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A Report on the Translation Practice of Hazards of "Chromium Pollution and the Trends and Prospects of Bioremediation" from English to Chinese

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Abstract

Chromium is a significant strategic metal resource that is extensively utilized in industrial production, encompassing electroplating, welding, dye manufacturing, and so on, thereby turning it into a serious environmental pollutant. With the rapid advancement of industry and urbanization, the damage to the ecological environment caused by heavy metal chromium has been escalating, thereby posing a threat to humanity itself. Hence, research on the remediation of chromium pollution has consistently been the focus in the domain of heavy metal pollution control. Numerous scholars both domestically and internationally have been dedicated to achieving the governance of chromium pollution through biological remediation technology, generating a considerable amount of literature reports. This translation report selects two environmental engineering texts related to chromium pollution biological remediation, respectively introducing the health hazards of chromium, the research progress of the molecular mechanism of chromium biological remediation, and the current trends and prospects of the biological management of hexavalent chromium. In this report, representative cases from the original texts are chosen, and case analysis is carried out using the Skopos Theory—the skopos rule, the coherence rule, and the fidelity rule—based on the viewpoint of Skopos Theory of Translation and integrating the practice of translating scientific and technical texts. In order to achieve the translation objectives of "accuracy" and "professionalism", it examines the challenges, solutions, and methods involved in actual translation. There are numerous sentences in the original text that describe research results. These sentences have distinct viewpoints and a considerable number of specialized terms, demanding high accuracy and professionalism in the translation. Based on the Skopos Theory, the translator adopted the translation skills of amplification, omission, and lexical conversion. To ensure that the translation is both faithful to the original and in conformity with Chinese expression habits, the translator employed the techniques of sentence dissection and reorganization and made adjustments to achieve smooth connection and logical coherence. Regarding the translation of specialized terminology names, the translator fully respected the thoughts and intentions of the original author and adopted the translation methods of literal translation and liberal translation in accordance with the requirements of the fidelity rule. This report commences from the perspective of Skopos Theory and, through specific instances, proposes corresponding translation methods, aiming to enhance the translator's own ability to translate scientific and technical texts and simultaneously provide some valuable references for translators engaged in the translation of scientific and technical texts.

Keywords

Scientific Text; Chromium Pollution; Bioremediation; Skopos Theory

1. Introduction

This report is based on two essays, respectively on "chromium health hazards and molecular mechanism of chromium bioremediation", and "the current trends and prospects of the biological management of hexavalent chromium". There are three sections to this chapter. To provide readers with a general grasp of this practice, it first provides the history of the translation process before going into detail on the importance of translating the selected books. This chapter also provides a quick illustration of the primary report structure.

1.1 Description of the Translation Task

China is an important industrial manufacturing base in the world. With the acceleration of industrialization, the extensive use of chromium in industries such as metallurgy, leather, and electroplating caused serious environmental pollution. Chromium mostly exists in the form of Cr (III) and Cr (VI) in the environment, of which Cr (VI), with high toxicity and strong oxidation, poses a huge threat to ecosystems and human health. Chromium pollution in China mainly occurs in industrial towns and industrial sites, where a large amount of chromium-containing wastewater and waste are not up to the discharge standard or are even untreated before discharge, causing widespread chromium pollution.

This translation project discussed the toxic effects of Chromium and the molecular mechanism of chromium bioremediation. These two essays are typical science and technology texts with a concise, clear, rigorous, and objective style, a large number of passive sentences and complex sentences, as well as rich contextual information, professional terms, and graphics related to chromium pollution. Thus, these can be defined as Sci-tech English texts.

Sci-tech English closely combines English and professional knowledge, and uses professional language to explain objectively existing things or facts (Han, 2007). Generally, Sci-tech English refers to English used in scientific works, essays, textbooks, scientific reports, and academic lectures in natural sciences and engineering. In summary, the translation of EST should conform to the following requirements: firstly, concise and accurate wording; secondly, be faithful and well-structured; thirdly, strict logic and appropriate context; fourthly, numerous and exclusive terms.

