct 'equivalent' term in the TL.

b) Grammatical level, grammatical rules may vary across languages and this may pose some problems in terms of finding a direct correspondence in the TL

c) Textual level, text type can help the translator in an attempt to produce a cohesive and coherent text in a specific context

d) Pragmatic level, working out author's intention and implied meanings in translation in order to get the ST message across (ibid.:11-12)

In his book, *Exploring Translation Theories*, Pym (2010) points out that, "there is no such thing as perfect equivalence between languages and it is always assumed equivalence" (p. 37). Panou (2013) concluded that "the usefulness or not of the concept of equivalence to the translation process varies according to the stance of the translators concerned on what they regard as the virtues of equivalence itself". (p:6) That is to say, that it is up to the translator to make a balance between the source and target texts, as far as equivalence is concerned, in all linguistics, textual and stylistic aspects. Finally, Zhen Xu (2016) highlights the role of the reader and proposes that any decision-making and the translator's creativity in finding equivalent expressions should be consistent with the reader's assumptions about the context and his ability to infer the relevant message from it. (p: 108)

In the following sections, we will attempt to examine some of the difficulties and experiences encountered in translation with regard to syntactic arrangement, content and style. The focus will be directed towards the three main issues involved in any written material namely:

1. syntactic equivalence;
2. lexical equivalence and
3. Stylistic equivalence:

0.1. Syntactic Equivalence

It is important at the outset to understand that any language is a list of items and concepts combined by a set of rules that coordinate and monitor any modifications on them. This, of course, includes technical translation as sub-system of language in general. Therefore, the same set of rules can be applied to both general and specific. The job of the translator, however, is to transfer the message from the SL to the TL language by rewriting it according to TL grammatical rules. But, the translator may sometimes fail to do so adequately. That is not because of the lack of command of the TL but rather due to difficulties and ambiguity in the structure of the SL.

The use of passive, for instance, is a common characteristic in English scientific, academic and technical writing and it is a preferred syntactic device in technical style. "The choice of the passive enables attention to be focused on the effect or result of an action which in science and technology almost always more important and therefore of greater interest to the reader of a technical text than knowing who or what performed the action" (Sager 1980 p:209). Although Sager is right about the role of the passive voice in building the syntactic structure and in conveying the message, it can be pointed out that it is sometimes necessary to know the agent i.e, who or what performed the action using the passive voice. For instance, it is generally important in descriptive and instructive writing to mention 'who' or 'what' performed the action as in the following example:

Example 1:

The platform is lowered and raised by the hoist crank

It is easier for the translator to deal with passive forms as in this example, than those which are not accompanied by an indication to 'who' or 'what', performed the action. One of the grammatical elements that causes the most difficulty is the distinction in descriptive and in instructive texts, between passives and statives i.e., those structures that on the surface resemble the passive in that they consist of the verb [to be] plus the past participle [PP]:

Example 2:

a. Passive: *The heat exchanger assembly is lowered from the compartment while resting on the platform.*

b. Stative: *The sensor is housed in a support assembly.*

Translators usually fail to give a right meaning when they cannot distinguish between an indication of activity and description of state. In example 2 the stative 'the sensor is housed' may be wrongly understood to mean that someone has housed the sensor.

Apart from the lexical difficulty in *b* which will be dealt with in subsection 2.2 below, the translation possibilities might come in Arabic as follows:

يتم وضّع المجس داخل تركيبة داعمة

يُوضَع المجس داخل تركيبة داعمة

Regardless the Arabic terms used to translate the statement, the translation might be perceived as an indication of an activity that means the sensor is housed by someone. Hence, an indication of state would be something like:

المجس موضوع (أو مثبت أو محمي) داخل تركيبة داعمة

This means that the sensor is protected in a support assembly:

المجس محمي داخل تركيبة داعمة

Another evident characteristic of the English language would be the use of nominal groups in a condensed manner:

Example 3:

The major refinery products produced by blending are, gasoline, jet fuels, heating oils and diesel fuels.

