

СОЦІАЛЬНО-ФІЛОСОФСЬКІ ПРОБЛЕМИ РОЗВИТКУ МОВНОГО ПРОСТОРУ

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COMMONLY USED TECHNIQUES IN SCIENTIFIC AND TECHNICAL LITERATURE TRANSLATION

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НАЙУЖИВАНІШІ МЕТОДИ ПЕРЕКЛАДУ НАУКОВО-ТЕХНІЧНОЇ ЛІТЕРАТУРИ

Objective. *The objective of the article is to study the peculiarities of the commonly used translation techniques in scientific and technical literature and to identify key problems and methods of their solution. To achieve this goal, the following tasks are set: to determine the ways of reproducing terms in translation; to analyze the ways of translating terms in scientific and technical literature; and to analyze the use of translation techniques in the scientific and technical literature.*

Methods. *The main results are obtained by applying such research methods as:*

- *descriptive method was used to characterize the terms and terminology;*
- *comparative method was applied for the identification terms' differences and similarities;*
- *contrastive method was used to analyze specific examples of the translation of terms.*

Results. *The theoretical analysis of the terms in the scientific and technical literature has made it possible to identify the types of term structure. Six main types of term structure are outlined. The author considers generalized types of term construction: terms consisting of a base or root which has the basic meaning of the term; terms formed by affixation; terms consisting of two or more root words; new terms formed by combining two or more words; abbreviations of one or more words used as terms; terms consisting of symbols and letters reflecting certain concepts or concepts; terms used to describe a certain model or concept. The conceptual and categorical apparatus of the study is formed, which includes definitions of the most commonly used translation techniques in the scientific and technical literature: "calquing", "transcoding" and "descriptive translation". The commonly used translation techniques in scientific and technical literature are identified as follows: calquing, transcoding and descriptive translation technique. Examples of the above-mentioned translation techniques are given on the basis of technical terms of the construction industry, which will allow to successfully manage the educational process of students of both philological and technical specialties.*

Key words: *translation techniques, scientific and technical literature.*

Introduction

English is the first of all natural national languages that can claim the title of *lingua franca*, a world language, a globalized language. A “world” language should have simple and most logical rules of written language, because it will be used by those for whom it is not their native language. In English, the number of written characters is much less than the number of phonemes and the spelling is quite archaic. But at the same time, English is very receptive to novelty.

The development of special vocabulary in a national language is inextricably linked to progress in the relevant scientific field, as language performs the function of storing, processing and transmitting information. The scientific and technological revolution in modern society increases the importance of terminology in various sciences as a tool for collecting and organizing scientific knowledge [8, p. 169]. The process of forming terms is always conscious and deliberate: new terms appear and develop as the need is realized. The issues of information provision and exchange of scientific and technical information play an important role in the formation of terminology.

On the other hand, when considering the translation of scientific and technical literature in the context of the academic space of higher education, let's pay attention to scientific publications. Scientific research in the world is covered in scientific, technical and popular journals and bulletins published in English. An important indicator of a university professor's academic activity and research work is the number of his or her publications. At the same time, the following are becoming increasingly important publishing scientific articles in editions of scientific citation databases, such as Scopus and Web of Science. Of particular importance is publication of scientific articles in English, but the probability of refusal of a publisher of this level to accept an article for publication is quite high.

Students of higher education institutions as well as university professors or tutors need to master not only commonly used but also professional vocabulary. Mastery of a foreign language in a professional field allows them to find special sources in a foreign language, select works on a particular topic, and study reference literature. The organization of students' current work involves the translation of technical texts and scientific and technical literature, which allows them to keep track of news in their professional field and always be aware of the latest global scientific achievements. In their future professional activities, they need to co-operate with foreign partners, translate documentation and specification of equipment in order to install and operate the equipment correctly, be aware of the latest technologies in production.

Fundamental studies in the field of linguistics formed the methodological and theoretical basis of this issue consists of the works of such researchers as R. Anttila [11], V. Karaban [4], [5] and S. Vlakhov [3].

