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Translation Strategies of English for Science and Technology

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Abstract: In recent years, science and technology has developed rapidly in China, and in the process of independent research, it is necessary to continuously absorb foreign advanced technology. Therefore, the research of scientific and technological English has attracted more and more attention. As a kind of applied "information text", English for science and technology has the characteristics of high degree of professionalism, formal language, objective and concise description, and relatively complex sentence structure and strong logic. The problem of cohesion not only makes the translation fluent and clear, but also can accurately restore the internal logical connection in the original text. The main purpose of this paper is to study translation strategies related to English for Science and Technology. The relevant principles and methods of translation strategies are proposed to help research and improve translation strategies. Experiments show that words that are not in the thesaurus account for 19.51%, and there are 2794 words, which leads to an increase in the difficulty of translation.

1. Introduction

As we all know, the world has entered the era of technology in the 21st century. Science and technology play a pivotal role in the social and economic development of various countries and in human life. Technology has not only become the main force driving social and economic development, but has also gradually evolved into an indispensable part of human daily life. At present, the development momentum of science and technology is rapid and changing with each passing day. As a special style, technical English has its unique style, vocabulary and sentence characteristics. Therefore, the translation of technical English is not easy, and translators often encounter various problems and obstacles in the process of translation. However, the quality of translation of technical English should not be underestimated. The quality of scientific and technological English translation will directly affect the effectiveness of Sino-foreign scientific and technological exchanges, affect the absorption and utilization of foreign advanced science and

technology, and even affect the development of science and technology in our country. Therefore, how to accurately and completely express the scientific and technological information of the English original text and ensure the correct understanding of the readers of the translated text is the key to ensuring the quality of scientific and technological English translation [1, 2].

There are many studies on translation, among which Jibreel I study explores students in translation courses to understand Translation Strategies (TS) and their role in generating high quality target texts. 92 translation majors and 52 non-translation majors at Hodeidah University were tested to measure the quality of their translations and compare their performance in terms of TS awareness. The results show that students majoring in translation have an understanding of translation strategies [3]. Carreira V A explores the use of translation as a teaching aid in the teaching and learning of specific purpose languages. The article confirms that, as long as certain teaching and learning conditions are met, translation as a teaching tool may be the most profitable in language teaching [4]. But it is still not enough for the study of English for science and technology.

The main purpose of this paper is to study translation strategies about English for Science and Technology. This paper analyzes the characteristics of English for Science and Technology, and discusses the application of translation strategies, such as improving the quality of English for Science and Technology translation. This paper discusses the translation strategies of scientific English cohesion from the three levels of vocabulary, sentence and discourse. From the lexical level, the content of demonstrative pronouns is supplemented, the noun is verbized, and the implicit cohesion is made explicit; the logic adjusts the cohesive sequence, increases the use of conjunctions, and supplements omitted information; reconfigures the order of sentences, reorganizes the content of sentences, and pays attention to the use of professional terms. It makes the content of the translated text closely linked, conforms to the readers' language habits, the language is more idiomatic, and it is more in line with the characteristics of the fluent and accurate introduction of scientific and technological texts. In a word, translators need to use cohesion theory flexibly in the process of translation, apply it to the practical process of translation, and combine theory with practice to improve the quality of translation.

2. Research on Translation Strategy Design of English for Science and Technology

2.1. Functional Translation Theory

Functional translation opens up new horizons for translation studies. It bridges the gap between technology and practical meaning, and is highly purposeful and functional. According to the scientific system of many dictionary models based on the purpose of the subject and the meaning and function of words, there is no doubt that the scientific research of language translation has a high reference value and value point. Here, we will focus on the technical guidance and reasoning process of the text format in English translation, and provide technical support for the translation principles adopted in the translation process [5, 6].

2.1.1. Text Type Theory

Rice believes that the function of the text should be evaluated by the relationship between the function of the original text and the function of the translation. He believes that translation should be based on chapters, so language-level equivalence should be sought. He pointed out that the evaluation of translations should not only start from one aspect or part, but should start from the

type of document being translated. Once word types and translation methods have been identified, the extent to which the translator meets the relevant requirements can be assessed. Based on the functional theory of language, Rice divides text topics into expression, practice, and information.