According to Sager (1980) nominal groups are the most appropriate vehicles of condensed linguistic expression for scientists and technologists who are trained to perceive and consequently to speak about the physical world in terms of concepts, processes and quantifiable units (p:219). Although the arrangement and quality of nominal groups lies in the fact that their information can be expanded by the use of different modifiers, such modifiers sometimes cause serious problems to the translator as in the following example:

Example 4:

The engineer is assembling centrifugal pumps and compressors.

In view of the fact that the translator cannot translate what he does

not understand, such an ambiguous example needs to be inquired about in order to be adequately translated. It is difficult for the translator in this case to decide whether 'centrifugal' refers to both pumps and compressors or to pumps only. Translation possibilities into Arabic can be perceived as follows:

1. يقوم المهندس بتركيب مضخات وضواغط تعمل بالطرد المركزي.
2. يقوم المهندس بتركيب مضخات تعمل بالطرد المركزي وضواغط.

In case there is no indication in the context that can help in disambiguating this sentence, then the translator may consult a dictionary or an expert. Both will confirm that there is centrifugal pumps as well as centrifugal compressors. However, does that mean the problem has been completely solved? Certainly not, because it is not a lexical problem only, but it is obviously a syntactic (structural) as well as a semantic problem related to the intention of the original writer. Therefore, it is a matter which can only be resolved by the original writer. Otherwise, the translator will have no choice other than leaving the sentence ambiguous to the TL reader as in possibility no1 above.

Through this brief discussion, it appears at the outset that equivalence cannot be achieved, or errors may occur if the intention of the writer does not clearly emerge through the syntactic structure.

2.2 Lexical equivalence

The rapid advance in science and technology has resulted in a great development in the language used in such fields. This development is characterized by the continuous creation of new vocabulary and specialized terms that have, in turn, rendered the job of the technical translator more difficult. It is vital in scientific and technical translation to transfer the content meaning of the SL text without any distortion, and to try to convey the ideas with great precision. Finch (1969) insists that this can be achieved through the choice of the right words rather than their arrangement, although he recognizes the influence that grammar and syntax might have on the meaning. He might be right in the sense that "the translator may usually encounter words in texts the meaning of which is quite impossible to discover or declare from the source at his disposal" (Finlay,1971: 145). But, as indicated earlier, in translation in general and in scientific and technical

translation in particular, a word in the SL may be rendered by a phrase in the TL. This phrase therefore, should be arranged adequately to convey the right meaning of the SL word or specialized term. Consequently, TL syntax has a vital role even in the translation of SL isolated words as in the case of translating the term 're-boiler' into Arabic.

Example 5:

Re-boiler غلاية إعادة الغلي والتبخير

Another example would be the word 'instrumentation' which can only be translated into Arabic as follows:

Example 6:

'Instrumentation' آلات القياس الدقيقة

Nevertheless, the work of technical translators reveals that terminology causes the central difficulty and accordingly affects the efficiency of translation. "It is estimated that technical terminology is responsible for 40 to 60% of the technical translator's errors, and that search for the proper terms takes up about 50% of his valuable time" (Sieny 1985 p:155). These high percentages are sometimes attributed to the emergence of new terminologies known as the **'neologisms'**. Neologisms are defined by Newmark (1988) as "the newly coined lexical units that require a new sense". He regards them as "the non-literary and the professional translator's biggest problem". (p: 140)

In addition to neologism, translators usually face among other difficulties confusing technical noun compounds for which dictionaries sometimes do not provide assistance. Trimble (1985) defines noun compounds as "two or more nouns plus necessary adjectives (and less often verbs and adverbs) that together make up a single concept" (p: 130). In order to clarify what has been said, the following are examples that confuse the translator and even the expert in the subject field.