1.2 Significance and Purpose of the Translation Report

In recent years, with the further strengthening of China's industrial structure adjustment and increasing environmental protection requirements imposed by regulatory bodies, numerous small-scale enterprises that produce chromium chemicals or engage in tanning and electroplating have been closed down or relocated. Many such businesses were trapped by outdated technologies, making them uncompetitive while failing to meet pollution control standards. As a result, these closures have led to abandoned sites filled with chromium waste piles, and the legacy left behind by these shuttered enterprises can leach into surrounding ecosystems if not properly managed. Furthermore, severe ecological degradation and adverse effects on human health can be caused.

The 2014 National Soil Quality Survey Report of China reported that chromium pollution exceeded the maximum level allowed by GB 36600—2018 (3 mg/kg) and posed a threat to public health and food safety, becoming a more prominent environmental issue. Due to its strong oxidation, mutagenic, carcinogenic, and teratogenic effects, chromium is listed as a priority pollutant by the USEPA (US Environmental Protection Agency) and one of the top five heavy metals controlled in China. The State Council's Action Plan for Soil Pollution Prevention and Control clearly proposes to focus on monitoring heavy metals such as chromium in soil and comprehensively rectify chromium contaminated sites (Wang et al., 2020). Therefore, the restoration of chromium-contaminated sites has increasingly drawn attention from both domestic and international scholars, and numerous reports have been published on chromium pollution remediation. This translation practice selects two texts on the hazards of chromium pollution and bioremediation technology, with the aim of providing a scientific basis and reference advice for chromium pollution control, and raising the environmental awareness of enterprises and relevant professionals.

2. Translation Process

There are three sections to this chapter. To provide readers with a general grasp of this process, it first provides the background of the translation practice before going into detail on the importance of translating the selected text. This chapter also provides a quick illustration of the primary report structure.

2.1 Pre-translation

The author chose the environmental engineering texts related to chromium biological remediation, which are typical science and technology texts. Before starting the translation, the translator mainly carried out three aspects of work, such as tool preparation, collection of parallel texts, and terms preparation.

2.1.1 Tools Preparation

"Sharp tools make good work". Complete and thorough preparation is required prior to translation. Having translation tools ready is essential for translators. Numerous challenges in the translation process can be resolved by translators with the aid of translation technologies. The Lu Gusun English-Chinese Dictionary (second edition) and the Oxford Advanced English-Chinese Dictionary (8th edition) were first prepared by the translator in order to fully understand the meaning of new words and steer clear of unclear words in the translation. Simultaneously, the translator could make use of online dictionaries such as Oxford, Collins, and Youdao, which can increase the effectiveness of the search and quickly generate a high-quality translation. The translator would also look up the exact translation on Google and Bing if they came across any unclear technical phrases. Finally, to increase translation efficiency, the author should also download SDL Trados Studio.

2.1.2 Parallel Text

In "Non-literary Translation", Li Changshuai employs the term "parallel text" to denote the relevant target language materials related to the source text (Li, 2009). These materials may take the form of encyclopedia entries, topical pieces, or even dictionaries with explanations and examples (Nord, 2007). In a nutshell, parallel texts are any pertinent materials that share content with the original text. Hence, in order to enrich the fundamental knowledge, the author learned the language features of scientific and technical texts and read relevant papers about bioremediation technology, chromium hazards, and so on, in order to be closely exposed to the original language of Sci-tech English translation.

2.1.3 Term Preparation

There are many technical terms in informative texts, and the selected texts are no exception. To master the technical terms of the original text, the author read some vocabulary manuals, such as the English-Chinese Chinese-English Vocabulary Handbook of Environmental Science and Engineering, published by Shanghai Foreign Language Education Press. The author also searched online using the keyword search method. Following a thorough search and comparison, the author found a number of scientific texts in both Chinese and English, which helped the author better understand the technical words.

2.2 While-translation

Firstly, the author made a translation plan and then allocated weekly workload based on the task volume, ensuring that the translation tasks were completed on time. According to the progress schedule, the author completed the weekly workload with the help of Trados and other online tools. Second, the author went back over the previously translated material after finishing a set amount of translation to fix any incorrect passages and ensure consistency. For content with doubts, the author would mark the incomprehensible and unclear places, and then carefully think about the difficult points after the entire translation is completed. With a deeper understanding, it would be easier to review this content combined with the context.

2.3 Post-translation

Translation proofreading and evaluation in the later translation stage are also critical. The success of case analysis and the caliber of translated content are directly tied to post-translation work.

