Proceedings of the 2nd International Conference on Interdisciplinary Humanities and Communication Studies
DOI: 10.54254/2753-7064/22/20231682

Features of English for Science and Technology and Translation Strategies under the Perspective of "Faithfulness, Expressiveness and Elegance"

---- A Case Study of Geological Translation

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Abstract: In the contemporary era, there is a burgeoning trend of intercultural communication among nations, prominently encompassing interactions within the scientific and technological (Sci. & Tech) domain. Within China, there has been a conspicuous dearth in the realm of Science and Technology translation, notably concerning the precise rendition of intricate professional knowledge across specific specialized fields and the requisite translation calibre. This deficiency has been accentuated by the absence of pertinent theoretical frameworks. Within this context, this research delves into the stylistic attributes of English for Science and Technology (EST) and elucidates translation strategies within the framework established by Yan Fu. Initially, the study scrutinizes the distinctive characteristics of EST, encompassing lexicon, syntax, and textual structures. Subsequently, it extrapolates these findings to the domain of Sci. & Tech translation. The ensuing section chronicles the evolution of domestic translation studies, culminating in the exposition of Yan Fu's translation standards-namely, "faithfulness, expressiveness, and elegance". The paper concludes by summarizing the targeted translation strategies for Sci. & Tech translation, encompassing meticulous preparation, the pursuit of precision, and rigorous review and refinement processes.

Keywords: "faithfulness, expressiveness and elegance", EST, translation strategy, Sci. & Tech translation

1. Introduction

Globalization has accelerated remarkably these days, leading to ongoing intercommunion among countries under diverse cultural backgrounds. Effective cross-cultural communication has become a pivotal factor influencing this interaction. Serving as a vital communication bridge, translation plays an exceptionally significant role in the cross-cultural communication process. Presently, intercultural communication takes place across various domains, encompassing science, technology, economics, culture, medicine, the environment, and numerous other disciplines. Among these, the

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interchange of science and technology plays a large proportion in the progress of society and the advancement of civilization.

Nevertheless, compared with literary translation, the domestic study of Sci. & Tech translation is not so well-developed and still has a long way to go. With only a few theories being widely acknowledged by the public, on the one hand, domestic study of Sci. & Tech translation is relatively fragmentary and incomplete, weak in systematization. A consolidated and normative theoretical system is highly and urgently demanded for the instruction of translation practice. On the other hand, most theories are put into the study of Sci. & Tech translation is something so general that it could be applied to various types of text and lack of pertinence without taking the unique stylistic features of Sci. & Tech text into consideration. Among these views coming from different translators, the standard of "faithfulness, expressiveness and elegance" put forward by Yan Fu is usually used for the study of literary translation but seldom seen in essays researching Sci. & Tech translation, despite that initially, it was targeted at translation of Western science and technology in the late Qing Dynasty. Roughly speaking, "faithfulness" demands that the translated text "be faithful to" the original text, accurately expressing the author's idea. "Expressiveness" refers to fluency and coherence, which means that the translated text should be readable without any illogical or obscure content. The last point, "elegance", emphasizes the translator's cultural level, stressing the translated text's literariness. Whereas the application of the three respects is distinct in Sci. & Tech translation and literary translation, deserving further exploration. Given that, based on Yan Fu's translation standard, this paper selects pieces of geological translation to study EST features and Sci. & Tech translation strategies, and summarize general rules for offering theoretical guidance and references for contemporary translators.

2. Analysis of Features of EST

The field of Sci. & Tech employs a normative style of written language, distinct from oral communication, which is utilized by professionals in specific research domains. These domains encompass economics, military science, environmental studies, physics, and various other facets. This style is characterized by its high degree of objectivity, logical structure, precision, and specialization, facilitating the generalization of facts and principles. Furthermore, research in certain domains frequently incorporates knowledge from diverse disciplines, resulting in the synthesis of interdisciplinary frameworks that span multiple fields. The distinctive features of this style can be categorized into two main components: the lexical aspect and the textual aspect.

