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Functional-semantic peculiarities of translating cybersecurity terminology

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Abstract

Purpose: This study aims to analyze the challenges and strategies involved in translating English cybersecurity terminology into Uzbek, with particular attention to preserving the functional and semantic features of the source terms.

Research methodology: The research applies a descriptive-analytical approach by examining existing terminological units in English and their Uzbek equivalents. Comparative linguistic analysis and semantic mapping are used to identify patterns of borrowing, adaptation, and equivalence in translation.

Results: The findings indicate that most Uzbek cybersecurity terminology originates from English, often entering through direct borrowing or partial adaptation. While many terms maintain functional accuracy, semantic distortions occur when literal translation is applied without contextual consideration. The research also highlights that some terminological units enrich the Uzbek lexicon, while others pose challenges in achieving precise equivalents due to cultural and linguistic differences.

Conclusions: Translating cybersecurity terms requires strategies that balance linguistic accuracy with functional clarity. The study concludes that a hybrid approach—combining direct borrowing with contextual adaptation—is the most effective way to maintain the semantic integrity of specialized terms.

Limitations: The study is limited to selected cybersecurity terms and does not encompass all branches of information technology. Broader corpus-based research may be needed to generalize the findings.

Contribution: This research contributes to translation studies and applied linguistics by providing insights into the mechanisms of term transfer between English and Uzbek, offering practical recommendations for translators, linguists, and ICT professionals.

Keywords: *Cybersecurity, Information Technology, Semantics, Terminology, Translation*

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1. Introduction

Translation is becoming increasingly common in all spheres of life, and with the rapid development of technology and the expansion of scientific and technical information, the importance of scientific and technical translation has also increased. In the era of global computerization, research into methods of translating cybersecurity terms into English is undoubtedly relevant. Scientific and technical translation is particularly important in this process (Paulsen, 2018). Philologists, linguists, and translation specialists attribute the difficulties in translating scientific and technical terms to such factors as the widespread use of various abbreviations, the dominance of some syntactic changes over others, the use of stylistic meanings in naming terms, and the transfer of several terms from other fields to cybersecurity

as hybrid terms, which, as a result, increases the semantic load of these terms (Henrico & Putter; Xu & Wang, 2016).

In recent decades, the digitalization of society has fundamentally transformed communication practices and the linguistic landscape of many languages. The emergence of new technologies has generated an unprecedented influx of neologisms, many of which are directly borrowed from English, the lingua franca of science and technology. Cybersecurity is a rapidly evolving domain that exemplifies this phenomenon. Terms such as “firewall,” “phishing,” “malware,” and “cryptography” have entered global discourse and often appear in their original English form, even in languages with rich terminological traditions. This widespread adoption underscores both the dominance of English in technical domains and the urgency of developing effective translation strategies to ensure clarity, accessibility, and cultural adaptation (Israilova, Israilova, & Gatsieva, 2023; Li, Cheng, Huang, Chen, & Niu, 2021).

Scientific and technical translation differs from literary or general translation in that it demands extreme precision and functional accuracy. Unlike literary texts, where stylistic freedom allows for interpretive creativity, technical texts require translators to convey exact meanings. A mistranslated cybersecurity term may not only distort understanding but also have practical consequences in legal, educational, and professional contexts. For example, misinterpreting “encryption key” as a literal “key” rather than a digital code could confuse end users or policymakers. Thus, translation in this field requires a balance between linguistic fidelity, terminological consistency and pragmatic applicability.

One of the central challenges lies in the linguistic properties of the cybersecurity terminology itself. Abbreviations and acronyms, such as “VPN” (Virtual Private Network), “DDoS” (Distributed Denial of Service), or “IoT” (Internet of Things), pose difficulties because their expanded forms may not be directly translatable or may sound cumbersome in the target language. Furthermore, many cybersecurity terms are hybrids borrowed from multiple domains. For instance, “honeypot” combines metaphorical imagery with a technical function, while “Trojan horse” refers to a classical cultural reference adapted into computer science. Translating such terms requires not only technical knowledge but also cultural awareness to preserve semantic nuances and communicative effects (Bakhromovna, 2025; Tavares, Tallone, Oliveira, & Ribeiro, 2023).