2.3.1 Self-revision

Self-revision is the process of the translator's improvement of the quality of the translated text. After the first draft was finished, plenty of work still needed to be done. Firstly, the author herself checked spelling and grammar, which helped avoid simple mistakes, such as Chinese typos, word spelling, and word collocation. Secondly, to guarantee the professionalism of the translated materials, the author proofread the terms' meanings. Thirdly, the translated text was legible and acceptable after the author reviewed it and made necessary modifications and polishes to ensure that the expression matched the target readers' reading preferences. The author finally clarified the technical words.

2.3.2 Peer Review and Proofreading

Proofreading by others is required to improve the quality of the translated material because self-revision is difficult to be objective about. Students majoring in environmental engineering, as well as peers in the same major, were asked to proofread by the translator. While students majoring in environmental engineering assessed the translated text's readability and professionalism, classmates objectively assessed the translation major's opinion on the text's accuracy and fluency. The translator revised the translated material, which ended up being the second draft, after summarizing the queries posed by classmates following their evaluation. After sending the second draft to her tutor, the author received some feedback from him. After all these efforts, the final translation can be obtained. Though imperfect, it is the best version of translation within the author's capability.

3. Theoretical Basis

The goal of the entire translation act is the most important component of the translation process. The Skopos Theory of Translation is one of the most representative and influential translation theories in contemporary Germany. The Skopos Theory is primarily concerned with the intended function of the target texts and emphasizes the pragmatic aspects of the translation process. According to the studies of the German functionalist school, there are three basic rules based on the Skopos theory, which refers to "skopos rule", "coherence rule" and "fidelity rule".

The skopos rule clarifies that the goal of translation determines its outcome (Nord, 2014). The Skopos rule, which has settled the debate over literal versus free translation for millennia, maintains that the goal of a given translation assignment dictates whether a text requires literal translation, free translation, or the neutralization of the two. According to the coherence rule, the text must be translated so that, under specific intellectual and environmental circumstances, the target text receivers may understand it. In a nutshell, the coherence rule stresses the need to adhere to the intralingual coherence criteria and focuses primarily on the coherence of form and meaning. According to the fidelity rule, a translation must be as accurate as possible to the source material. It indicates that there should be interlingual coherence and consistency between the source text and the translation, that is, being loyal to the source text.

4. Case Analysis

4.1 Skopos Rule

As mentioned in Chapter Three above, the whole process of translation behavior is determined by the purpose to achieve, and the purpose of translation directly determines which translation method the translator should adopt. As the two selected essays are scientific and technical texts, the language features of EST should be considered. According to the classification of text types, EST is a typical information-oriented text. The translation should objectively convey the information of the source text and strive for accuracy without errors. On this premise, it is preferable for the translator to present the translation in a manner familiar to the target language readers in order to ensure the effective transmission and communication of the original content. During the translation process, the author noticed that a large number of sentences describing the research results appeared in the texts, which were highly professional. Effective transmission and communication will be difficult to achieve if the information in translated sentences is poorly expressed. The author lists three methods—amplification, ellipsis, and conversion—in this translation endeavor to guarantee these objectives.

4.1.1 Amplification

Amplification is to add necessary words, phrases, or sentences to the original text so that the translation can conform to the Chinese habit in grammar and language form, and the translation can be consistent with the original text in

rhetoric, grammatical structure, meaning, or mood, to achieve the purpose of the translation (Li, 2009). Amplification is not an arbitrary addition of words without basis, but words that convey the intended meaning, although not expressed in the original text. While additional words can be added according to specific context in theory, the difficulty lies in how to add words properly and within certain limits, which requires careful consideration.

Example 1

Source text: Bioremediation of chromium (Cr) using bacteria is very thoughtful due to its eco-friendly and cost-effective outcome.

Target text: Due to its eco-friendly and cost-effective outcome, bioremediation of chromium (Cr) using bacteria is very thoughtful.

Analysis: The logical thinking in English and Chinese languages presents distinct disparities: English typically presents the conclusion first and then provides the demonstration, description, or facts. By contrast, it is customary in Chinese to explain the reason first and then express the viewpoint and position. The original sentence is to first state the viewpoint and position, and then talk about the reason, while in the Chinese language habit, the reason is usually clarified first, and then the opinion and position are expressed. Thus, for this sentence, the reason "due to its eco-friendly and cost-effective outcome" should be translated first, followed by the opinion "Bioremediation of chromium (Cr) using bacteria is very thoughtful".

