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Reflection on Translation Techniques of Sci-Tech Text

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Abstract: ***Sci-tech text is specialized written materials that focuses on technical content and serves as essential vehicles for knowledge dissemination. It encompasses various forms, such as scientific research papers, technical reports, popular science books, scientific information, and scientific news, tailored for diverse target audiences. These texts predominantly employ narrative, explanation, and argumentation to summarize, communicate, promote, popularize, and disseminate the characteristics, essence, and laws of specific phenomena within the realm of natural sciences. Consequently, in sci-tech translation, the translator needs to master the language characteristics and adopts some relative translation techniques, such as shift of voices, rewriting and restructuring, so as to make the translation align with the reading habits of the readers. This article aims to explore and analyze sci-tech texts, ensuring utmost accuracy and consistency in translation, facilitating the cross-linguistic and cross-cultural dissemination of scientific knowledge, fostering scientific communication and collaboration, and laying a solid foundation for future advancements in the field of sci-tech translation.***

Keywords: Sci-tech text; language characteristics; translation techniques; sci-tech translation.

1. INTRODUCTION TO SCI-TECH TEXT

He Sanning (2011) noted that scientific and technological discourse represents a distinct form of informative language characterized by objectivity and scientific rigor. Its content is definable, comparable, measurable, and verifiable, and is distinguished by its unique lexicon, syntax, and stylistic qualities[1]. Scientific and technological text can be classified into two main categories: specialized and popular. Specialized scientific text includes monographs, conference papers, scientific reports, while popular scientific text primarily refers to science literature aimed at a broader audience. These texts manifest in various forms, such as scientific writings, research papers, reports, experimental findings, and plans. Additionally, they encompass different types of scientific information and textual materials, technical manuals detailing the description and operational procedures of equipment, machinery, and tools, discussions, meetings, and conversations related to scientific and technological topics, as well as relevant audio and video resources. The primary focus of these texts is to convey information pertaining to technology, products, industries, policies, and development trends within the field of science and technology.

In the realm of language, there exists a specialized form known as English for Science and Technology (EST). EST refers to the usage of English in scientific literature, research papers, textbooks, technical reports, and academic presentations within the fields of natural sciences and engineering. It includes all written and spoken language that discusses or relates to technology. Specifically, EST is the language used in the domain of science and technology, serving as a specialized means of describing and communicating knowledge, technology, and the latest developments within this field. EST finds wide application across various aspects of the technological realm, including but not limited to scientific research, engineering technology, product design, marketing, and scientific news reporting. The language used in EST often involves the utilization of specialized terminology and technical language, necessitating readers to possess a certain level of scientific background and specialized knowledge in order to comprehend and engage with the content effectively.

2. CHARACTERISTICS OF SCI-TECH TEXT

He Sanning (2011) proposed that as widely recognized, one of the hallmarks of scientific and technological text is its intricate and verbose sentence structures, which also present a formidable challenge in the field of translation[2]. Scientific and technological text, in contrast to other literary works, requires the utilization of technical language and specialized terminology, with language expressions that must be concise, accurate, and supported by reliable data, extensive evidence, and well-defined conclusions. Thus, the characteristics of scientific and technological texts determine the distinctiveness of their writing language. In addition to the general traits of well-crafted academic writing, such as precise word choice and coherent sentence structures, scientific and technological texts should also embody conciseness, naturalness, and adherence to professional standards. Wu Yaowu and Lu Shan (2014) claimed that scientific and technological texts span various domains within the natural and social sciences, each exhibiting its own distinctive stylistic features[2]. The composition of scientific and technological texts necessitates precision, rigor, and clarity, with the ultimate aim of effectively communicating accurate scientific information and knowledge. Throughout the writing process, authors must possess an in-depth understanding of relevant knowledge and information within the field of science and technology. They must also select appropriate expressions and language styles based on the needs and background of their target audience, avoiding the use of ambiguous, vague, or exaggerated language. Additionally, authors must pay meticulous attention to the structure and organization of the text, ensuring a logical presentation

of information that enables readers to swiftly access the required information and enhances the readability and comprehensibility of the text. The primary characteristics of scientific and technological text can be summarized as follows:

