TECHNICAL AND SCIENTIFIC TRANSLATION

4.1 Introduction

The role that technical and scientific translation plays in today's age of information is becoming more important than ever before. This type of translation promotes the most significant technological advances, which remarkably change our lives. Practically, these technological advances have transformed our experiences of basic life aspects such as learning environments and entertainment. The advances would not be possible without translation, the key role of which is sharing technical knowledge. Byrne (2012, p. 1) explains that:

> Virtually every aspect of our lives from education and work to entertainment, shopping and travel has been swept along by a seemingly unstoppable wave of new inventions and technological advances. What many people do not realize is that these inventions and advances are accompanied at almost every step of the way by translation in its capacity as a vehicle for disseminating scientific and technical knowledge.

Tylor (1998, p. 121) explains that the word *technical* includes "scientific disciplines (medicine, physics, astronomy, chemistry, etc.), fields of applied technology (computers, engineering, etc.) and even less obviously 'scientific' subjects such as geography, economics, architecture and the like." The author adds that technical writing is as old as literary writing.

Dickins et al. (2017, p. 230) distinguish between two basic types of technical texts: culturally common technical texts and culturally non-common technical texts. Culturally common technical texts address notions shared by the SL culture and the TL culture. Examples of such texts include natural scientific and mathematical texts. Culturally non-common technical texts, however, do not share basic notions in the SL and TL cultures. Dickins et al. (2017, pp. 230–231) explain that the problems

arising from the translation of culturally common technical texts relate to technical terms and genre. Examples of culturally non-common texts include the Islamic jurisprudence and Arabic traditional grammar.

4.2 Lexical issues and text features

Words used in technical and scientific texts can be a source of difficulty to translators who generally do not specialize in a specific type of such texts. The field of technology and science contains terms that are only understood by professionals.

Dickins et al. (2017, p. 231) explain that technical texts are relatively inaccessible to non-specialist readers due to lexical and conceptual reasons. The authors add that the lexical problems of technical translation arise from using three types of ST terms:

1 Technical terms totally unfamiliar to the lay translator because they are used in technical contexts only
2 Technical terms familiar to the translator because they are used in non-technical contexts but look as if they are being used in some technically specialized way in the ST
3 Technical terms familiar to the translator because they are used in non-technical contexts but do not obviously look as if they are being used in some technically specialized way in the ST

Dickins et al. (2017, pp. 232–234) provide examples of the three types. The following is the first example containing the three types:

الاختبارات الجلدية

وهي ضرورية ومفيدة لدراسة وكشف بعض الإصابات الجلدية {الأرجية1} يلجأ إلى هذه الاختبارات لتعيين وتحديد المواد {المحسسة1} أو الضارة، كما هي الحال في أكزيما {التماس2} وخاصة {المهنية2} وفي {الشرى1} {المعاند1} وفي {الأرج1} الغذائي أو الدوائي وفي حالات {التحسس1} ب {الجراثيم3} و {الفطور2} و {الخميرات2} ومفرزاتها.

TT skin tests

These tests are necessary for the study and investigation of some {allergic1} skin reactions. They are conducted in order to specify and diagnose the {allergenic1} or harmful substances, as for example in the case of {contact2} eczema, especially {occupational2}, in {chronic2} {urticaria1}, and in food or drug {allergies1}, or in {sensitivities1} to {bacteria3}, {fungi2}, or {yeasts2} and their products.

Type one lexical items include

الأرجية allergic, المحسسة allergenic, الشرى urticaria, المعاند chronic, الأرج allergies.

Type two lexical items include

التماس contact, المهنية occupational, الفطور fungi, الخميرات enzymes.

Type three examples are problematic because, as Dickins et al. (2017, p. 234) explain, translators may not recognize them as technical terms and render them depending on their general meaning. The word الجراثيم is translated in the technical sense as *bacteria*. If translators fail to recognize this sense, they would possibly translate it as *germs* and thus render an inaccurate translation.