Example 2

Source text: According to the World Health Organization, the total amount of Cr in drinking water should not exceed 0.05 mg/L.

Target text: According to the standards of the World Health Organization, the total amount of Cr in drinking water should not exceed 0.05 mg/L.

Analysis: In scientific and technical English articles and materials, the grammatical structures employed differ from those in general English writing, and more attention is paid to the expression of content. Some complete semantic structures are not comprehensive enough. During the translation of EST, in order to meet the grammatical requirements, the method of amplification is adopted. When translating, the translator should add appropriate nouns, verbs, adjectives, or adverbs to the target text to clearly illustrate the meaning intended by the source text, enabling the translation to convey the information of the original text more accurately and clearly.

4.1.2 Ellipsis

Ellipsis refers to the omission of certain words in the source text during the translation process, and these words can be understood or inferred from the context. This approach enables the expression of the translated text to be more fluid and natural, avoiding repetition and conforming to the language conventions of the target language (Halliday & Hasan, 1976). Nevertheless, it should be noted that ellipsis does not imply the reduction of the ideological content of the original text; rather, it maintains the meaning of the original text by optimizing the language structure.

Example 3

Source text: Similar instances have been reported at multiple places with high levels of Cr in most of the Indian rivers.

Target text: Such instances have been reported at multiple places with high levels of Cr in most of the Indian rivers.

Analysis: The application of the method of ellipsis mainly refers to the elimination of some redundant and repetitive words, and the premise is that the original meaning of the text cannot be changed or, some more concise and clear language is used to replace the original cumbersome and verbose words, thus enhancing the professionalism of EST. In the previous sentence, the phrase "similar such instances" refers to the phenomenon of high chromium concentration, and the phrase "high levels of Cr" appears at the end of the sentence. If the phrase "similar such instances" is translated, it will result in semantic repetition. Therefore, in order to ensure the professionalism of scientific and technical English, the translator omitted "similar such instances".

Example 4

Source text: Excess of Cr in the vicinity causes sensitive cells to become elongated with an inhibited cell division, resulting in mutagenic effects upon prolonged exposure. This has been proposed to have a detrimental effect on saprophytic and nitrifying bacteria, thus altering the normal soil microbial flora.

Target text: Excess of Cr in the vicinity causes sensitive cells to become elongated, which would inhibit cell

division and cause mutagenic effects after prolonged exposure. Thus, it will have a detrimental effect on saprophytic and nitrifying bacteria, thus altering the normal soil microbial flora.

Analysis: In English, the predicate of a sentence must be a verb, but in Chinese, the predicate can be a verb, an adjective, a noun, or a phrase. This feature allows us to often omit the verb in the original text during translation. The omitted verbs are usually certain linking verbs or actions in English. If we translate "has been proposed", it would be very awkward. By omitting "has been proposed," the translator ensures accurate information delivery while avoiding the translationese.

4.1.3 Conversion

English and Chinese belong to different language families, presenting considerable disparities in terms of vocabulary, grammar, and expression. Owing to the lexical discrepancies between English and Chinese, at times, if English words are directly translated into their corresponding Chinese words, the resulting translation may appear rigid and deviate from the norms of Chinese expression. Under such circumstances, it often becomes imperative to transform the part of speech of the words to produce a translation that aligns with the characteristics of the Chinese language. In light of the dissimilarities between English and Chinese, it is feasible to convert nouns, adjectives, and prepositions, for example, in English, into verbs in Chinese, or convert adverbs into adjectives, and vice versa, when necessary.

Example 5

Source text: Lipid peroxidation, DNA damage, and DNA-protein crosslinks are all caused by excessive quantities of ROS, which are toxic to cells and may lead to their eventual demise.

Target text: Excessive quantities of ROS lead to lipid peroxidation, DNA damage, and DNA-protein crosslinks, which are toxic to cells and may lead to their eventual demise.

Analysis: In English, adjectives that express a person's perceptions, emotions, desires, etc. as well as those that describe the essence of things, can often be translated into Chinese verbs when they function as predicate adjectives after a linking verb. "toxic" is an adjective that describes the essence of things. However, "toxic" implies an action concept in Chinese, so it is translated into the Chinese verb.

