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PROBLEMS OF TRANSLATING IT TERMINOLOGICAL UNITS

Summary. The work aims at studying how the global tendency of increasing demand for translation services in IT correlates with the situation in Ukraine, the country of a full-scale war; identifying problems of translating IT terms, viewing the main means of reproduction of computer terminological units in Ukrainian language.

The analysis of the data from the reliable sources confirmed the first assumption that the number of Ukrainian IT workers has been increasing despite the war in Ukraine. The research showed the discrepancy between growing demand for translating services and lack of competence of translators in the sphere of IT. This leads to actuating the problem of adequate translation of IT terms into Ukrainian.

Generally, a *term* is understood as limitation, restriction or regulation. It was estimated, that IT terms may violate the common interpretation of the concept as being monosemic which is explained by deep penetration of IT in the current life of people. Review of literature in the field of translation of IT terms proved the assumption that borrowings are the main means of reproduction of computer lexical units in Ukrainian. The main types of them include transcoding, tracing, explication, equivalent translation. The dominance of multi-component prepositional phrases in the English language creates certain difficulties in the translation process, this problem is normally solved by tracing with a change in the sequence of the components of the phrase. Affixal, affixless, and lexical-semantic are the most common word formation methods in computer vocabulary.

To solve the problem of low qualification of the majority of Ukrainian translators, it is suggested to introduce independent English and Ukrainian language testing of those who obtain bachelor and master degrees in the field of IT.

Key words: computer terminological units, transcoding, tracing, explication, equivalent translation, transliteration, transcribing, blended transcoding, adapted transcoding.

The relevance of the chosen topic is determined by rapid changes in the field of computer technologies and the growth in demand for translation services in general, and technical texts in particular. According to Fact.MR 2023 Translation Industry Trends and Stats | Redokun Blog, the global language services market was valued at USD 60.68 billion in 2022. It is projected to reach USD 96.21 billion by the end of 2032, with a CAGR of 5.94% [1]. The employment of translators and interpreters is expected to increase by 20% from 2019 to 2029, which far exceeds the average rate of 4% for all occupations [2]. This actualizes the problem of improving the quality of translation of IT texts.

Analysis of scientific thought on the topic of discussion, lead to the conclusion that this field of study has not been developed quite well by Ukrainian scholars. Even those few works mostly cite and refer to the studies of their Russian colleagues. However,

the theoretical basis for methods of translation of computer lexical units was developed by such Ukrainian scholars as Zatsnyi I. A. [3], Karaban V. I. [4], Kovalenko A. Y. [5], Kyiak T. R. [6] who outlined general problems of scientific and technical translation. Korunets I. V. studied peculiarities of translation of lexical innovations [7]. Myroshnychenko V. M., Shishkova I. S. viewed computer terms and the ways of forming computer neologisms, appearance of sleng in Ukrainian and English IT language [8]. Fabian M. P. considered approaches to lexical semantic studies [9].

The aims of the work are: to research how the global tendency of increasing demand for translation services in IT correlates with the situation in Ukraine, the country of a full-scale war; to identify problems of translating IT terms; to view the main means of reproduction of computer terminological units in Ukrainian language.

Our *first assumption* is that the number of Ukrainian IT workers will be increasing despite the war with Russian aggressor, as this kind of job can be done on-line, remotely, thus actuating the problems of translating IT terms.

Our *second assumption* is that the biggest amount of English IT vocabulary are borrowings as primarily, the innovations in computing have been introduced and described in English. Besides, people use borrowed words in their native language when they lack knowledge of the object or notion they describe.

Thus, the tasks of the article are to check the mentioned above assumptions and to identify main ways of translating English computer terms.

Methodology/Methods. Language is a system, and the most systematized description of lexical units is introduced in monolingual and bilingual dictionaries – our main source for the research. A system-oriented approach to lexis analysis based on the principle that language forms a system of a definite structure is applied [9]. Methods of observation, systematization, synthesis and analysis of reliable data have been employed in literature review and to check the assumptions. Reviewing articles about lexical units in IT field suggests application of discourse analysis.

Results and Discussion. To check our first assumption, we applied to the data of Ministry of Justice in Ukraine, the Unified State Register of Legal Entities and Individual Entrepreneurs, provided to DOU by the YouControl analytical service. It was estimated that, as of February 24, 2023, there were 271,699 individual entrepreneurs working in the IT field in Ukraine. Within the year of the full-scale war, the number of IT professionals registered as individual entrepreneurs increased by 31,793, or by 13% [10]. Moreover, despite the full-scale war, the number of IT professionals registered as physical persons entrepreneurs grew in all regions of Ukraine. Even in Kharkiv, Kherson, Luhansk and Donetsk regions there

was an increase of about 10%, although this is less than in other regions [ibid]. To supplement the statistical data, they used the data of the survey of Ukrainian IT specialists, which was conducted in the Telegram channels DOU Polska, DOU and Traktor on DOU in March 2023. 6290 people took part in it [ibid]. This data from the reliable source confirms our first assumption that the number of Ukrainian IT workers is increasing despite the war in Ukraine.