Dickins et al. (2017, p. 235) add that the conceptual problems related to technical translation arise from translators' unfamiliarity with the knowledge taken for granted by experts. This highlights that translators' familiarity with ST technical terms is crucial for appropriately accounting for technical terms. The word ضَمَنَ used by sharia judges is a technical term that means ordering a party to a litigation to pay certain fees. Unfamiliarity with such terms may lead to translating the term as *include* or *ensured*. إبرة is literally translated into English as *needle*, but the dominant meaning in the medical domain is *syringe*.

Lexical features of technical English

Every field of knowledge uses certain terms that set it apart from other fields. A term can exist in two different domains of knowledge but with one meaning and interpretation for each. Disregarding its meaning in psychology, *depression* can be used in economics to mean a long downturn in economic activity. It can also be used in the weather domain to mean a region of lower atmospheric pressure. Pinchuk (1977, p. 165) lists the features of technical and scientific language as follows:

1 Technical language is a specialized language and, as opposed to ordinary language, tends to become more specialized.
2 Technical language seeks to be economic in terms of using linguistic means.
3 Technical language avoids ordinary language associations and defines terms accurately.

Simple and informative language

Dickins et al. (2017, p. 240) and Tylor (1998, p. 121) say that the language used in English technical texts is informative and characterized by impersonal style.

Use of metaphors

Byrne (2012) explains that metaphors are used in scientific texts to put a concrete name to an abstract concept. Examples of well-known metaphors used in technical texts are *Black Hole* and *Greenhouse Effect*. Metaphors can be used to explain complex processes depending on the readers' existing knowledge.

TABLE 4.1 Technical terms

ST	*TT*
Comparative anatomy	التشريح المقارن
Detergents	المنظفات
Rodenticides	مبيدات القوارض

Terminology

A significant feature of scientific and technical texts lies in the terminology used. Newmark (1988, p. 151) maintains that about 5 to 10% of a given text contains specialized terms. Examples of some technical terms and their translations into Arabic are given in Table 4.1.

Exercise 1: translate the following sentences into Arabic

1 Comparative anatomy studies the similarities and differences in the anatomy of different species.
2 Rodenticides are pesticides which are used to kill rodents.

Facts

A key feature of technical and scientific texts is the presentation of facts. Such texts are objective in nature. Byrne (2012, p. 53) provides the following example:

> The recommended dose is between 50 and 80 mg per liter of water. It can be translated into Arabic as:
>
> الجرعة الموصى بها هي 50 و80 ملليغرام لكل لتر ماء.

4.3 Syntactic features

Tylor (1998, p. 121) says that the grammar of scientific language is complex to the layman because it is influenced by the technical nature of the content. Geoffrey, Greenbaum, Quirk, and Svartvik (1985, p. 1351 as cited in Tylor, 1998, p. 122) explain that technical language "has a higher proportion of complex noun phrases, and a few simple noun phrases as clause subject." The following is an example:

> Two or more atoms joined to form a molecule are represented by . . .

Abstract subjects

Dickins et al. (2017, p. 241) explain that the subjects in technical texts tend to be abstract. Guerra (2000, pp. 93–94) points out that the pronoun *I* is replaced by *we* or passive forms.

Passives

One of the main features of technical English is the extensive use of passive structures (Dickins et al., 2017). Guerra (2000, p. 93) explains that the passive voice is normally used to emphasize the importance of the message.

Use of connectors

Guerra (2000, p. 93) points out that the use of connectors and repetition of key works (mainly nouns) is common in technical texts.

Simple sentences

Byrne (2012, p. 48) explains that simplicity is a key feature of technical texts. The author points out that simplicity aims at reducing the work readers need to do and reducing the risk of misunderstanding. Using simple and declarative sentences can improve the simplicity of technical texts. The following is an example of simple declarative sentences:

> The detector automatically checks the condition of the batteries.
> It can be rendered into Arabic as:
>
> يفحص الكاشف حالة البطاريات اوتوماتيكياً.