(1) Expressive text: that is, "creative work", which has certain aesthetic value and creativity. Generally speaking, the expressor has a certain social status, the expression method is special, the expression effect is outstanding, and has aesthetic significance; at the same time, the content is full of imagination and creativity;

(2) Operational text: "promote behavior", to influence readers and make them realize a certain behavior by exhorting, preventing, requesting, etc.;

(3) Informational text: The text is simple and logical, good at focusing on the topic, and the content includes objective facts, subjective ideas and knowledge popularization.

2.1.2. Teleology

Fundamental Principles of Functional Explanation: The Principle of Purpose. This principle holds that interpretation is an intentional act and that purpose is everything. The main factor affecting the purpose of translation is the recipient. According to different cultural backgrounds and communication needs, translators need to explain contextual words and the relationship between language and context through cultural knowledge [7, 8]. According to the theory of purpose, all definitions follow the following rules:

(1) The law of purpose: the purpose determines the behavior process, that is, the result determines the method.

(2) The law of fidelity: the translation needs to be faithful to the original text, and the form should be determined according to the purpose and understanding;

(3) The law of coherence: the expression should be consistent, and the culture and habits of the translation language should be fully considered.

2.2. Translation Strategy

English for science and technology is specialized in vocabulary, with complex sentence patterns and unique expressions. Therefore, in the process of translation, we should follow the principles of in-depth analysis and overcome difficulties [9, 10].

2.2.1. Translation of Technical Vocabulary

(1) Word sense selection. General technical vocabulary occurs more frequently in scientific English, and a word has different meanings in different academic fields. In order to accurately present the original information and achieve the purpose of translation, the correct choice is the key. This also reflects the purposive principle that interpretation is a function of human behavior, a function that is influenced by specific foundations. Therefore, a translation is a speech made for a specific purpose and target audience in the context of the target language.

(2) Part of speech conversion. Often, during translation, partial conversions between word parts of speech can be done in order to maximize the meaning, make it explicit and adapt it to the culture and conventions of the vernacular cultural context.

2.2.2. Translation of Different Long Sentences

Scientific terminology includes a large number of passive phrases, inconsistent phrases, and

compound phrases. The purpose principle also emphasizes the connection and compliance of definitions. This suggests that an appropriate translation process must be selected based on the actual state of the text. When interpreting a sentence, it is necessary to first understand the relational structure of the sentence, extract the key parts of the sentence, and then add appropriate translation methods to facilitate the interpretation of user behavior.

(1) Sequential method. General technical English texts describe a certain concept or method, so the space-time sequence and the turbine level are similar and can be translated directly in sequence.

(2) Variation method. When the language expression is different, you can adjust the sentence structure and change the word order translation.

(3) Sub-translation method. Generally speaking, there are many long sentences in technical English, and direct translation is not easy to understand. Therefore, the structure can be split and translated into clauses or clauses, which is convenient for expression and understanding [11, 12].

(4) Combined translation. According to customary logic, different components can be combined for translation, generally only when the structure of the article is closely related.

2.3. Algorithm Research

2.3.1. CBOW Model

Predict the probability of previous words based on contextual words. The specific formula after the model optimizes the objective is as follows:

$$L = \sum_{\omega \in C} \log P\left(\omega \mid context\left(\omega\right)\right) \tag{1}$$

This model is similar to the Bengio model, but the difference is that the hidden layer of the model shares all words.

2.3.2. Skip-gram Model

The model predicts the probability of its context word based on the current word. The following is the specific expression of its optimization goal:

$$L = \sum_{\omega \in C} \log P\left(context(\omega) \mid \omega\right) \tag{2}$$

In formula 2, P(wi|wt) is the probability, where t-c≤i≤t+ci≠t, c represents the number of words in the context to be considered, and is a constant.

3. An Experimental Research on Translation Strategies of English for Science and Technology

3.1. Translation Strategy of Professional Terminology

When interpreting technical vocabulary, such as technical terms and definitions, the translator must understand the language associated with the vocabulary and use it. It is necessary not only to understand the vocabulary, grammar and idioms in the source language, but also to have a complete vernacular vocabulary, grammar and idiom vocabulary to form a complete language system, avoid misreading, and achieve perfect and accurate translation. Since there are similarities and differences in vocabulary and expression between languages, in the process of interpreting, the translator must

first understand the similarities and differences of word formation in English and Chinese, and then analyze and explain the differences accordingly. In the process of interpretation, the choice of meaning must also be narrowly divided according to the composition of words. In addition, some terms cannot be understood literally, so when translating, it is necessary to understand not only the literal meaning of many words in the mixed words, but also the meaning of professional words in the background to obtain an accurate definition. When interpreting specialized words in the original text, the author summarizes two principles of interpretation: the extension of word meaning and the method of adding meaning according to lexical features and related linguistic features.