Example7:

1. *Full swivel steerable non retracing tail wheel overhaul.*
2. *Heterogeneous graphite moderated natural uranium fuelled nuclear reactor.*
3. *Split damper inertially coupled passive gravity gradient satellite attitude control system.*(Trimble 1985:133)

Trimble categorizes the above examples as very complex. He states that, "each compound requires a thorough knowledge of the subject matter to be understood and even then number 2 and 3 had to be 'translated' by their writers before their colleagues could understand". Trimble puts the word 'translated' between inverted commas to indicate that the compound noun must be explained or paraphrased by the writers to their colleagues. But, who will explain or paraphrase similar compounds to the translator if experts sometimes face the same difficulty. The translator who is expected to forge equivalents sometimes finds difficulties even in simpler terminology or compounds, for instance ***'metal cutter'*** may indicate two different meanings; a. A cutter made of metal; b. An instrument used to cut metal.

2.1. **Stylistic Equivalence**

As indicated earlier that the intention of the writer cannot be conveyed, unless right words are put or constructed in the right order. That is to say that the information contained in these words cannot be easily comprehended unless they are adequately arranged. Once this is achieved, then the result would normally be a good written language i.e., good style. Sykes (1971) argues that "proper words in proper places make the true definition of style" (p: 105). It is therefore clear that style involves both grammar and vocabulary.

It has initially agreed with Newmark (1988) and Pinchuk (1977) in the principle of equivalent effect as an essential in technical translation and that "emphasis will be placed on the effect on the reader" (Pinchuk 1977 p: 44). Therefore, it can be said that the equivalent effect can only be expressed through adequate style. Style is the carrier of the original writer and the translator's message through the choice of words and their arrangement. This leads to the argument that translation equivalence is dependent upon the intention of the writer that should be conveyed according to TL stylistic norms by the translator. In Other words, for the translation to be accurate, the SL writer's intended effect must appear clearly to the reader of the TL text. Nevertheless, it is sometimes difficult or even impossible for the translator to determine who the intended reader is, since the reader is the essential element in determining style or deciding the level of writing.In other words, the translator must know from the SL text to what kind or level of readers such text is directed in order to control his/her TL text style. However, one of the stylistic problems that nowadays face the translators from English is the

writer's shift from formal to the informal and vice versa. This kind of shift is becoming the habit or the usual practice of not only the ordinary technicians but also the supposed experts. This is generally occurs when those experts write to the nonprofessional or speak to the public. The translator, accordingly, gets confused whether the text targets experts and specialists or the layman. The following example may clarify what has just been said:

Example 8:

The battery

You probably take your car's battery pretty much for granted. In fact, you've probably been ignoring if not totally abusing your battery all summer and getting away with it. But unless you want to be walking that first morning winter hits hard, You'd better re-establish a proper relationship with your battery. Cold absolutely zonks your battery. A standard storage battery produces current on demand through a chemical reaction between the battery plate material and the sulphuric acid in the electrolyte liquid. When a battery is fully charged, there is a high percentage of acid in the electrolyte to react with the plates. Since acid is heavier than water, the specific gravity is high if a battery is in good condition. (Trimble 1985:99)

The above example shows that unless the translator perceives the intention of the original writer, with respect to his intended reader, he/she may not be able to convey information, ideas and consequently effects adequately. Therefore, it can be said that style is the choice of words and their way of arrangement in order to convey messages and intentions which can easily reach the target readers.

3. **Conclusion:**

Aiming at investigating area of possible equivalence in scientific and technical translation, this study has highlighted the role of the three components of syntax, lexis and style. It was argued that the combination of right words and their accurate syntactic arrangement would result in an adequate style through which the writer's message to his intended reader appears clear in the translation. For the translator to fulfil his task, he must be in full collaboration with the subject specialist, in addition to having sufficient knowledge of the subject matter. At the same time, the translator is required to continuously improve and update his knowledge through extensive readings about new industries and technologies.

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