Firstly, it includes knowledge, techniques, and the ever-evolving dynamics in the field of technology, which require the usage of specialized terminology and technical language, demonstrating a significant level of expertise and technicality. Secondly, the content of sci-tech text is usually intricate, demanding precise descriptions of information related to technological products, principles, regulations, and other relevant aspects. Thus, the accuracy of the text holds paramount importance. Thirdly, it must adhere to specific norms and standards, strictly following the terminology, symbols, and regulations within the realm of science and technology. This ensures the accuracy and readability of the information presented. Fourthly, sci-tech text often encompasses various facets of technology domain, including scientific research, engineering technology, product design and so on. Consequently, readers are required to possess a certain level of technological background and specialized knowledge in order to comprehend and apply the content effectively. Fifthly, the language style employed in sci-tech- text is typically formal and serious, avoiding the use of exaggerated, ambiguous, or emotionally charged language. This is done to guarantee the accuracy and readability of the information conveyed. In summary, scientific and technological text is characterized by its professionalism, precision, rigor, technicality, and serious language style. The ultimate purpose is to effectively communicate accurate scientific information and knowledge.

He Sanning (2011) indicated that there is no fundamental difference between scientific and technological English and other forms of English. It inevitably possesses the characteristics of the English language[1]. Scientific and technological English is different from ordinary English in that it does not possess emotional or imaginative thinking, aiming to make the readers understand easily without generating too much imagination. It does not frequently employ rhetorical devices such as metaphors, parallelism, or exaggeration. Instead, it focuses on accurately expressing objective laws and describing problems with clear logical thinking. Wu Yaowu and Lu Shan (2014) stated that generally speaking, scientific and technological English has distinct characteristics in terms of vocabulary and syntax[2]. Scientific and technological English is primarily a written language that requires rigor and conciseness without the use of elaborate language or consideration for oral recitation. Besides, in terms of grammar structure, the passive voice is extensively used in it, which reduces subjectivity, enhances objectivity, and makes sentences as concise as possible by omitting the personal subject. Scientific and technological English has the following characteristics:

Firstly, its expressions are usually concise and clear, avoiding verbosity and unnecessary words, in order to help readers better understand and grasp the required knowledge and information. Secondly, it requires strict adherence to standardized grammar, spelling, and symbol rules to ensure the accuracy and readability of information. Thirdly, it is an important language for international scientific and technological communication, with an internationalized character. It often uses standardized terminology and symbols to facilitate effective communication and collaboration among scientists and scholars from different countries and regions. In summary, scientific and technological English is characterized by conciseness, standardization, and internationalization. Therefore, translators should focus on conveying information and employ appropriate translation techniques when translating scientific and technological texts.

3. TRANSLATION TECHNIQUES OF SCI-TECH TEXT

Luo Jianhua (2011) proposed that sci-tech translation emphasizes functionality, and the translation strategies can be guided by principles and methods derived from functional translation theory[3]. Scientific and technological genres value precision, accuracy of concepts, strong logic, concise writing, emphasis on key points, well-structured sentences with minimal variations, and the use of prepositional statements to frontload important information. Zeng Lisha (2002) argued that in sci-tech translation, translators should adhere to the concept or principle of enlightening the readers, which is determined by the purpose of the translation and the specific requirements of the target readers[4]. Besides, Luo Jianhua (2001) noted that the content of sci-tech texts often reflects industry-specific knowledge in various fields. As the saying goes, “It’s as difficult as crossing a mountain for those who are not in the field.” This industry-specific knowledge is often obscure and difficult to understand for translators and many readers, which increases the difficulty of translating scientific and technological texts[3]. Moreover, Cao Shanke and Ma Xian (2008) pointed out that in sci-tech translation, a precise understanding of the semantic meaning of the source text is crucial. It depends not only on the translator’s knowledge and understanding of scientific and technological terms but also on the context and the translator’s knowledge schema[5]. The characteristics of sci-tech texts in terms of language structure include clarity, accuracy, conciseness, and precision. Therefore, it is important to handle these language characteristics and adopt appropriate translation techniques such as shift of voices, rewriting and restructuring in sci-tech translation.