3.1.1. Word Meaning Extension Method

The meaning of words is mainly based on the understanding of the primitive verbs and the extraction of the basic meaning of the primitive. In the process of scientific interpretation and technical rules, the translator must fully understand the grammatical structure of the native language and the vernacular, and correctly understand the lexical structure and interpretation of words based on the words in the original text. Thus creating a more consistent meaning with the meaning of the original and closer words, the rules described are easy for readers to understand and accept. When you understand and interpret some professional rules, it is impossible not only to incorporate definitions literally, but also to delve into the meaning of the original text.

3.1.2. Addition of Word Senses

There are many similarities between native language and vernacular. When translating complex technical terms, additional translations can also be used to preserve both the appearance of the source language and the source language. When the translator understands the linguistic principles of the native language and the vernacular, he should follow the principles of accuracy and fairness, and translate on the basis of a complete understanding of the word verbs and the meaning of the vernacular verbs. By grasping the language and purpose of translation, you can translate perfectly.

3.2. Translation Strategies for Acronyms

The use of acronyms is very common in modern English technology. Its composition is also very different. In the process of understanding, the interpreter is always at a loss. Linguistics has a slight influence on the interpretation of abbreviations in technical English. As a linguist, when translating abbreviations into technical English, the translator must first fully understand the grammatical structure of abbreviations in the original text and learn their writing rules. On the basis of maintaining the complete language system of the vernacular, the original text is changed to a standard translation that is faithful to the original text.

3.2.1. Decomposition Reduction Method

In the translation of abbreviations, the source words of some words can be gradually found out by means of splitting, restoration, etc. through their word formation characteristics, so as to obtain the translation, so that readers can more easily understand the corresponding meanings of the original concepts and expressions. This requires the translator to understand the grammar and grammatical features of the source language when translating, and at the same time to know the language meaning of the vernacular, in order to achieve accurate translation.

3.2.2. Copy the Raising Method

There are many abbreviations in the process of translation, you will find that the translation is very long, and it is not easy to communicate and understand. The theory of language schemas requires the mastery of basic knowledge such as the idioms in the source language and the target language. Therefore, in the translation of abbreviations, in order not to affect the reading and understanding of the target language readers, the vocabulary in the language schema of the source language can be used according to the vocabulary in the source language. Meaning, the translation is displayed in the form of annotation, and the original text is copied directly without translation. By copying the annotation method, the language schema of the original text can be output in the correct form, and at the same time, the semantic meaning of the original text can be accurately conveyed on the basis of following the language schema of the target text, which is convenient for readers to understand.

3.3. Translation Strategies of Non-predicate Verbs

In scientific and technological texts, the application of non-predicate verbs can make the original sentences more concise, compact and complete. When translating this type of vocabulary, it should also be concise and accurate. Under the guidance of language schema theory, when translating non-predicate verbs, translators should first accurately grasp the basic language knowledge such as vocabulary and grammar in the original text, so as to stimulate and form correct language schemas. Language schemas have important guiding significance for translation. Therefore, only by firmly grasping these basic vocabulary and grammar knowledge and applying them to the language schema expression of the target language can we avoid mistranslation.

3.3.1. Addition Method

During translation, words or phrases are added according to semantic expressions. This makes the translation more in line with the habit of the target language in terms of lexical expression and grammar. The theory of language schema requires translators to have sufficient language knowledge, accurately grasp the target language, use the vocabulary and grammar knowledge they have mastered to clear the obstacles to the source language, and translate the source language into the target language more smoothly and accurately. The author uses the guiding points of language schema theory to analyze and judge the grammar and word meaning in the source language schema during translation, and then according to Chinese expression habits and grammar knowledge, appropriate vocabulary is added to achieve the purpose of accurate translation..