The problems of translation of scientific and technical literature have been an interest to various fields of linguistics and are the subject of attention of researchers such as Jespersen O. [13], Karaban V. [4],[5], Korunets I. [6], Fesenko I. [9] and Vannerem M. [13].

The terminological glimpse into in the recipient language and the methods of its research are presented in the works of such linguists as: Abibilova N. [1], Furt D. [10], Krymets O. [7], Plyhun O. [8] and Vyhovanets I. [3].

Scientific and methodical studies by Jespersen O. are devoted to the growth and structure of the English language and the study of the process of the translation.

However, the analysis of the commonly used translation techniques in scientific and technical literature could hinder effective research and it did not become the subject of researchers' attention.

The objective of the article is to study the peculiarities of the commonly used translation techniques in scientific and technical literature and to identify key problems and methods of their solution. To achieve this goal, the following tasks are set: to determine the ways of reproducing terms in translation; to analyze the ways of translating terms in scientific and technical literature; and to analyze the use of translation techniques in the scientific and technical literature.

Methods

The main results are obtained by applying such research methods as:

- descriptive method was used to characterize the terms and terminology;
- comparative method was applied for the identification terms' differences and similarities;
- contrastive method was used to analyze specific examples of the translation of terms.

Results and Discussions

Consideration of the methods of translation of scientific and technical literature is directly related to the use of terms. The translation of terms is the basis of scientific and technical translation, so it is important to understand the peculiarities of translating this part of the vocabulary to achieve maximum equivalence.

In the terminological scientific discourse, from the point of view of the structure, it is customary to distinguish the following types of terms: root words, derivatives, compounds, phrases, abbreviations, symbol words, model words [7, p. 173].

- terms consisting of a base or root that carries the main meaning of the term, for example: “design”, “mechanics”, “trench”, “alloy”, “valve”;
- terms that are formed by adding prefixes, suffixes or other affixes to the base word, for example: “antitechnology”, “foundation”, “engineer”, “engineering”, “exterior”. “interior”, “construction”, “heating”. “predetermined”, “prestressed”;
- terms consisting of two or more root words, for example: “structural material”, “expert system”, “compressive properties”, “natural language processing”;
- a combination of two or more words that forms a new term, for example: “engineering mechanics”, “seismic activity”, “exterior design”, “tailing storage facility”;
- abbreviations of one or more words used as terms, for example: “BFRP” (Basalt Fiber Reinforced Polymer), “DNA” (deoxyribonucleic acid), “CPU” (central processing unit). “CAD” (Computer Aided Design), ArchiCAD (architectural CAD software);
- terms that consist of symbols and letters that represent certain concepts or concepts, for example: “H₂O” (water), “CO₂” (carbon dioxide);
- terms used to describe a particular model or concept, for example: “in-situ concrete”, “DNA model”, “turn-key basis”.

The semantic and structural features of terms are that each term reflects a specific concept or concept in the language. From a semantic point of view, terms should be clearly defined and have an unambiguous meaning to avoid distortions in perception. Especially in the translation of scientific and technical texts, terms should accurately reflect the concept or object to which they refer without the possibility of ambiguity or ambiguity. These features contribute to the clarity and consistency of the use of terms in language, making them effective communication tools in scientific, technical, and professional contexts.

The translation of terminology is one of the most difficult problems in linguistics and translation studies. This is because terms are an integral part of the vocabulary that is rapidly evolving, in demand among specialists in various fields, and requires special attention. The translation of terms faces certain difficulties, as their adequate translation is impossible without additional knowledge related to the origin, classification, functioning, and peculiarities of the translation of terms.

When translating terms from English into Ukrainian, linguists mainly seek to find a lexical equivalent – a stable lexical equivalent that accurately reproduces the meaning of the word. [10, p. 276]. This task is difficult because many terms have appeared recently and it is not always possible to accurately reproduce their meaning in the context of the scientific environment in Ukraine.

Translating terms requires understanding not only the language but also the specific field of knowledge they cover. The process of translating terms can be divided into two stages, which are identified by V. Karaban:

- finding out the meaning of the term in the context;
- translation of this meaning into the native language [5, p. 318].