On the other hand, in another survey, 52% of respondents said that they have not acquired any formal translator or interpreter certifications in their native language [11]. As for the level of English among those looking for a first job in IT, it appeared to be quite low, with only 28% rating it as advanced or above average, and a third have a basic or below average command of the language. Employed novice professionals with up to a year of experience know English significantly better: 45% rated their level as advanced or above average [12]. In other words, more than a half of those engaged in translating are lacking competence in it. This discrepancy causes the need to review the ways of translating lexical units in the field of IT into Ukrainian and work out the ways of increasing the quality of translation. This task leads to necessity to pay much more attention to scientific research in the field of translating IT terminology.

Thesaurus.com defines “terminology as the system of terms belonging or peculiar to a science, art, or specialized subject; nomenclature: eg. *the terminology of computing*.”

The science of terms, as in particular sciences or arts [13]. Thus, *terminology* is vocabulary associated with a certain field of study, profession, or activity. Knowing *terminology* is an important part of being able to work in a given profession [ibid]. Computer terminology refers to the technical words used in computing and technology. *Terms* are considered to be the most informative lexical units at the level of a word, names of a special kind that signify the concept of a special sphere of human activity. Generally, *term* is understood as limitation, restriction or regulation. If in general language (outside of certain terminology) a word can have multiple meanings, then, falling into a certain terminology, it becomes unambiguous. The specifics of the terms as the special lexical category of words consists in the fact that they are created in the process of industrial and scientific activity, and therefore, function only among people who possess the relevant scientific and industrial realities, that is, the macro context. Therefore, unlike ordinary words, the ambiguity of terms in language communication is provided by the situation or the linguistic context, and is regulated by the extralinguistic macro context or the linguistic micro context [14].

However, IT terms' field of function is far wider in current conditions and includes all spheres of people's life, thus violating the common interpretation of the concept as being monosemic: eg.: application – застосунок, додаток; subscriber, user – абонент; screen, shield – екран, etc.

According to some linguists, “the main source of the appearance of terminology in the Ukrainian language is borrowing, translation” [15]. Bearing in mind the mentioned above data about low level of professionalism of more than a half of Ukrainian translators in the field of IT terms, we consider that this incompetence might be among the main reasons of borrowings.

Another specific feature of computer vocabulary is that due to intense spread of computer technology and its penetration into all spheres of society it is swiftly losing its highly specialized character and is becoming more and more commonly used vocabulary. The

scholars describe the stages of transformation of the term from borrowing to slang: “Borrowing (translation) – use in special (scientific literature) – use in the youth press (journalistic style) – use in colloquial speech (virtual communication)” [ibid].

The phenomenon of simplification of terms in virtual communication can be explained by the need for quick, spontaneous communication speech. Many of them are formed as a result of metaphorical, associative thinking.

eg.: computer – комп; to delete – зносити; to connect two computers – шлангувати; hard disk – гвинт; driver – дрова; megabyte – метр [ibid]

However, the main means of reproduction of computer terminological units are borrowings, and they include:

- Transcoding;
- Tracing;
- Explication;
- Equivalent translation [16].

Transcoding is used when the sound and/or graphic form of the word of the source language is transmitted by means of the alphabet of the target language. The transcoding of IT neologisms occurs in translation in those cases when the culture and, in particular, the science of the country of the language of translation lacks a corresponding concept and a corresponding translation equivalent, and the translator cannot choose a word or words in the translation language that would adequately convey the meaning of the concept and meet the requirements for term formation. Transcoding of terms occurs especially often in those cases when the term in the translation language consists of international term elements of Latin or ancient Greek origin.

In transcoding the following four subtypes are distinguished:

1. Transliteration. It should be noted, that doubling of consonants between vowels is not transmitted, as, for example, in the word "commutator". Besides, the letter "r" at the end is usually transferred, regardless of whether it is pronounced in the original word, or not, for example, "monitor".

eg.: “buffer – буфер; commutator – комутатор; conflict – конфлікт; decoder – декодер; indicator – індикатор; laser – лазер; monitor – монітор; multimedia – мультимедіа; operator – оператор; plotter – плотер; port – порт; portal – портал; printer – принтер; processor – процесор; scanner – сканер. server – сервер; status – статус” [ibid].

2. Transcribing. It is characterized by the transfer of the letter "r", for example, "driver". eg.: “browser – браузер; cartridge – картридж; cluster – кластер; computer – комп'ютер; display – дисплей; driver – драйвер; provider – провайдер; site – сайт; toner – тонер; user – юзер” [ibid].