3.1 Shift of Voices

According to John Swales from the University of Leeds, at least one-third of the predicates in scientific English are in the passive voice. This is because scientific articles focus on narrative reasoning and emphasize objectivity and accuracy. The excessive use of first and second person pronouns can create a subjective impression. Therefore, it is preferable to use the third person narrative and passive voice. Liu Dingjia and Wang Kefei (2020) cited that the passive voice in English and Chinese cannot be expressed in a fixed and equivalent form, which poses translation difficulties[6]. In addition, Yang Hong (2020) stated that the core of the English passive structure is the patient, along with the theme introduced around the patient and the action

exerted on the patient. Chinese emphasizes the theme and usually uses topic sentences[7]. According to the above, the translation technique of shift of voices can be adopted.

Example 1:

Source Text: Attention must be paid to the working temperature of the machine.
Target Text: 应当注意机器的工作温度。

Example 2:

ST: The forces due to friction are called frictional forces.
TT: 由于摩擦而产生的力称之为摩擦力。

Example 3:

ST: A call for paper is now being issued.
TT: 征集论文的通知现正陆续发出。

Example 4:

ST: The results obtained must be cheeked.
TT: 获得的结果必须加以校核。

Liu Dingjia and Wang Kefei (2020) indicated that passive structures in English can be translated into various forms in Chinese, including passive structures, active structures, beneficiary subject structures, and dispositional structures. They can also be translated into forms such as nominalization, pseudo-nominalization, verb-object structures, noun structures, and adjective and adverb phrases[6]. Additionally, as mentioned earlier, scientific articles often prioritize the main information and place it in the subject position. This is a major reason for the extensive use of the passive voice. He Sanning (2011) emphasized that it is important to note that in scientific translation practice, translators need to consider the reading habits of the target audience[1]. Therefore, shift of voices is employed in Example 1 to Example 4 to unleash the translator's subjectivity and agency.

3.2 Rewriting

Scientific and technological articles demand concise and tightly structured writing. For this reason, participle phrases are often used instead of relative or adverbial clauses, participle independent structures instead of adverbial clauses or coordinate clauses, infinitive phrases instead of various clauses, and prepositional phrases instead of relative or adverbial clauses. These substitutions serve to shorten sentences while maintaining prominence. Ji Kefu and Hu Weiping (2009) proposed that the primary objective of scientific translation is to ensure accuracy and clarity of meaning. "Accuracy" requires the translated text to faithfully reflect the informational content of the original text, leaving no room for error. On the other hand, "clarity of meaning" allows for some degree of rewriting in order to convey the information more fluidly and effectively[8]. Besides, Hong Wei and Yang Yue (2014) suggested that it should be noted that the main body of the text should not be altered arbitrarily due to the specialized nature of scientific texts[9]. Accordingly, rewriting the original content is necessary in order to reflect the linguistic characteristics of scientific texts.

Example 5:

ST: Radiating from the earth, heat causes air currents to rise.
TT: 热量由地球辐射出来时，使得气流上升。

Example 6:

ST: A body can more uniformly and in a straight line, there being no cause to change that motion.
TT: 直流电是一种总是沿同一方向流动的电流。

Zeng Lisha (2002) claimed that the purpose of sci-tech translation is to "convey scientific information or intelligence," and the achievement of this purpose has a characteristic of immediacy[4]. Moreover, Liu Wei and Liu Lu (2022) stated that logic can be considered the lifeline of scientific translation, and translators should highlight rather than weaken the logical structure of the original text[10]. Therefore, rewriting is adopted in Example 5 and Example 6 so as to make the translation more fluent and readable.

3.3 Restructuring

Liu Wei and Liu Lu (2022) pointed out that English scientific writing is influenced by Aristotelian deductive logic, relying on explicit connections, emphasizing analytical reasoning, and developing ideas around a central theme in an organized and hierarchical manner. In terms of information arrangement, it starts with a clear introduction, progresses from near to far, and tends to have longer introductions and conclusions. English scientific writing excels in clearly distinguishing main and subordinate clauses, utilizing a mix of long and short sentences, and employing various grammatical tools such as subordinate clauses, appositives, and conjunctions to achieve a rigorous writing style. This is in stark contrast to the Chinese writing convention of "peeling bamboo shoots layer by layer" [10]. Compared to the syntactic characteristics of general literary genres, a prominent feature of scientific texts is the predominance of long sentences. The core reason for this is the extensive use of post-modifiers, which is also one of the characteristics of scientific articles. To handle such texts, the main translation technique is restructuring or word order adjustment.