Another issue arises from the syntactic patterns. English, with its flexibility and preference for compound nouns, often produces compact terminological units such as “cloud storage security” or “data breach management.” Translating these directly into languages with different syntactic structures may result in awkward or excessively long sentences. Therefore, translators must employ strategies such as reordering, nominalization, or adaptation to align with the grammar of the target language while maintaining accuracy. Stylistic dimensions also play a role in translations. Certain terms carry stylistic or metaphorical meanings that reinforce their function. For example, “black hat” and “white hat” hackers are metaphorical expressions that classify hackers based on their intent and ethics. Rendering these literally into another language may cause confusion or a loss of nuance. In such cases, translators face a dilemma: whether to preserve the metaphor, risking incomprehension, or replace it with a culturally adapted equivalent that conveys the intended distinction (Bolduc, 2022; Deilen, Lapshinova-Koltunski, & Carl, 2023).

The global expansion of cybersecurity has also led to the cross-fertilization of terminology from related fields. Terms from military science, criminology, law, and psychology increasingly appear in cybersecurity discourse. Words such as “attack,” “defense,” “threat,” and “vulnerability” are borrowed from security studies, while “identity theft” combines legal and sociological dimensions. These hybrid usages broaden the semantic scope of cybersecurity terms but also complicate translation because the same word may carry distinct connotations in different contexts. Therefore, translators must exercise heightened awareness of interdisciplinary overlaps and avoid oversimplification. Beyond purely linguistic challenges, the cultural and institutional contexts of translation must be considered. Languages differ in their openness to borrowing foreign words.

For example, French traditionally favors the creation of equivalents (e.g., “logiciel” for “software”), whereas many other languages readily adopt English loanwords. In the Uzbek context, the influx of English IT terms has enriched the lexicon but has also created inconsistencies in usage. Some terms are borrowed wholesale, others are adapted phonetically, and others are translated semantically. This variability reflects the dynamic negotiation between linguistic identity and global technological integration (Alaa & Al Sawi, 2023; Ramirez & Choucri, 2020).

Cybersecurity adds another layer of urgency because it intersects with national security, personal privacy issues, and international law. Governments, institutions, and educational systems require terminological consistency to draft legislation, train professionals, and educate the public on the subject. Inconsistent or inaccurate translations can undermine cybersecurity policies or hinder international cooperation. For example, if “cyber resilience” is translated differently across documents, stakeholders may misunderstand its scope, leading to gaps in preparedness. Thus, translation in this field is not merely an academic exercise but also a matter of societal importance.

With the rise of machine translation and AI-driven language technologies, new opportunities and challenges have emerged. Automated systems can provide rapid translations of technical texts, but they often fail to capture specialized terminology or cultural nuances. For instance, machine translation engines may mistranslate “worm” as a literal biological creature rather than as a type of malware. This highlights the continuing need for human expertise in scientific and technical translations. Nevertheless, AI tools can support translators by offering initial drafts, concordances, or term databases, provided they are supplemented with human judgment (Martínez, Robles, El Oualidi Charchmi, Estévez, & DeCastro-García, 2025; Rivera et al., 2019).

The pedagogy of translation also deserves further attention. Training future translators in cybersecurity terminology requires an interdisciplinary curriculum that combines linguistics, computer science, and cultural studies. Students must not only master translation strategies but also understand underlying technological concepts. Without this knowledge, they risk producing translations that are linguistically accurate but technically misleading for the reader. Therefore, educational programs must emphasize practical exercises, case studies, and collaboration with IT professionals to build competence. Translation studies scholars have proposed various strategies for handling specialized terms. Vinay and Darbelnet’s classical techniques—borrowing, calque, literal translation, transposition, modulation, equivalence, and adaptation—remain relevant but must be judiciously applied.