The large number of available transcribed lexemes is explained by the rapid development of computer technologies: in modern scientific journals, novelties appear every week, so it is obvious that in the conditions of such a technological revolution, every new phenomenon should obtain a name. Usually this name is the original version of the term.

3. Blended transcoding. It is characterized by the use of transcription with elements of transliteration and vice versa.

eg.: “adaptor – адаптор; chat – чат; chipset – чіпсет; chorus – хорус; codex – кодекс; device – девайс; interface – інтерфейс; on-line – он-лайн; organizer – організатор” [ibid].

4. Adapted transcoding. It occurs, when the word of the original language is adapted to the structural features of the target language.

The following features are characteristic of this terminological translation tool: the use in Ukrainian of a softening at the end of a word that is absent in the English word, for example, "модуль"; the presence of a generic ending in the translation language, for example, "модифікація"; doubling of consonants between vowels is not transmitted in the Ukrainian language, for example "команда".

eg.: "card – карта; command – команда; domain – домен; implementation – імплементація; matrix – матриця; menu – меню; profile – профіль; viewer – в'юер" [ibid].

Tracing occupies the second place in frequency of use. This is a method of translating terms, when the first equivalent in the dictionary in the translated language is chosen to be the equivalent of a simple or (more often) complex term of the English language, as a rule. This method of translating terminological units is carried out by replacing their constituent parts – morphemes or words – with their lexical equivalents in the target language. It is more often used in the translation of complex words (terms). It can also be applied to only one of the components of a compound word (term). Quite often tracings are used in translation for those complex terms formed with the help of commonly acknowledged words. In some cases tracing is accompanied by the change of order of traced elements. Sometimes transcribing and tracing occur summaltenuously. Below there are some examples.

eg.: "artificial neural network – штучна нейтронна мережа; composite key – композитний ключ; computer network – комп'ютерна мережа; control panel – панель управління; current drive – поточний дискет; data warehouse – інформаційне сховище; disk storage – дискова пам'ять; error checking – контроль помилок; file system – файлова система; image recognition – розпізнавання зображення. mailbox – поштова скриня; matrix printer – матричний принтер; network neighborhood – мережеве оточення; process-handling procedure – процедура управління процесом; ring network – кільцева мережа" [ibid].

Tracing is justified when the constituent elements of terminological phrases have already occupied a certain place in the terminological system of the language of translation and are understandable by specialists [17].

In the case when the word combination consists of terms that have not yet come into use in a certain field of science or technology in the language of translation and require their own interpretation, method of explication is used [18, p.178]. Explication (from the Latin explicatio - explanation) is a lexical-grammatical transformation in which a lexical unit of the original language is replaced by a word combination that gives an explanation or definition of this unit. With the help of explication, multi-component terminological phrases are translated:

eg.: "burning – запис компакт-диска; business application – програма комерційних розрахунків; cross fade – плавний перехід від одного звукового фрагмента або відеокліпа до іншого; deluxe – розширена версія програмного пакета, яка включає додаткові програми чи можливості; freeware – безкоштовне програмне забезпечення; gigaflops – мільярд операцій з рухомою (плаваючою) комою (крапкою) за секунду; log – текстовий файл звіту, в який записують усі дії, які виконує програма, і їх результати; magnetic bubble memory – запам'ятовувальний пристрій на циліндричних магнітних доменах; native mode – режим роботи у власній системі команд; non-mouse program – програма, яка не підтримує роботу з мишкою; nucleus – ядро операційної системи; policy module – модуль керування вико-

ристанням ресурсів; processor-specific code – програма, прив'язана до певного процесора; protocol – метод передачі даних; shareware – умовно-безкоштовне програмне забезпечення, з яким можна працювати протягом певного часу; software – програмне забезпечення; wizard – інтерактивний інструмент для покрокового виконання різних операцій" [ibid].

Sometimes explication works together with tracing as, for example, MS-DOS (MicroSoft Disk Operating System) – дискова операційна система фірми Microsoft.

The English language is dominated by multi-component prepositional phrases, which is not inherent in the Ukrainian language and this creates certain difficulties in the translation process [ibid]. These difficulties are often eliminated by tracing with a change in the sequence of the components of the phrase:

eg.: "BIOS (Basic Input/Output System) – базова система введення-виведення; DMA (Direct Memory Access) – прямий доступ до пам'яті" [ibid].