2.1. Lexical Level

The number of word meanings or degree of specialization used in EST may vary from word to word. Accordingly, they can be classified into technical, semi-technical, and non-technical words [1]. The technical word refers to what can only be used in a certain field. Generally speaking, they only have one meaning, determining that they are not restricted by the context. Technical word has the most accurate and strict meaning. Thus, it can only be employed within a narrow sphere with its exceeding degree of specialization. For the same reason, technical words are in common use in the international community, for example, terms like "graben", "allomorph", and "phenocryst" in geology. Semi-technical word means what appears in multiple fields but has different meanings. Translation of semi-technical words requires the translator to conduct a comprehensive analysis cautiously according to the context. Certainly, in a medical context, "Waterhead" denotes a condition resulting from an excessive accumulation of cerebrospinal fluid within an encephalocoele. Conversely, within the field of hydrology, it pertains to the specific energy per unit weight of water at a given cross-section of a water body. Another illustrative example is "cleavage", which signifies

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the rapid division of the fertilized ovum during early developmental processes in biology while also denoting a material property in mineralogy, specifically the tendency of a crystalline mineral to fracture along specific directions when subjected to external forces. The semi-technical word frequently appears in EST, one of the most key and difficult points for translation. Non-technical words are some general words used in our daily lives. Most of them play a functional role and can be used in all kinds of text. However, when appearing in the Sci. & Tech text, they are much more formal and normative [1].

Apart from the slather of terminology, it is also a prominent feature of EST to use substantial derivatives and abbreviations. During the conversion of information, expressions do not necessarily exist that have an entirely consistent implicature in both languages. To figure out the issue, translators often exert their creativity to create new derivatives based on the original core word by means of roots and affixes word-building to convey the author’s idea precisely [2]. Common roots and affixes are auto-, bio-, re-, -logy, -meter and the like. Abbreviations are used to simplify the expression of the idea. Usually, they are formed by selecting the initial letters of a phrase to constitute a new word, for example, MAC (abbreviation of Mobile Element Absorption Coefficient), DELP (abbreviation of Dynamic and Evolution of the Lithosphere Project) and ECD (abbreviation of Equivalent Circulating Density). In geological articles, some words that express geologic age, geological structure and the mineral component can be abbreviated to clipping words, for example, O (short for Ordovician), calc (short for calcareous), mdst (short for mudstone) and max (short for maximum). One thing that needs to be paid attention to is that polysemy is prevalent among them.

Given what has been mentioned above, words in EST are featured with a high degree of specialization and accuracy, while some words also work as functional words.

2.2. Textual Level

In the book Approaches To Translation, Peter Newmark put forward the renowned theory of Text Typology, classifying texts into expressive, informative and vocative text based on their functions. Sci. & Tech text discussed in this paper belongs to the informative type [3]. Informative text aims to express information, emphasizing the content’s faithfulness and the narration’s logicality. Moreover, precise sentence structure and objective attitude are embodied, along with clear and fluent expression and formal diction in between the lines.

The text features of EST can be examined starting with their passage and syntax aspects. At the passage level, EST exhibits a notable level of specialization. Consequently, it often incorporates numerous charts, statistics, or formulas to provide comprehensive and visually informative representations of the research subject. This particular attribute places significant demands on the preparatory work required by translators. Regarding the syntax level, several key aspects merit further investigation in the subsequent section.

2.2.1. High Objectivity

In EST, sentences, for the most part, are impersonal, and passive voice is widely used to avoid subjective assumptions. For example:

An appraisal of the advances in wind tunnel test techniques can be readily obtained by comparing modern wind tunnel facilities with their historical predecessors [4].

The inanimate subject can highlight the research subject and experiment conclusion to some extent, reinforcing scientificity and preciseness. Additionally, few rhetorical devices may appear in EST for the faithfulness of narration and the concealing of personal feelings.

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2.2.2. Frequent Occurrence of Complicated Sentence

For the succinctness and explicitness of the expression, compound sentences with multiple modifiers and determiners may exist frequently. For example:

Einstein's equations indicated that when a star several times larger than the sun exhausts its nuclear fuel and collapses, its matter crushes together at its center with such force that it forms a singularity, an infinitely dense point with no dimensions and irresistible gravity [5].

The trunk of the sentence is that "Einstein's equations indicated that", followed by an object clause, in which an adverbial clause and appositive and another object clause inferior to them appear. Despite the frequent occurrence of complex sentences, which can potentially result in a somewhat tedious style and consequently lead to comprehension challenges, this remains one of the most prominent and ubiquitous characteristics of English for specific purposes.