The main method of translation of terms is the use of lexical equivalents - permanent lexical correspondences that accurately reproduce the meaning of a word. Terms with their equivalents in the native language play a key role in translation. For a successful translation, it is important to be able to find the appropriate equivalent in the native language and expand knowledge of equivalent terms. It is impossible to find an absolute equivalent. In cases where the text contains only a partial reflection of the concept, you can replace the absolute equivalent with a relative one. A relative equivalent conveys the general concept associated with the term and can only be used in a context that allows us to reproduce the main characteristics of the object. It is used in cases where an absolute equivalent becomes too voluminous. For example, the absolute equivalent of the English term “*BFRP armature*” is “*Basalt fiber Fiber Reinforced Polymer armature*”, while the relative equivalent may simply be “*базальто-пластиковою арматура*” if it is possible in the context.

Sometimes a translator has to create new equivalent terms in the native language, which leads to the emergence of neologisms, which make up a significant part of the lexicon in translations. This is especially true when translating scientific and technical literature, where the main problem is the reproduction of terms.

Various techniques are used in the process of translating terms. One of the simplest methods of translating terms at the lexical level is *transcoding*, when the source lexical unit is transcribed using the alphabet of the target language. This method, known as *transliteration*, is rarely used in technical translation practice, for example: “*returning émigré*” can be translated as «*ре-емігрант*», “*router*” can be translated as «*роутер*» (*маршрутизатор*). However, when using this method, it is important to keep in mind the “false friends of the translator” that can lead to a gross distortion of the meaning. For example, some words, such as “*contribution*”, “*conductor*”, and “*data*”, “*design*”, “*instance*”, “*stimulation*”, “*structure*” can have different meanings in different contexts, so their translation requires care and attention.

In the process of transcoding, the entire form of a word or a significant part of it can be transmitted using the letters of the language. Sometimes combined transcoding is used when most of the translated word reproduces its sound in the source language, but some elements of its graphic appearance are also transmitted for example, “*drone*” can be translated as «*дрон*» (*квадрокоптер*). Transcoding of terms is used when the culture, in particular the scientific environment of the translating country, does not have a corresponding term and its translated equivalent, and the translator cannot find a word or phrase in the target language that would accurately convey the meaning of the concept and meet the requirements of terminology. Since a word has one specific meaning during transcoding, this translation method is useful when you need to create a well-defined term in the target language.

Another method of translating terms is *calquing*, which is used to convey the combinatorial composition of a word. In this method, the constituent parts of the term are translated by the corresponding elements of the target language. If transliteration/transcription is used mainly for translation of individual words, the translation of terminological phrases are translated more by means of calquing and descriptive translation. Calquing is used mainly when translating terms with a complex structure [1, p. 127].

For example:

- *IT companies* - *ІТ компанії*;
- *MBA diploma* (*MBA - Master of Business Administration*) – *диплом MBA*;
- *cyber police* – *кіберполіція*;
- *infrastructure* – *інфраструктура*;
- *website* - *вебсайт*.

Before applying *transcoding* or *calquing*, the translator must make sure that there is no appropriate translation equivalent in the target language for the term to be translated. Otherwise, transcoding may result in duplicate (synonymous) terms, which can lead to misunderstandings and disrupt the clarity and structure of the terminology system.

When considering between transcoding and calquing, calquing is more often preferred, since transcoding can lead to the formation of expressions that are not understandable in the target language. However, calquing is used only if the translated expression created in this way does not violate the norms of word usage and compatibility in the target language. In addition, calquing often requires various types of transformations, such as changing case forms, the number of words in a phrase, affixes, word order, morphological or syntactic status of a word.

Recently, the number of cases has increased when the use of such methods of translating terms as transcoding and calquing is not logically justified. For example, so-called pseudo-terms have appeared, such as «атітюд» (attitudes), «тенеза» (genesis), «елястичний» (elastic), «іригація» (irrigation), «квестія», «квест» (quest), «модератор» (moderator), «туторіал» (tutorial), «фасілітатор» (facilitator), «фреймворки» (frameworks), «фундатор» (founder) etc..