Example 7:

ST: In radiation, thermal energy is transformed into radiant energy, similar in nature to light.
TT: 热能在辐射时，转换成性质与光相似的辐射能。

Example 8:

ST: The heat produced is equal to the electrical energy wasted.
TT: 产生的热量等于浪费了的电能。

Example 9:

ST: During construction, problems often arise which require design changes.
TT: 在施工过程中，常会出现需要改变设计的问题。

Wu Yaowu and Lu Shan (2014) cited that sci-tech translation should not only transform the content but also appropriately convert the stylistic features of the original text[2]. Moreover, Yang Hong (2020) asserted that in English, complex sentences often express multiple details within a domain of events, typically forming a collection of subordinate clauses. These clauses are connected using conjunctions and time-related grammatical forms that syntactically represent the concept of time, without necessarily relying on word order. In contrast, in Chinese, events are typically presented first, followed by evaluations or comments on those events, with the sentence order usually arranged in a narrative-before-expressive pattern[7]. Therefore, based on this characteristic, the translator adopts restructuring technique to make the translation more authentic and natural.

4. CONCLUSION

In scientific English, there are often many long and complex sentences, as well as the frequent occurrence of numbers, data, formulas, equations, molecular formulas, various symbols, marks, and diagrams. All of these elements should be accurately reproduced in the translation. A small mistake can lead to a significant error, especially in scientific translation. Therefore, it is necessary to apply the specialized knowledge and adopt techniques related to scientific translation. Research on translation techniques of sci-tech text is of great significance in ensuring accuracy and consistency, improving translation efficiency, promoting scientific progress and innovation, as well as facilitating cross-cultural communication and understanding. This will contribute to the development of the scientific field and the advancement of global cooperation. However, in the actual translation process, excelling in these areas alone is not enough. It requires translators to continuously accumulate experience and explore repeatedly in order to become outstanding professionals in the field of scientific translation.

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REFERENCES

[1] He Sanninng. Looking for Beautiful Lines: A New Perspective of Translation Strategy of Science and Technology[J]. Shanghai Journal of Translators, 2011(03):29-32.
[2] Wu Yaowu, Lu Shan. Over-translation and Under-translation in Scientific Text and Its Avoidance Strategies[J]. Journal of Xi'an International Studies University, 2014, 22(01):119-121.
[3] Luo Jianhua. The Effect of Thinking Mode on English-Chinese Translation of Scientific Texts from the Perspective of Functional Translation Theory[J]. Foreign Language and Literature, 2011, 27(S1):54-57.

[4] Zeng Lisha. The Difficult "Carbon-based Predecessor": Discussion on the Principle of "Puzzle-solving" in Sci-Tech Translation[J]. Journal of Guangdong University of Foreign Studies, 2002(02):51-54.
[5] Zeng Shanke, Ma Xuan. Reflection on Semantic Problems in Sci-Tech Translation[J]. Foreign Languages and Their Teaching, 2008(09):48-50.
[6] Liu Jiading, Wang Kefei. The Translation of Passive Constructions from English to Chinese: A Multi-Variate Study Based on Big Data[J]. Technology Enhanced Foreign Languages, 2020(01):45-52+7.
[7] Yang Hong. On the Characteristics and Translation of Fintech English[J]. Chinese Science & Technology Translators Journal, 2020, 33(04):31-34.
[8] Ji Kufu, Hu Weiping. Rewriting: A Practical Skill in Sci-Tech Translating[J]. Language and Translation, 2009(01):43-46.
[9] Hong Wei, Yang Yue. Re-reading Lu Xun: Reflection on the Translation of Lu Xun's Early Sci-Tech Texts and Scientific Novels[J]. Chinese Translators Journal, 2014, 35(02):39-43.
[10] Liu Wei, Liu Lu. Reflection on Strategies for Translating Sci-Tech Texts from Rhetorical Perspective[J]. Chinese Science & Technology Translators Journal, 2022, 35(01):5-8.