2.2.3. Universality and Regularity

To represent objective phenomena or general rules, EST often adopts simple present tense, while sometimes past tense will also be used in cases of reviewing experimental processes or summarizing predecessor's research. Generally speaking, it can be more intuitional of simple present tense to reflect the regularity of scientific facts, the existential state and the essential attributes of object [6].

3. Sci. & Tech Translation

Translation work is inseparable from the text's style of language. According to different types of text, the translator must refer to different translation standards and abide by different criteria. The translation of the Sci. & Tech text differs fundamentally from literary translation in both method and strategy, given its specific object of focus.

Domestic Sci. & Tech translation study can be traced back to the Han Dynasty. Despite not having become an entirely independent subject, the translation of Buddhist scriptures during that period encompassed various aspects of natural science, including art, philosophy, medicine, and the calendar. This was in addition to its primary purpose of disseminating religious teachings and fostering intellectual enlightenment [7]. Translation activities during this period covered a wide range of matters affecting all aspects of lives, while the study did not explore in depth but just stayed still on the surface. In the Ming and Qing Dynasties, under the occasion of dual pressure of both domestic turmoil and external aggression, Chinese people strove painstakingly for the nation's security and rejuvenation. Translation for Western Sci. & Tech text reached a climax with a blooming of renowned translators like Yan Fu, Lin Zexu and Xu Guangqi. From then on, study on Sci. & Tech translation flourished vigorously with increasingly more theories, and a system of pragmatic translation totally different from literary translation then came into being. Evaluation of translated Sci. & Tech text extended out of the former fixed framework, carrying forward new criteria and measuring dimensions [7].

Through the ages, scholars studying translation have put up with numerous translation theories about principle, purpose, process and many other aspects, enriching the connotation of the discipline and offering scientific guidance for contemporary translating practice activities, for example, "understand thoroughly and then apply properly to surpass others" put forward by Xu Guangqi, and "learning from others to defeat others" addressed by Lin Zexu. Nevertheless, most of these early assertions are mainly targeted at literary translation but do not match appropriately with the focus of the pragmatic text. Therefore, they are difficult to put into the translation practice of EST text. Until the late Qing, Yan Fu put the translation standard pursuing "faithfulness, expressiveness and elegance", which can instruct literary translation and be employed in other types

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of practical text. It is regarded as one of the pioneer theories of Sci. & Tech translation, and has a profound influence on later scholars. Actually, coeval British translator Alexander Tytler also had the same idea as Yan Fu by coincidence in his famous point of view, "three principles of translation" (namely, "the translated text must convey the thoughts of the original text completely", "the style and attitude of the translated text have to be in same with the nature of the original text" and "the translated text need to be as fluent as the original text") [8]. This paper's topic is to explore EST's translation strategies under the perspective of "faithfulness, expressiveness and elegance" by examples of geological translation and conclude a set of scientific and systematic EST translation theories.

3.1. Translation Standard

In the translation of the introductory remarks of the Evolution and Ethics, Yan Fu put that there are three aspects of translation difficulty, namely faithfulness, expressiveness and elegance. Faithfulness is already hard to approach, while casting aside expressiveness to pursue faithfulness is meaningless. Thus expressiveness is equal crucial [9]. Among them, "faithfulness" means that the translated text should seek for reality and accuracy, being faithful to the original text without any addition or omission. "Expressiveness" refers to the fluency and smoothness of the translated text. "Elegance" requires the decent diction of translation, which can reveal the literariness of language. Initially, these standards were directed towards scientific and technical translation. However, due to their wide applicability, they have evolved into one of the predominant theories within the translation field, encompassing various types of texts. This paper aims to investigate the implications of Yan Fu's translation standards within scientific and technical translation, focusing on different genres.

First and foremost, faithfulness is what should be given priority to during the translation of EST. Characterized by a high degree of professionalism and technical expertise, EST establishes elevated standards for faithfulness. Consequently, translators are required to meticulously refine and enhance the translated content, prioritizing unwavering fidelity to the source material to prevent any potential distortion or loss of information resulting from personal assumptions.

Second, whether the translated text is fluent and natural is another critical factor. Sometimes, there are some popular Sci. & Tech texts that not only offer service for professionals but also function as educational readings for ordinary people which needs translators to pay attention to the readability and straightforwardness of the translated text. Translation of these texts should not merely be word for word and sentence for sentence; instead, the translator should first grasp the main idea of the original text and then deliver this information according to idiomatic expressions of the target language for better coherence and cohesion.