Equivalent translation occurs, if during the translation, the meaning of the English word completely coincides with the meaning of the Ukrainian word. Equivalence acts as the basis of communicative similarity, the presence of which makes a text a translation. The concept of equivalence of translation is understood as reproducing in translation the content of the original, which is considered to be a set of information contained in the text, including emotional, stylistic, figurative, aesthetic functions of language units [19, p. 112]. Thus, equivalence is a broader concept than "accuracy of translation", which usually means only the preservation of the "subject-logical content" of the original. In other words, the norm of equivalence means maximum accordance with the original [ibid].

eg.: "accept – приймати; addition – додавання; alarm – тривога; alert – сигнал попередження, застереження; align – вирівняти; allocate – виділити, розміщати, розподіляти; argue – масив; arrow – стрілка; assign – присвоювати, призначати; available – доступний, наявний; backup – резерв, резервувати; bar – панель; browse – продивлятися; brush – пензель; bus – шина; cancel – відмінити; capture – введення (із цифровим кодуванням); clock – генератор, годинник; desktop – робочий стіл; drive – дисковий; editor – редактор; erase – витерти; logout – вихід системи, error – помилка; keyboard – клавіатура; lock – блокування; memory – пам'ять; message – повідомлення; mode – режим" [ibid].

Conclusions. To sum up, the relevance of the topic is explained by the growing demand of translating services in IT sector in Ukraine on one hand, and lack of language competence of those engaged in translating on the other. The insufficient level of language competence of IT workers causes the necessity to review the main means of reproduction of computer terminological units in Ukrainian language.

The peculiar feature of computing terms lies in the fact that fast developments in the field of advanced technologies and penetrating of IT into all spheres of our life not only cause swift appearance of new terms, but also polysemic nature of some of them even within this narrow group of lexical units. The study of the terminological system in the field of information technologies also proved the assumption that the biggest amount of English IT vocabulary are borrowings, and they include: transcoding; tracing; explication; equivalent translation.

The dominance of multi-component prepositional phrases in the English language which is not inherent in the Ukrainian

language creates certain difficulties in the translation process, this problem is normally solved by tracing with a change in the sequence of the components of the phrase.

The concept of equivalence is one of the main tasks of the translator, which is to convey the content of the original as fully as possible, and, as a rule, the actual accordance of the content of the original and the translation is extremely significant. As far as functioning and vocabulary of computer terminology are concerned, they are the subject to the rules of the Ukrainian language. In particular, affixal, affixless, and lexical-semantic are the most common word formation methods in computer vocabulary.

The problem of the lexico-semantic method of forming English-language vocabulary in the field of computer science and information technology is so voluminous that it requires a separate thorough study and will serve as the subject of further scientific research.

To solve the problem of low qualification of the majority of Ukrainian translators, it might be useful to encourage them to increase their level of both their native Ukrainian language, and English. This might decrease the number of misinterpretations of IT terms and make the language of IT more understandable for the wider circles of users. In our opinion, independent English and Ukrainian language testing of those who obtain bachelor and master degrees in computing could contribute to solving this issue.

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Шапаренко О. В. Проблеми перекладу термінологічних одиниць сфери інформаційних технологій

Анотація. Метою роботи є дослідження того, як глобальна тенденція зростання попиту на послуги перекладу в IT співвідноситься з ситуацією в Україні, країні повномасштабної війни; виявлення проблем перекладу IT-термінів, розгляд основних засобів відтворення комп'ютерних термінологічних одиниць українською мовою.

Аналіз даних із достовірних джерел підтвердив перше припущення про те, що незважаючи на війну в Україні кількість українських працівників у сфері IT зростає. Дослідження показало невідповідність між зростаючим попитом на послуги перекладу та недостатньою компетентністю перекладачів у сфері IT. Це призводить до загострення проблеми адекватного перекладу IT-термінів українською мовою. Загалом термін розуміється як обмеження, або регулювання. Було виявлено, що IT-терміни можуть порушувати поширене тлумачення поняття слова «термін» як моносемічного, що пояснюється глибоким проникненням IT у життя людей на даний момент. Огляд літератури в галузі перекладу IT-термінів підтвердив припущення про те, що запозичення є основним засобом відтворення комп'ютерних лексичних одиниць українською мовою. До основних їх видів належать транскодування, калькування, експлікація, еквівалентний переклад.

Домінування в англійській мові багатокомпонентних приєднаних словосполучень створює певні труднощі в процесі перекладу, цю проблему зазвичай вирішує калькування зі зміною послідовності компонентів фрази. У комп'ютерній лексиці найпоширенішими способами словотворення є афіксальний, безафіксний і лексико-семантичний.

Щоб вирішити проблему низької кваліфікації більшості українських перекладачів, пропонується запровадити незалежне тестування з англійської та української мов тих, хто здобуває ступені бакалавра та магістра у сфері IT.

Ключові слова: комп'ютерні термінологічні одиниці, транскодування, калькування, експлікація, еквівалентний переклад, транслітерація, транскрибування, змішане транскодування, адаптоване транскодування.