Example 6

Source text: Nevertheless, use of algae not only has a promising potential for Cr bioremediation but also offers additional advantages of being safe, cheap, and easily available as well as an opportunity to contribute to green-house gas mitigation and climate change.

Target text: Nevertheless, the use of algae not only has a promising potential for Cr bioremediation but also offers additional advantages of being safe, cheap, and easily available, which has an opportunity to contribute to green-house gas mitigation and climate change.

Analysis: In English, nouns are used more often than in Chinese. As a result, some English nouns are frequently translated into Chinese verbs in English-Chinese translations, and the source text's semantics must be respected while also adhering to the target text's linguistic conventions. In the original sentence, "opportunity" is an abstract noun. If it strictly adheres to the structure of the original sentence, it won't be in line with Chinese expression habits, and may even appear translationese. The translation of the verb "has an opportunity" not only expresses the meaning of the original text clearly and concisely, which conforms to the characteristics of EST, but also enhances the smoothness and naturalness.

4.2 Coherence Rule

The coherence rule, also known as the intratextual coherence rule, states that the translated text must be internally coherent, meaning that the translation should be readable and acceptable to the recipient, enabling them to understand and make sense of it within the context of the source culture and the communicative context in which the translation is used. The cultural and informational substance of the source material can only be successfully communicated to the target language reader when it is relevant to them in their communicative context. Since the cultural background and discourse habits of different language readers are diverse, the coherence rule states that "a translation should be acceptable in the sense that it is coherent with the recipient's situation" (Reiss, 1984). Reiss and Vermeer believe that any text is "an offer of information from which each receiver selects the items they find interesting and important", while the target text is "an offer of information formulated by someone else in the source culture and language" (Reiss & Vermeer, 2014).

Science and technology texts frequently use a lot of technical terminology and proper nouns that can be hard for readers to understand. Translators should focus on the original information's accuracy during the translation process and make sure the translation captures the original text's professional and scientific tone. To demonstrate the author's opinions and argumentation process, it typically uses a logical reasoning approach that involves posing queries, offering supporting data, and evaluating findings. Therefore, the text structure of scientific and technological texts is often more rigorous and methodical. In the process of translation, the translator categorized two translation strategies based on the coherence rule: deviation and restructuring.

4.2.1 Deviation

According to Reiss's text type theory, these source materials belong to the informational texts, which frequently utilize multiple subordinate clauses for articulating research findings and viewpoints. Guided by the coherence rule, long and complex sentences are segmented using deviation techniques during translation processes so as to obtain accurate and fluent translations. The crux of deviation lies in segmenting the original sentence based on semantic units by cutting at connection points such as relative pronouns, adverbial conjunctions, coordinating conjunctions, and transitional phrases before sequentially translating each segment into coherent whole sentences. The merits of employing deviation include: firstly, preserving much of the original English syntax, thereby minimizing omissions; secondly, aligning long English constructions with typical patterns found in concise Mandarin expressions characterized by clarity and cohesive tone.

Example 7

Source text: Various microbial-based agents and aquatic plants like duckweeds are emerging as efficient adsorbents of metals, and their role in chromium bioremediation is an effective green technology that needs to be harnessed effectively.

Target text: All kinds of microbial preparations and aquatic plants (such as duckweed) have seemingly become effective metal adsorbents. Their role in chromium bioremediation is an effective green technology. It needs to be utilized effectively.

Analysis: The original text can be categorized into two parts. The first part adopts a subject-attributive-verb-object structure. Here, "and" connects two subjects, and the prepositional phrase "like duckweeds" serves as an attributive to modify "aquatic plants", with the general meaning being "All kinds of microbial preparations and aquatic plants (such as duckweed) have seemingly become an effective metal adsorbent." The second part features a subject-verb-object-relative clause structure, and the main idea is that "Their role in chromium bioremediation is an effective green technology that needs to be utilized effectively". Guided by the principle of coherence, the second part is decomposed into two groups of meaning: "Their role in chromium bioremediation is an effective green technology" and "It needs to be utilized effectively".

Example 8

Source text: As discussed in section 2, adsorption has been one of the most effective ways of metal removal and hence research all across the world is being focused on finding new and efficient adsorbents for Cr removal from industrial effluents, contaminated soil, and polluted water bodies.