3.3.2. Part of Speech Conversion Method

In the process of translation practice, translators should carefully analyze the components and functions of non-predicate verbs in sentences, master and apply relevant grammatical knowledge, and then form accurate language schemas and obtain accurate translations. According to the requirements of language schema theory, the author first analyzes the composition of non-predicate verbs in their respective sentences, and skillfully applies the grammatical knowledge that he has mastered, and then adopts the method of part-of-speech conversion to obtain an objective, rigorous, coherent and concise expression that is in line with Chinese expressions customary translation.

4. An Experimental Analysis of Translation Strategies in English for Science and Technology

4.1. Text Analysis of Translation Tasks

Analyze the three basic lexicons of BASEWORD, and select the 1000 most commonly used English words in 1, the 1000 most commonly used words in 2, and the commonly used words in 3 middle school subjects. The lexical situation of the translation materials was analyzed by RANGE software, and the specific data are shown in Table 1:

Table 1: Comparison of TOKEN, TYPE, FAMILY of different thesaurus

Word list	Tokens	Types	Families	Tokens/%	Types/%
Baseword1	8767	879	527	61.21	36.25
Baseword2	1469	325	224	10.26	13.4
Baseword3	1293	358	225	9.03	14.76
Not in the list	2794	863	/	19.51	35.59
Total	14323	2425	976	100	100

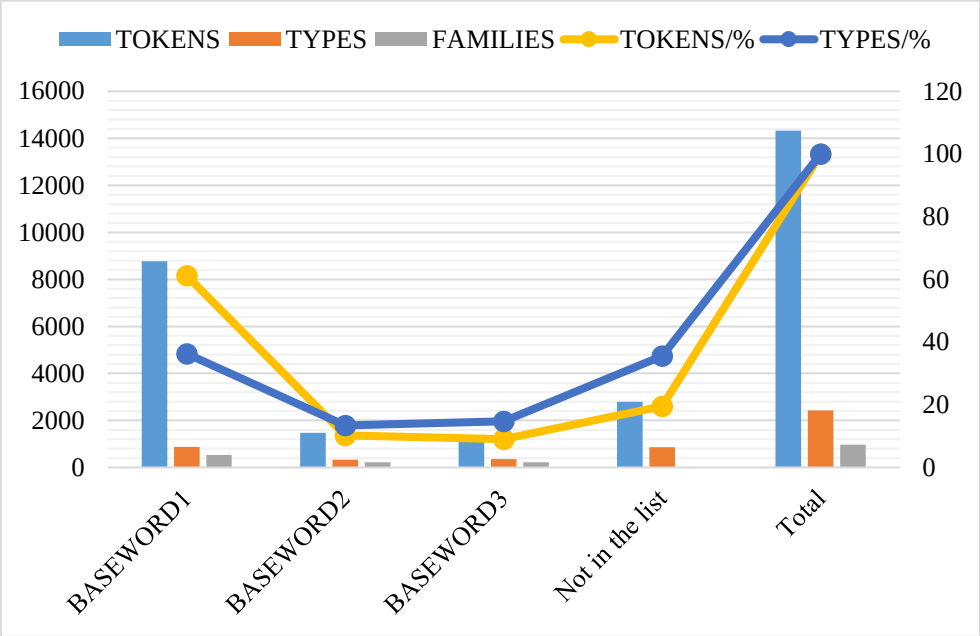

Figure 1: Comparison of TOKEN, TYPE, FAMILY of different thesaurus

As can be seen from Figure 1, the translated material has a total of 14323 pictographs, 2425 class symbols, and 976 word families. Among them, 61.21% of the words in the translation materials are in thesaurus 1, and there are 8767 words, all of which are commonly used words, so it is not difficult to translate words. However, there are 2794 words outside the thesaurus, accounting for 19.51% of the vocabulary of the translation material, which leads to an increase in the difficulty of translation.