Last but not least, the quality of the translated text not only lies in the level of the original text but also greatly depends on the literary skills of the translator. In fact, culture-specific vocabulary seldom appears in the domain of EST translation. This notably reduces the challenges in translation, in contrast to literary translation, as it is not dependent on cultural context. Nonetheless, translators must strive to maintain the linguistic style of the source text to the extent possible, without entirely forsaking its literary qualities. Unlike typical literary texts, the literary aspect of EST translation primarily manifests through sophisticated and elegant expressions [10]. For example, the sentence shown in the former part:

Einstein's equations indicated that when a star several times lager than the sun exhausts its nuclear fuel and collapses, its matter crushes together at its center with such force that it forms a singularity, an infinitely dense point with no dimensions and irresistible gravity [5].

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(Translation: 爱因斯坦的方程式表明，当一个比太阳大数倍的星体耗尽了自身的核燃料而坍塌时，它的物质以雷霆万钧之力在其核心部位挤在一起，从而形成一个奇点；这一奇点没有维度，却具有无限的密度和不可抗拒的引力。)

This sentence is a typical complicated sentence, including multiple modifiers of the adverbial clause, appositive, and more. The translated text was divided into parts properly and conveyed the original idea concisely after reorganization, reflecting the particular literariness of EST translation.

3.2. Translation Strategy

The translation is an activity of mind and a multilevel and multidimensional interlingual conversion [7]. Therefore, translators should not only accumulate experiences from practice but also read up on the works of renowned translator to follow suit and improve themselves. For higher quality of the translated text, there are several points that translators are expected to take care of.

3.2.1. Fully Prepared to Better Understand the Text

EST is highly professional and precise, requiring the translator to gain deep insight into relevant field knowledge in advance, make full preparation and grasp the fundamental principles. Drawing arbitrary conclusions based on speculation is highly irresponsible when translating text. When encountering unfamiliar content, it is advisable to consult references or seek assistance from experts. A thorough understanding forms a strong basis for clear expression. Analyzing the author's thought process enables a more effective bilingual conversion and facilitates information transmission. One thing that is worth noting is that polysemy caused by semi-technical words is one of the most abstruse parts of EST translation; thus, the translator must be especially alert to verify its meaning in order not to make mistakes.

3.2.2. Be Flexible in Rewriting, Concentrating on Functional Equivalence

Translation should be faithful to the original text; while in the meantime, creativity is also essential in that process. It does not mean that the translator can alter the original expression arbitrarily. Actually, the translator should not be confined to the original syntactic structure but can restructure this information with a creative mind to make the translated text fluent and easy to understand. For example, the translation of frequently complicated sentences requires a clear comprehension of its inner logical connection, which demands the translator to analyze the sentence structure first and then find the primary and secondary messages separately to rewrite the sentence. Furthermore, the translator should gain deep insight into the discrepancies between Chinese and Western culture in syntactic structure and expressing habit in order to endow the translated text with higher readability based on accurate information transmission. That also reflects the priority to functional equivalence rather than simple formal equivalence in EST. On the one hand, flexibility is highly recommended to avoid the obscurity and stiffness of the translated text; on the other hand, the translator can never run counter to the author's idea or even gild the lily [10].

3.2.3. Re-check and Polishing

Review and processing after translation is of considerable importance. During the transfer of language from one culture to another, losses or changes are exists undoubtedly, which may cause the distortion of the original text [11]. Translators of EST must cultivate a rigorous and practical style to ensure the veracity of their works, conveying information properly and accurately.

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4. Conclusion

Translation is an art of communication. As the linguist Ke Ping once said, communication refers to the process the translator express his understanding of information to receivers properly and naturally. In spite that EST belongs to pragmatic text for transmitting information, “faithfulness, expressiveness and elegance” is still crucial in its translation. The translated text should be faithful and fluent, reflecting the literariness without losing its unique accuracy feature. Accordingly, translators are supposed to prepare fully in advance, rewrite the text with flexibility in translation and review the translated text afterwards. This paper summarizes these rules mentioned above by studying some geological essays, whereas there are still several shortcomings due to a lack of experience. For instance, the material selected is inadequate, and the study is not thorough enough, requiring further complement and improvement.

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