In cybersecurity translation, borrowing is often the simplest choice (e.g., “phishing”), but overuse can lead to the alienation of target readers unfamiliar with English. Calques may preserve structure but risk awkwardness, while adaptation requires creativity to find culturally resonant equivalents. Translators must evaluate each term individually and consider factors such as the audience, function, and text type (Martínez et al., 2025). Research in this area has begun to document the patterns of term transfer across languages. For example, studies in Russian, Chinese, and Arabic show similar trends of borrowing from English, although with differing degrees of adaptation. Comparative research can illuminate how linguistic systems respond differently to global technological changes.

For Uzbek, where translation traditions are still developing in this domain, documenting these patterns is especially important for building a standardized terminology. In conclusion, the translation of cybersecurity terms represents a complex intersection of language, technology and culture. It is shaped by global scientific developments, linguistic structures and cultural norms, and pedagogical strategies. Addressing these challenges requires an integrative approach that draws on linguistics, information technology, and translation studies. As societies become increasingly digitalized, the ability to translate cybersecurity concepts accurately and effectively will play a vital role in safeguarding communication, ensuring inclusivity, and supporting international cooperation.

2. Literature Review

2.1. Translation Theory and Scientific-Technical Terminology

Translation has long been recognized as a complex process that goes beyond mere linguistic substitution. Scholars such as Musaev define translation as a creative act of re-expressing meaning from one language into another while preserving semantic and structural unity. Similarly, Gafurov emphasizes the importance of pragmatic and linguocultural aspects in ensuring equivalence between source and target texts. Theories from P. Newmark also highlighted translation as the accurate transfer of intended meaning, stressing the translator's responsibility in maintaining precision in specialized domains. Scientific and technical translation differs from literary translation in its demand for functional accuracy and for terminological consistency. As noted in this article, mistranslations in technical fields such as cybersecurity can result in misunderstandings with significant legal, educational, and professional consequences. This aligns with the view of scholars like R. Pronina, who underlined the challenges posed by neologisms and polysemous common words frequently embedded in technical texts (Tiimub et al., 2023).

2.2. Cybersecurity Terminology: Nature and Challenges

Cybersecurity terminology occupies a unique position within the information technology terminological system. Unlike terms in other sciences, cybersecurity terms are characterized by the internationality of form, stylistic neutrality, polymorphism, and multifunctionality. They often emerge through borrowing, metaphorical transfer, or hybridization with concepts from other disciplines, such as law, criminology, and psychology. For example, terms such as *firewall*, *Trojan horse*, and *identity theft* have both metaphorical and interdisciplinary origins. A major challenge in translating these terms is the prevalence of acronyms and abbreviations (e.g., VPN, DDoS, IoT), which may not have natural equivalents in the target language. Moreover, the syntactic and stylistic features of English—particularly its compound noun structures—lead to difficulties when rendering terms into languages with different grammatical rules, such as Uzbek (Awadh & Shafiull, 2020; Gou, 2023; Putra, Ahadiyat, & Keumalahayati, 2023).

2.3. Problems of Translating Cybersecurity Terms

Scholars including V. Karaban and E.F. Skorokhodko emphasizes that synonymy, neologisms, and technical polysemy present significant hurdles in translation. Cybersecurity translation inherits these challenges, given its reliance on rapidly evolving vocabulary. According to D.V. Tabanakova states that the absence of stable equivalents in recipient languages requires translators to adopt flexible strategies, often resorting to descriptive definitions or borrowing. R.O. Sindega also notes the metaphorical and emotional nature of computer terminology, where terms like *mouse* or *Windows* rely on imagery familiar to everyday users. This metaphorical layer adds to the semantic load, demanding cultural and linguistic sensitivity during translation (Endi, Fanggidae, & Ndoen, 2023; Latunusa, Timuneno, & Fanggidae, 2023).