Target text: As discussed in section 2, adsorption has been one of the most effective ways of metal removal. Hence, research all across the world is being focused on finding new and efficient adsorbents to remove Cr from industrial effluents, contaminated soil, and polluted water bodies.

Analysis: The source text contains two main clauses, namely "adsorption has been one of the most effective ways of metal removal" and "research... is being focused on finding new and efficient adsorbents…". The second main sentence is more complex and needs to be split into two sentence groups. The total structure of the sentence after deviation is: As discussed in section 2//adsorption has been one of the most effective ways of metal removal// and hence research all across the world is being focused on finding new and efficient adsorbents //for Cr removal// from industrial effluents, contaminated soil and polluted water bodies.

4.2.2 Restructuring

Restructuring refers to the process in translation where, in order to make the translated text more fluent and in line with the narrative and reasoning conventions of the target language, after clarifying the structure of long sentences and understanding the original meaning of the English text, the translator completely abandons the original word order and sentence form and structure, reorganizing the sentences accordingly. Sometimes, even the entire article is

reorganized. Restructuring mainly includes adjustments in the length and structure of sentences.

Example 9

Source text: Cr (VI) may also affect redox equilibrium via the Fenton route, which produces reactive oxygen species (ROS), as well as by depleting cellular antioxidants.

Target text: The Fenton route produces Cr (VI) and reactive oxygen species (ROS). Cr (VI) can deplete cellular antioxidants and then affect redox equilibrium.

Analysis: Although the translation of EST requires the use of the original structure and rhetorical devices as much as possible. However, it doesn't mean that the readability of the language should be abandoned. This sentence can be divided into three parts:(1) Cr (VI) may also affect redox equilibrium via the Fenton route; (2) which produces reactive oxygen species (ROS); (3) as well as by depleting cellular antioxidants.

Example 10

Source text: However, parameters such as adsorption capacity, operational cost, regeneration ability, reusability, and recovery will have to be worked out for the development of an efficient technology that is capable of treating real Cr containing wastewaters.

Target text: However, to develop an efficient technology that is capable of treating real Cr containing wastewaters, parameters such as adsorption capacity, operational cost, regeneration ability, reusability, and recovery will have to be worked out.

Analysis: The original text can be categorized into four parts: (1) However; (2) Parameters such as adsorption capacity, operational cost, regeneration ability, reusability and recovery have to be determined; (3) for the development of an efficient technology; (4) that is capable of treating actual chromium-containing wastewaters. In part (2), "such as" provides examples of the "parameters". In part (4), a relative clause modifies the term "technology" in part (3). Evidently, the main content of this sentence lies in part (2), clarifying what needs to be accomplished. Parts (3) and (4) signify the purpose of doing so. Thus, in accordance with the principle of coherence, the translation sequence of this sentence should be (1)-(3)-(4)-(2), which is in line with the writing characteristics of scientific English and exhibits strict logic.

4.3 Fidelity Rule

The fidelity rule addresses the intertextual coherence between the source text and the translation. In other words, there should be inter-textual coherence and consistency between the source text and the translation. This is comparable to what other translation theories refer to as "faithfulness to the original". The form and degree of loyalty are determined by the purpose of the translation task and the translator's understanding of the original text. On the other hand, the translator must balance the original author's goals and intentions while being faithful to the original author. However, the translator must explain the decisions made during the translation process to the original author, clients, translator readers, and other parties.

4.3.1 Literal Translation

Literal translation is a frequently employed approach in translation. It implies maintaining the language form of the source text as closely as possible during the translation process, encompassing word choices, sentence structures, rhetorical devices, and the like. Simultaneously, it demands smooth language expression. Literal translation typically can be divided into two kinds: One is that the translation adheres precisely to the form of the original text, without any alterations to the sentence sequence or grammatical structure; the other is that the translation does not fully conform to the structural form of the original text, and necessary adjustments are made to the word order or sentence order as required (Newmark, 2001). Since the content encompassed in scientific and technological articles rarely exhibits cultural disparities and the meanings of scientific and technological vocabulary are relatively specific, numerous literal translations are acceptable to the general public.

Example 11

Source text: An epidemiological birth cohort study from Hubei province, China, evaluated the association between maternal Cr exposure during pregnancy and the risk of preterm birth among 7,290 pregnant women.