4.2. Comparative Experiments on Small-scale Datasets

The two experimental platforms are set to the same parameters. In the process of model training,

models with different rounds are selected, tested on the same test set, and the BLEU value is used as the indicator. The specific results are shown in Table 2 below:

Table 2: Comparative experimental results of small-scale datasets

Experimental platform	Groundhog (BLEU)	Nematus (BLEU)
China-Japan (iter26000)	22.34	21.47
China-Japan (iter60000)	23.65	24.57
Chinese-English (iter30000)	18.54	17.77
Chinese-English (iter60000)	19.60	21.03
English-Japanese (iter30000)	16.21	15.59
English-Japanese (iter60000)	18.19	19.60
China-Japan (iter26000)	22.34	21.47

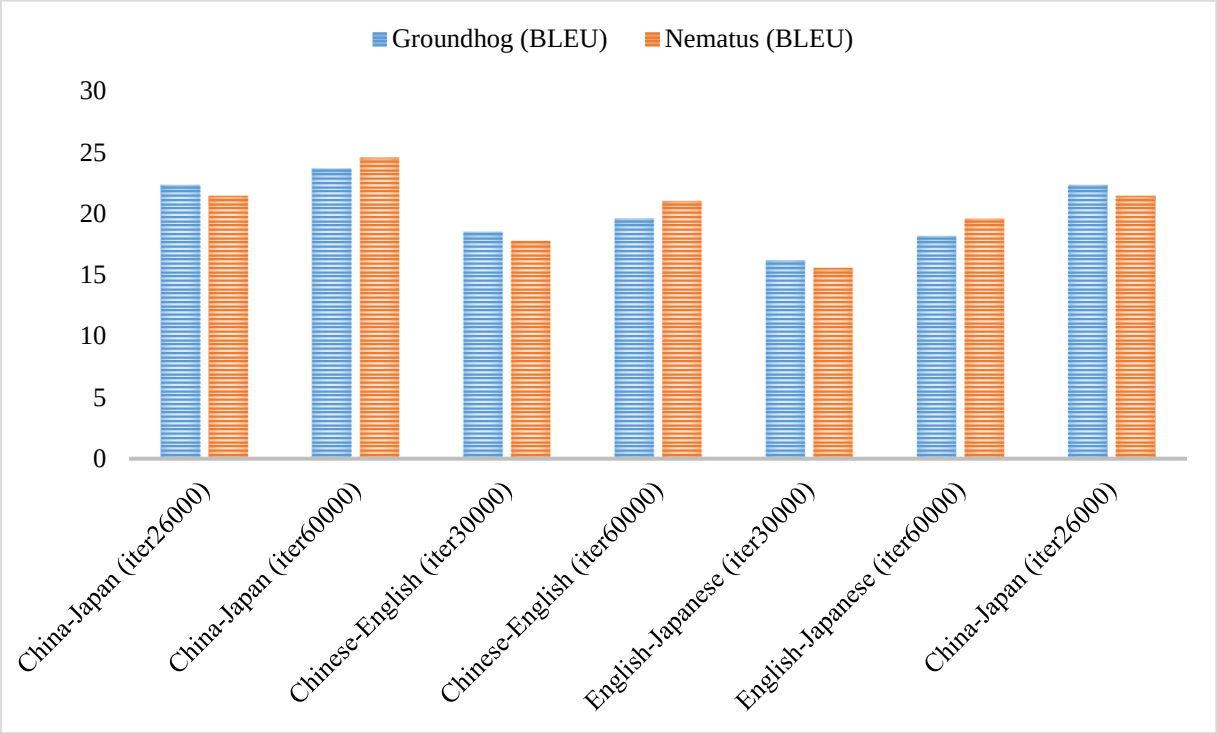

Figure 2: Comparative experimental results of small-scale datasets

As can be seen from Figure 2, Nematus outperforms Groundhog on small-scale datasets. In addition, although Groundhog converges earlier in the model training process, when the model is stable, its final performance is not as good as Nematus.

5. Conclusions

The translation of S&T English is a very complex and comprehensive process. According to the characteristics of S&T English, this paper divides S&T discourse coherence into grammatical coherence, semantic coherence, professional knowledge coherence and common sense coherence. The coherence of the first two levels belongs to the coherence within the text, and the coherence of the latter two levels belongs to the coherence outside the text. Accurate translation of scientific and technological texts should be coherently reconstructed at these four levels. Under this theoretical framework, this paper analyzes the coherence of each level above to verify the practicability and

operability of this theoretical framework. Finally, this paper puts forward suggestions: in order to better achieve these levels of coherent reconstruction, translators should strive to improve their grammatical knowledge, learn to analyze semantic relations through context, and strive to make themselves some Experts in the field should also cultivate themselves to be "miscellaneous" in life.

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