2.4. Methods and Transformations in Translation

This article synthesizes classical frameworks in translation studies Molina and Hurtado Albir (2002). Scholars such as Barkhudarov and V. Komissarov classified translation transformations into lexical, grammatical, and lexico-grammatical categories. These include transcription, transliteration, calque, modulation and grammatical substitution. Other scholars, such as Molina and Hurtado Albir, propose the term *translation transformations* to highlight the dynamic processes involved in adapting text fragments.

Common techniques applied in cybersecurity translation include the following:

a. Borrowing (*accreditation → akreditatsiya*),
b. Calque (*active threat → faol tahdid*),
c. Descriptive equivalence (*botnet → botni masofadan boshqarish dasturi*),
d. Notes and additions to clarify complex terms (*crack* or *dialler*).

These strategies reflect the need for translators to balance functional precision and semantic clarity, often requiring context-sensitive decisions (Rahu, Neolaka, & Djaha, 2023).

2.5. Functional-Semantic Considerations

The functional-semantic approach underscores that translation is not only about lexical substitution but also about preserving pragmatic and contextual meanings. For instance, metaphorical terms such as *black hat* and *white hat* hackers cannot be rendered literally without losing their ethical connotations. Therefore, functional equivalence is essential to ensure that the term carries the same conceptual weight in the target language (Bolduc, 2022; Mohamed, 2022).

2.6. Cross-Linguistic and Cultural Dimensions

Cross-cultural studies reveal variations in how languages adapt to IT and cybersecurity terms. While French institutions prefer coining native equivalents, languages such as Uzbek frequently borrow English terms. This creates inconsistencies, as some terms remain untranslated, while others are adapted phonetically or semantically. This article emphasizes the importance of standardized practices to avoid fragmentation in national terminological systems.

3. Research Methodology

Several countries have taken measures to protect the spelling and pronunciation of foreign words from appearing in the national language. For example, in China, all borrowed words are translated into Chinese or replaced with their predecessors (Molina & Hurtado Albir, 2002). Translators play an important role in this regard. Presidential Decree No. UF-5850 of October 21, 2019, ' On measures to radically raise the prestige and status of the Uzbek language as the state language' specifically outlines the issue of 'introducing scientifically sound new words and terms, creating Uzbek alternatives to modern terms and ensuring their uniform use, controlling and coordinating the naming of geographical and other toponymic objects in accordance with regulatory and legal acts' means that there is a lot of work to be done to find and The development of the field of translation studies is of great importance in the realization of such reforms.

Theoretical foundations of the translation concept. Translation is an important aspect of social life. Translation is a bridge between two people and languages. Translation enables communication between people who speak different languages. Information about new objects or subjects created in science and technology is transmitted to other people through translations. According to Musaev, translation, a complex form of human activity, is a creative process that consists of recreating a verbal utterance (text) created in one language by means of another language while preserving the unity of its form and content (Molina & Hurtado Albir, 2002). Translation is indeed a creative process. The creation of a creative product in one language in another language is the creator's creative product.

Gafurov emphasizes that 'translation is a process of transforming or transferring the speaker's speech, author's work, various documents and information from one language to another and making them understandable in another language'(Molina & Hurtado Albir, 2002). According to I. Gafurov and K. Summarising Musaev, translation can be defined as the transformation of a written or spoken text from one language into another, considering its semantic, linguocultural, pragmatic, and linguistic features (Newmark, 1988). A. According to Rohee, 'the process of translation between two languages is the transformation by the translator of a written text in one source language into a written text in the target language and an oral text in one source language into an oral text in the other target language' (Newmark 1988).

According to P. Newmark states that 'in rare cases, translation is the transfer of the meaning of a text into another language in the way the author intended it to be translated'(Pym, 2007). Therefore, when translating, it is necessary to pay attention to the equivalence of languages, taking into account the syntactic, semantic, stylistic, pragmatic, and linguocultural features of the source and target languages. We can also see these characteristics of translation in J. Nord's definition of translation. He emphasizes that 'translation is a learning process aimed at replacing the source language text with the best equivalent in the target language text, and this requires understanding the syntax, semantics and pragmatics of the target language, as well as analyzing this process'(Lopez, 2009).