Nominalization

One of the distinctive features of technical and scientific texts is the use of nominalization. Dickins et al. (2017, p. 241) provide examples as *accompaniment*, *spread*, *provision*, and *outbreaks*. Hervey and Higgins (2002, p. 180) define nominalization as "the use of a noun which, in the same language or in a TT, could be replaced by an expression not containing a noun." Pinchuk (1977, p. 165) says "The nominalization style is easier to write and its impersonality avoids commitment to tense, unlike the controversial style." Tylor (1998, p. 123) believes that nominalization distinguishes the grammar of technical texts from the grammar of the spoken language. The author points out that technical texts nominalize process and actions as in *The flywheel housing installation position must be ensured*. Tylor explains that the greater nominal content in technical texts means that the lexical density of such texts is higher than that in verbal non-technical texts. Lexical density measures the proportion of lexical words to function words or the proportion of lexical words to the number of clauses in a text. For the first proportion, Tylor (1998, p. 124) quotes Yates (1988, p. 111) example:

> The gaseous products of volcanic activity include water vapour, carbon dioxide, nitrogen, hydrogen, and various sulphur compounds. The most prominent constituent is water vapour.

This extract contains 17 lexical words as opposed to six function words in two clauses. The following text is cited from Oates (1994, p. 5) in Tylor (1998).

> On the school bus going home she whispered in my ear, "That was because of us, wasn't it! – what happened to that woman?"

This extract contains seven lexical words and 16 function words in three clauses.

4.4 Stylistic features

Herman (1993, p. 11) points out that technical writing and technical translation share common stylistic features such as clarity, concision, and correctness.

Clarity

Herman (1993) explains that when the syntactic and lexical features of the source text and target texts are different, clarity necessitates that TL sentences be restructured. Translators here do not merely look up words in a dictionary but rather search for the most appropriate meanings of lexical items and proper structuring of TL texts. Herman (p. 15) remarks that in addition to rearranging the original sentence in the target text, "clarity sometimes requires the use of English terminology with a different degree of specificity than that of the original."

Concision

Herman (1993) notes that translators render wordy first drafts in order to ensure accounting for all ideas in the original texts. The author remarks that technical translators are paid by word; therefore, taking extra steps to deliver concise work is disadvantageous for them. In addition, technical authors are paid because of their knowledge not because of their writing styles, which can sometimes be bad. Some technical texts are not well organized and readers are consequently reminded of previous information through repetition. This type of work is the task of technical translators who can improve concision sentence by sentence.

Correctness

Herman (1993) mentions that correctness in technical translation refers to two things. First, correctness means accurately re-creating the technical terms of the original in the target language. Such re-creation is generally impossible if the technical translator does not have some comprehensive knowledge about the subject matter of the text intended for translation. Obvious typographical and grammatical errors in the original are suppressed if they do not impede comprehension.

Second, correctness means producing accurate target language technical documents despite the mistakes in the original. Common errors in technical papers include "inconsistencies between numbers listed in tables and the conclusions drawn from those numbers" (p. 18). The second sense of correctness here does not sound practical for most translators, especially those working on translation between Arabic and English. Although finding errors related to numbers is an easy task, identifying other types of errors can be impossible for translators who do not have detailed knowledge of technical texts.

Addressing specific readership

Byrne (2012, p. 27) remarks that all technical documents are written for specific purposes as in helping users perform certain tasks, demonstrating a particular concept, or providing sufficient information to allow decision making. Thus, technical documents are considered "task-orientated tools aimed at a particular group or groups of people."

Technical communication is a tool

Byrne (2012, p. 28) explains that the aims of technical documents include "performing a task, understanding a concept and making a decision based on clear facts." Readers read technical texts because they need to perform certain tasks. Technical texts are therefore a tool and a means to an end.

Mixed styles

Technical documents are regularly written by several people. On the one hand, we can find technical texts written by more than one writer, each having a different style of writing. On the other hand, some texts written by a single writer pass through review by various people, such as technical experts, marketing teams, lawyers, and users with changes being made to each version of the document (Byrne, 2012). In such a situation, it is quite natural to find stylistic variations because different writers have different ways of writing.

Translators may find that different terms can be used to refer to a concept. In extreme cases, translators may not be able to translate a certain part of a text "because the style and clarity of the text suddenly deteriorates in comparison to the rest of the document" (Byrne, 2012, p. 29). Similarly, a number of translators can work on a single technical document, particularly those large documents with short delivery deadlines. This highlights that inconsistencies in style must be addressed by editors, senior translators, or lone freelancers.