The use of these terms is not justified, as there are already precise equivalents in the Ukrainian language that clearly reflect the essence of English concepts (e.g., «відношення» or «відносини», «походження», «гнучкий» or «пружний», «зрошення», «питання», «ведучий», «посібник», «координатор», «рамки» or «структури», «засновник»). The borrowing of such pseudo-terms can be explained by the “linguistic fashion” and they can be considered as “empty” concepts that represent English-language barbarisms.

To translate terms, *descriptive translation method* is used as well. Descriptive translation is the closest to *explication* because it is the transfer of the meaning of a foreign language word with the help of an extended explanation. This is the application of new lexical elements of the source language in the translation of a phrase that accurately conveys the essence of a simple term [10, p. 277]. This technique allows conveying the meaning of the term sentence construction and changes the quantitative composition of the translation.

This method is used in explanatory dictionaries. For example:

- *brick-veneer structure* – дерев'яна конструкція з цегляним облицюванням;
- *mixing in transit* – змішування бетонної суміші в дорозі роторними змішувачами або «на дорозі-змішування»;
- *local building permit* – дозвіл на будівництво, виданий місцевою владою;
- *manual mode* – режим ручного управління;
- *prefabricated element* – збірний елемент заводського виготовлення;

Thus, the disadvantage of descriptive translation is its verbosity and complexity, which deprives it of accuracy and brevity. It is advisable to use descriptive translation when none of the above methods reveals the meaning of the of a foreign language concept, and therefore it simply needs to be explained, or in those cases when it is possible to limit oneself to a fairly brief interpretation. In order to apply this technique, it is necessary to determine, based on the context, the meaning of the lexical unit being translated, take into account its word-forming elements and the main ways of forming new words.

Conclusions

Overall, the translation of terms is the basis of scientific and technical translation, so it is important to understand the peculiarities of translating this part of the lexicon to achieve maximum equivalence.

Due to the fact that various techniques are used in the process of translating terms, such as calquing, transliteration, descriptive translation, inversion, and others. Often, a combination of several translation techniques is used simultaneously. When translating, it is important to take into account the context and specifics of the terminology field.

In the article there is an overview of the commonly used translation techniques in scientific and technical literature such as calquing, transcoding and descriptive translation.

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Мета – дослідити особливості найпоширеніших перекладацьких прийомів у науково-технічній літературі, виявити ключові проблеми та шляхи їх вирішення. Для досягнення цієї мети поставлено такі завдання: визначити способи відтворення термінів у перекладі; проаналізувати способи перекладу термінів у науково-технічній літературі; проаналізувати використання перекладацьких прийомів у науково-технічній літературі.

Методи. Основні результати отримано шляхом застосування таких методів дослідження, як: описового методу, котрий використано для характеристики термінів; порівняльного методу для виявлення відмінностей та подібностей термінів; контрастивного методу для аналізу конкретних прикладів перекладу термінів.

Результати. Теоретичний аналіз термінів науково-технічної літератури дав змогу виділити типи побудови термінів. Окреслено шість основних типів побудови термінів. Розглянуто узагальнені типи побудови термінів: терміни, що складаються з основи або кореня, який носить основне значення терміна; терміни, які утворюються шляхом афіксації; терміни, які складаються з двох або більше кореневих слів; нові терміни, утворені шляхом поєднання двох або більше слів; скорочення від одного або декількох слів, які використовуються як терміни; терміни, які складаються з символів і букв, що відображають певні поняття або концепції; терміни, які використовуються для опису певної моделі або концепції. Сформовано понятійно-категоріальний апарат дослідження, що містить визначення найуживаніших перекладацьких методів у науково-технічній літературі: «калькування», «транскодування», «описовий переклад». Найпоширенішими методами перекладу науково-технічної літератури визначено: калькування, транскодування та описовий переклад. Наведено приклади вищевказаних перекладацьких методів на основі технічних термінів галузі «будівництво», що дозволить успішно керувати навчальним процесом студентів як філологічних, так і технічних спеціальностей.

Ключові слова: методи перекладу, науково-технічна література.