If we refer to the descriptions and definitions given to translation by scholars, translation can be explained as follows: translation is the process of transferring any words, phrases, texts, etc. in oral or written form from the source text to the target language, taking into account linguistic (syntactic, semantic, stylistic) features of the source and target languages, as well as extralinguistic (linguocultural, pragmatic, and cognitive) features. *Theoretical foundations of cybersecurity terminology.* When translating terms in any field, it is important to first pay attention to the main characteristics of terminology in the given field, that is, the derivational, semantic, methodological, and cultural aspects of the terms. The study of cybersecurity terminology is important for all branches of the state and society, and its study is of interest not only to information technology specialists but also to all spheres of social life.

Cybersecurity terminology occupies an important terminological layer in the terminological system of the information technology sector. A term is considered a lexical unit of language and is a nomenclature of words and word combinations related to a specific field. Any term in any field has the properties of unambiguity, clarity, expressiveness, nominative, and systematicity. In the structure of cybersecurity terminology, three main layers of terms are distinguished by their degree of importance: electronic scientific and educational publications, manuals, reference books, technical instructions, coded terms used in electronic dictionaries, terms borrowed from the common language with their new content and additions based on metaphorical and metonymic transfers (inter-network and inter-system assignments) from other areas of scientific knowledge, and general technical terms that serve to create terms of information technologies and information technology. The cybersecurity terminosystem is a set or corpus of terminological units that provide the naming of concepts in the field of information technology knowledge linked by logical, semantic, and other relations.

In terms of logical and semantic structure, cybersecurity terms are divided into terms denoting objects, processes, volumes of information, and their units. Cybersecurity terms are divided into semantic groups, such as computer devices, software, commands, Internet communication, multimedia, types of personal computers, subjects of interaction, and units. The terminological system of this field is divided into domain terms, termoids, and prefixes, and their meanings are more fluid and dynamic than those of terms in other fields, such as chemistry or physics.

They can easily transition to new situations. The systemic characteristics of cybersecurity terms differ from terminology in other fields in that they have inherent characteristics, such as internationality of external form, thematic focus, stylistic neutrality in the terminological field, polymorphism, and multifunctionality. International terms are also of particular importance in cybersecurity terminology because they form a significant part of industry terminology. The weighting of allocations in the cybersecurity terminology system is also unique to this study. Typically, absorption rates are determined as follows:

- The tendency to eliminate polysemy and homonymy of the source word in the recipient language
- The need for a detailed explanation of the concept
- The expression of positive/negative connotations in the target language;
- tendency to form words similar to those of the target language for understanding
- nomination of a new thing, concept, or phenomenon
- The absence of a corresponding concept in the recipient language
- Stylistic impact of the borrowed word on the principle of expressiveness.

The following typology of difficulties related to the practical application of cybersecurity terminology, in particular appropriation terminology, consists of the following issues:

- Lack of knowledge and skills in this area among ordinary citizens
- Spelling errors in terms directly and indirectly borrowed from the English language
- errors in the pronunciation of familiar cyber security terms

The user of the term remains unaware of the basic meaning associated with the borrowed term.

- The occurrence and practical non-reflection of cases of narrowing and broadening of meanings of acquired terms over time
- There are cases when borrowed terms do not have a neutral meaning but acquire a stylistically mobile meaning, expressing positive or negative connotations.

According to V. Karaban states that one of the most difficult processes in translation is the selection of one lexical unit from several synonyms. It is also necessary to consider the semantic and stylistic peculiarities of synonyms, which the translator should know well and be able to choose the right variant. In turn, the Ukrainian philologist, E.F. Skorokhodko, in her work 'Problems of translating technical literature into English, ' emphasizes that 'a large number of special terms in the text, especially newly appearing (neologisms), creates serious difficulties in the practice of translation.' A. Weiss, N. Kireev and Mironchikov also emphasized that special attention should be paid to neologisms, which cause great difficulties when working with texts related to industrial sources, since most of them are not found in dictionaries. The differences in translation noted above also apply directly to cybersecurity terminology. This is because most cybersecurity terms belong to the information technology field.