Target text: An epidemiological birth cohort study conducted in China's Hubei province assessed the relationship between 7,290 pregnant women's risk of preterm delivery and maternal Cr exposure during pregnancy.

Analysis: “An epidemiological birth cohort study” is the name of a research project. Herein, “birth cohort” is an important research method and resource for exploring the influence of early life factors on the health course of the offspring throughout their life, and it is an epidemiological method. Therefore, the translator adopts the strategy of literal translation.

Example 12

Source text: Most chromium exposure in the general population is through ingestion of the chemical in food containing chromium (III), although exposure is also possible as a result of drinking contaminated well water, or living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

Target text: Although exposure can also occur from drinking tainted well water, living close to uncontrolled hazardous waste sites that contain chromium, or working in industries that use chromium, the majority of chromium exposure in the general population occurs through ingestion of the chemical in food that contains chromium (III).

Analysis: In general, EST centers on objective things and emphasizes accuracy and clarity. This sentence is about the ways in which the general population is exposed to chromium with logical rigor and plain style. Therefore, the translator adopts the strategy of literal translation.

4.3.2 Liberal Translation

Liberal translation is another frequently utilized approach in translation. It implies that during the translation process, the emphasis of the translated text lies in expressing the ideas of the source text rather than strictly adhering to the correspondence of its lexical meaning, formal structure. The primary responsibility of the translator is to represent the meaning of the source text faithfully and conform as closely as possible to the Chinese usage. Moreover, some expressions in scientific and technological articles often appear abstruse and difficult to understand when translated literally.

Example 13

Source text: Solid deposition of chromium (VI) would lead to “chromium ulcers” or “chrome holes”, while a high concentration of chromium (VI) solution would lead to chromium burn.

Target text: A high concentration of chromium (VI) solution would result in chromium burn, whereas solid deposition of VI would cause “chromium ulcers” or “chrome holes”.

Analysis: Although numerous professional reference tools are accessible for consultation at present, it is not guaranteed that a corresponding Chinese term can be found for every English technical term. Based on the generation methods of existing technical terms, a wide range of scientific and technological translators have summarized multiple translation processing methods, such as liberal translation. The term “chrome holes” has a simple word formation, and a literal translation can fulfill the translation purpose.

Example 14

Source text: The role of iron and sulphur reducing bacteria has shown potential for enhanced Cr remediation.

Target text: It has been found that iron and sulphur-reducing bacteria have the potential to enhance the remediation of chromium.

Analysis: If the translator analyzes the whole language environment and looks for the relevant knowledge concerning microorganisms, she will come to realize that the word “role” here refers to “effect” or “function”. In conclusion, the liberal translation of “role” makes the whole expression logical and maintains the original meaning.

5. Conclusion

5.1 Major Findings

This translation practice report analyzes the translation of EST texts from the perspective of Skopos Theory. The principles and connotations of Skopos Theory can guide the translation of English for science and technology (EST). Through in-depth analysis of the connotations of the three principles of Skopos Theory, as well as the structure, content, and text types of EST, this paper concludes that the two are compatible in terms of translation purpose. As an organic combination of English and science and technology, it is necessary to ensure accuracy, coherence, and authenticity in translation while effectively communicating and achieving the social functional purpose. Therefore, the translation of EST from the perspective of Skopos Theory takes on a more utilitarian approach, becoming more flexible and culturally oriented, characterized by increased rigor and professionalism.

5.2 Limitations

Firstly, the translator's linguistic skills still have certain shortcomings. The goal of translation practice would be difficult to achieve if the translator misunderstands the original material or neglects to modify the translation, making it difficult for the intended audience to understand.

Secondly, the source text chosen by the translator is a scientific and technological literature piece with an extremely high level of professionalism. Although the translator has previously translated scientific and technological literature, numerous difficulties were still encountered during the translation process. For instance, the translator needs to acquire knowledge of bioengineering.

Finally, the translator still lacks mastery of translation theoretical knowledge. When applying the three principles of the Skopos Theory to case analysis, the translator summarized some related translation strategies. Despite the application of these strategies to the translation of sentences and terms, the analysis of the text remains insufficient. The translator should consult more original materials on the Skopos Theory and conduct in-depth reflection from an English perspective once again.

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