It is possible to study the opinions of many researchers regarding the translation of information technology terminology. Most of them discuss translation problems related to neologisms when translating information technology terms. R. Pronina notes that 'despite the large number of specialized terms in their field, the language of scientific and technical literature contains a large number of commonly used words and expressions, and most commonly used words are polysemous'(L.S, 1975). Cybersecurity terms are also considered terminology of scientific and technical texts, and their translation can be particularly challenging.

According to D.V. Tabanakova states that 'the reason for the difficulty of translating texts, especially those related to information technology, is the translator's use of a large number of information technology terms.' This is because word combinations that have no equivalents in information technology texts have no permanent correspondences in Russian (except for descriptive entries in dictionaries) (Gafurov, 2008). The use of special terms in Russian-language texts on information technology can also be found in the Uzbek language. Many terms of information technology in the Uzbek language have come directly from English or indirectly from Russian.

R.O. Sindega expresses the following thoughts about information technology terms and their translations: 'A distinctive feature of computer terminology is its metaphorical meaning and emotional appeal, because for the creators and users of the term, it emphasizes that the field of computer technology is intellectual. For example, the term '' mouse, which refers to the device that controls the movement of the cursor, resembles the creature 'mouse' in appearance. In addition, the name of the program, 'Windows, ' is based on the similarity of the principle of presenting information in the form of Windows on the computer screen. They are used in everyday life not only by computer professionals but also by people of all ages and professions. 'These features must be considered in translation (Komissarov 1990). Therefore, similar features and problems of translation apply to the translation of cyber security terms. Having analyzed the opinions and comments expressed regarding the translation of cybersecurity terms, we felt it necessary to focus on the following important aspects:

First, to correctly define the words represented by a term, it is necessary to know the field of science and technology to which the term refers to. Second, although a term is associated with a well-defined concept, a specific meaning, and is described, it cannot be considered a separate semantic unit, as there may be several terms with a specific technical meaning. Their spiritual content must vary according to the field in which they are used. Finally, to properly understand and translate terms, it is also necessary to know the morphological structure of terms, the semantics that distinguish them from commonly used words, the main types of expressions, and the peculiarities of their structures and usage.

Methods of translating cybersecurity terms. In translation studies, the methods used to translate small text fragments are described using the terms 'translation methods', "' translation tools, '" ' translation

procedures, ' and 'translation transformations. ' " In particular, Vigner and Darbelnier and P. Newmark treats these concepts as translation processes, while E. Aznaurova, L. Barkhudarov, V. Komissarov, and N. Kambarov argue that they are translation transformations. Molina, Urtardo Albir, and M. Ordudar use the term 'translational transformations' to refer to these concepts. Based on the ideas of Aznaurova, Barkhudarov, and V. Komissarov, and N. Kambarov, we have applied the term 'translational transformations' to translation methods aimed at transforming small units of the text.

L. Barkhudarov subdivides the transformations used in the translation process into four types[1](Tulkinovna) : 1) change of location; 2) exchange of words; 3) addition of words; 4) omission of a word. V. Komissarov divides translation transformations into three main types: lexical, grammatical, and lexico-grammatical (Xiangdong 2002). Lexical transformations: 1. Transcriptional and translational transformations. 2. Calculative transformation: 3. Lexico-semantic exchange (refinement, generalization, modulation) and transformation. Grammatical transformations: 1. Transformation by syntactic analogy (literal translation). 2. A transformation that changes the structure of a sentence (e.g., splitting or combining sentences). 3. Grammatical substitutions (replacing a word-form, part of speech, or parts of speech). Complex lexico-grammatical transformations: 1. Antonymic translation transformation. 2. Explication (explanation of the content) of transformation. 3. Compensatory transformation:

4. Result and Discussion

Translation studies employ a wide range of techniques when translating lexical units, particularly terms. These techniques include the following:

1. **Word borrowing.** In this process, lexical items are transferred directly from the source language to the target language.
2. **Calque.** A foreign word or phrase is translated literally into the target language and becomes part of its lexical system. Here, the translator recreates an equivalent word or expression by preserving the structural features of the source term.
3. **Transposition.** This involves changing grammatical categories or word order. For example, a verb in the source language may be rendered as a noun in the target language (Pronina, 1989). Other grammatical adjustments include:
    - changing singular into plural forms,
    - applying conversion when certain structures do not exist in the target language,
    - transforming verbs into nouns or vice versa,
    - shifting plural nouns into singular forms, and similar operations.
4. **Modulation.** This technique changes the semantic perspective or cognitive category of a lexical unit. While transposition modifies grammatical form, modulation modifies conceptual meaning. The translator reproduces the information from the source text according to the target language's cognitive and stylistic norms. Vigneault and Darbelnier identify 11 types of modulation, such as shifts from concept to precision, cause to effect, transformation to result, part to whole, or geographical shifts (e.g., replacing "Chinese porcelain" with "Indian porcelain"). Intrawai and Scavi argue that modulation is often more effective than other techniques and propose expanding its procedural scope.
5. **Equivalence.** A completely different expression is used to convey the same idea, commonly applied to terms, idioms, proverbs, or set phrases.
6. **Cultural equivalence.** The translator replaces a culture-specific term in the source language with a culturally appropriate equivalent in the target language.
7. **Descriptive equivalence.** The meaning of a lexical unit is explained using a descriptive phrase rather than a single word.
8. **Functional equivalence.** A term is replaced with another term in the target language that performs the same function and matches the stylistic context.
9. **Formal (linguistic) equivalence.** Each word is translated separately, maintaining close structural correspondence with the source text.

10. **Adaptation.** Adjustments are made to the term or expression so that the translated text becomes more natural and suitable for the target audience or the translator's communicative goals.
11. **Compensation.** A lexical or stylistic effect that cannot be rendered in its original location is recreated elsewhere in the text.
12. **Concentration.** A concept in the source language is expressed with a more general concept in the target language.
13. **Dissolution.** A source-language concept is expressed using a broader or expanded meaning in the target language.
14. **Amplification.** Additional lexical items are inserted to fill syntactic or semantic gaps in the target language.
15. **Narrowing (economy).** The translator reduces the number of lexical units, similar to linguistic economy, without altering meaning.
16. **Reinforcement.** A variant of expansion in which additional words strengthen the meaning of the original concept.
17. **Condensation.** A variant of narrowing intended to compress the idea into a more concise form.
18. **Explanation of meaning.** The original lexical item is replaced with a fuller or more explicit paraphrase.
19. **Implication (implicit meaning).** Contextual clues are used to convey meanings that are not explicitly stated. This is essential for maintaining pragmatic equivalence.
20. **Generalisation.** A specific term in the source language is replaced with a more general term in the target language (Sirojiddinov, 2011).
21. **Concretisation.** A broad or general term in the source text is translated into a more specific term in the target language.
22. **Changing word order (inversion).** Words or phrases are repositioned in the sentence to create a more natural structure in the target language.
23. **Antonymous translation.** A positive idea may be expressed in negative form or vice versa in the target language.
24. **Transcription.** The source-language term is reproduced according to its pronunciation.
25. **Transliteration.** The source-language term is reproduced according to its written form (orthography).
26. **Addition.** Additional words are inserted to express grammatical or semantic components that are implicit in the source language.
27. **Omission.** Certain lexical items or structures may be removed when required by grammatical or stylistic norms of the target language.
28. **Naturalisation.** A borrowed word is adapted first to the pronunciation and then to the morphological rules of the target language. This is closely related to transcription and transliteration.
29. **Paraphrase.** A culturally loaded lexical item is explained using a broader or more detailed descriptive phrase.
30. **Couplets (harmony of transformations).** Two or more translation techniques are applied simultaneously.
31. **Notes.** Additional explanations provided at the bottom of the page, at the end of chapters, or in appendices to clarify culture-specific or untranslatable lexical units

The translation techniques highlighted above are used to reflect the functional and semantic features of translating English cybersecurity terms into Uzbek. It is reasonable to translate the following cybersecurity terms from English to Uzbek according to their meaning (see Table 1).

Table 1. Cybersecurity Terms with Definitions, Uzbek Equivalents, and Applied Translation Techniques

Term	Meaning	Uzbek translation	Method used
Adware	An advertising application that shows the user unsolicited advertising. Often, it acquires information about behaviour. Note:	Reklama dasturi	Creative equivalence

	the application may be installed without user knowledge or consent, or may be pushed to the user under licensing conditions of other software		
Active threat	Any threat of an intentional change in the state of a data processing system or computer network. Threat, which would result in message modification, the inclusion of false messages, false representation, or service denial.	Faol tahdid	calque
Accreditation	The official management decision of a competent representative of an organisation, to authorise the operation of the information system and the explicit acceptance of risks (including the strategic, economic or reputational ones) that ensue to the organisation from the agreed security measures.	Akreditatsiya	borrowing
Normal operation	An operation where the entire set of algorithms, security functions, services, or processes is available or configurable.	Me'toriy operatsiya	Semi-calque
Botnet	Software for the remote control of bots, which run on infected computers. The software ensures that the cracker can access the computing power of many machines simultaneously.	Botni masofadan boshqarish dasturi	Descriptive equivalence
Crack	Unauthorised infringement of programme or system security protection, its integrity or the system of its registration/activation.	Dastur xavsizligi yoki uning yaxlitligini ruxsatsiz buzilishi	Notes
Dialler	The harmful programme that connects the computer or smartphone of the user to the Internet via a wired line using a very expensive service provider	Zararli dastur	addition

5. Conclusion

5.1 Conclusion

The penetration of cybersecurity terminology into all aspects of public life necessitates extensive research on this terminology, its theoretical foundations, and its practical significance. Studying terminology in this field from linguistic, translational, and cultural perspectives provides significant assistance in understanding and correctly interpreting terms. Thus, the key parameters in the translation process are not only selecting the appropriate option to convey the meaning of the source text but also the ability to align knowledge, logic, context, and understanding when choosing synonyms. Various translation techniques are actively employed when translating English cybersecurity terms into Uzbek, such as equivalence, paraphrasing, word borrowing, semi-paraphrasing, figurative equivalents, notes, and word additions. The translation of term combinations allows for the identification of the logical connection between these symbols through a detailed semantic analysis of individual term elements, considering the content of the source text. To determine the meaning correctly, it is advisable to refer to the context and additional literature in the original language, search for an equivalent term in the target language, and consult dictionaries and supplementary literature in the target language.

5.2 Suggestion

1. For Translators:

a. Use a contextual approach when translating cybersecurity terms, rather than relying solely on literal translation.
b. Apply a variety of techniques (equivalence, paraphrasing, borrowing, figurative equivalents, notes, additions) according to the needs of the text and the target audience.
c. Always consult specialized dictionaries, supplementary literature, and original English-language sources to ensure accuracy of meaning..

2. For Linguists and Researchers:
a. Conduct further research on the functional-semantic aspects of cybersecurity terminology in the Uzbek language, particularly regarding metaphors and term hybridization.
b. Develop a bilingual cybersecurity terminology database (English–Uzbek) to support translation consistency.
c. Analyze in greater depth the logical relationships among elements of compound terms using a semantic-comparative approach.

3. For Educators and Institutions
a. Integrate the translation of technical and cybersecurity terminology into linguistics and translation study curricula.
b. Train prospective translators using real case studies to familiarize them with multidisciplinary contexts.
c. Facilitate workshops or collaborative seminars between IT experts and linguists to improve accuracy in understanding terminology.

4. For policymakers and standardization bodies:
a. Promote the development of national standards for cybersecurity terminology in the Uzbek language to prevent inconsistent variations.
b. Establish collaboration with international institutions to ensure that the terminology used remains aligned with global developments.

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