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Teknik Çeviri Öğretiminde Bilişsel-Pragmatik İlkeler*

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Öz

Bu makale, uzmanlık çevirisi didaktiği alanında bilişsel-pragmatik ilkelere dayanan kuramsal ve uygulamalı bir çalışmayı sunmaktadır. Araştırma, İngilizce, Rusça ve Kazakça dillerini kapsayan üç dilli bir bağlam içerisinde, katı cisim mekaniği terimleri üzerine odaklanmaktadır. Temel araştırma problemi, çok dilli ortamlarda görev yapan teknik çevirmenlerin, salt sözcüksel eşdeğerliğin bilimsel anlamı aktarmada yetersiz kaldığı durumlarda yaşadıkları kavramsal ve pragmatik hazırlık eksikliğidir. Kazakistan'da üç dilli bilimsel iletişimin giderek önem kazanması, yüksek nitelikli çevirmen ihtiyacını artırmaktadır. Bu doğrultuda çalışma, karmaşık mühendislik terimleriyle çalışan çevirmen adaylarının eğitiminde bilişsel-pragmatik ilkeleri bütünleştiren özgün bir yöntemsel çerçeve geliştirmeyi amaçlamaktadır. Terimsel analiz, karşıtsal analiz ve söylem analizi gibi yöntemlerin kullanıldığı araştırmada, Kazakçadaki terim oluşturma stratejilerinde melezleştirme (%33) ve çevriyazımın (%30) en yaygın yöntemler olduğu saptanmıştır. Bulgular, diller arası terimsel asimetrilerin ancak kavrama dayalı bir öğretim yaklaşımıyla aşılabileceğini göstermektedir. Çalışma, çevirmenlerin kavramsal yeterliklerini, diller arası farkındalıklarını ve üstbilişsel becerilerini geliştirmeye yönelik pedagojik bir model sunarak, gelecekteki müfredat geliştirme ve deneysel uygulamalar için kapsamlı bir temel teşkil etmektedir.

Anahtar Kelimeler:

Terim, term olusturma, uzmanlik cevirisi, bilissel-pragmatik yaklasim, kavramsal yeterlik.

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Cognitive-Pragmatic Principles in Technical Translation Didactics*

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Abstract

This article presents a comprehensive theoretical and applied study of cognitive-pragmatic principles within the didactics of specialised translation, specifically focusing on solid mechanics terminology in a trilingual context involving English, Russian, and Kazakh. The research addresses the critical problem of insufficient conceptual and pragmatic preparedness among technical translators in multilingual environments, where literal equivalence often fails to convey precise scientific meaning. Given the rising demand for highly qualified translators in Kazakhstan's increasingly trilingual scientific landscape, this study aims to develop a methodological framework that integrates cognitive-pragmatic principles into engineering translation training. The research material comprises terminological units from authentic texts, analysed through contrastive, discourse, and word-formation methods. Key findings identify hybridisation (33%) and calquing (30%) as the dominant term-formation strategies in Kazakh. The results demonstrate that terminological asymmetries can only be effectively bridged through concept-based instruction. Consequently, the study proposes a pedagogical model designed to enhance translators' conceptual competence and interlingual awareness. This framework provides a solid foundation for future curriculum development and experimental implementation in the field of translator education.

Keywords:
cognitive-pragmatic approach, specialised translation, terminology formation, terminology, translation didactics, conceptual competence.

* Ethical Statement: * It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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1. Introduction

Contemporary situations in the world is characterized by rapid development of science and technology thus a cross-linguistic professional communication is of particular importance. Solid mechanics is a fundamental engineering field which requires high accuracy and unambiguity in information transfer. The quality of its terms' translation and their unambiguity influences on successful information exchange thus on development of technologies. However, there are some problems of terms translation refer to linguistic and extralinguistic factors such as cultural-cognitive differences, specifics in terminological systems in different languages.

Special translation didactics faces with necessity to train high-qualified specialists who can adequately transfer peculiarities of special concepts into another language. Traditional approaches of teaching often focus on purely linguistic aspects ignoring the cognitive processes occurring in the translator's mind and the pragmatic tasks that are set for the translation product. Due to it there is high necessity to develop and then introduce cognitive-pragmatic principles in special domain didactics. Such principles, in turn, enable the formation of conceptual and contextual competences in future technical translators, in addition to linguistic competences.

The relevance of the study is due to the growing need for competent translators in the scientific and technical sphere, especially in the context of actively developing trilingualism in Kazakhstan, as well as the need to improve methods of teaching specialised translation, considering modern linguistic and pedagogical approaches.

The purpose of the study is to theoretically substantiate and develop a set of cognitive-pragmatic principles that form the basis of the didactics of specialised translation of terms in the Solid mechanics from Russian and Kazakh into English. As the translation from English into both languages does faces minor challenges as the terms in Kazakh and Russian are polysemantic. To achieve the purpose, the following objectives are set:

1. To analyse contemporary approaches for terminology study and issues of special translation.
2. To identify the features of the terminological system of Solid mechanics in English, Russian and Kazakh languages, including methods of terminology formation and sources of their formation.
3. To study the cognitive-pragmatic aspects of mechanical terms, their synonymy, metaphorical nature, and possible translation difficulties.
4. To justify the use of the cognitive-pragmatic approach to the analysis of the process of translating mechanical terms.
5. To develop didactic principles aimed at developing the cognitive and pragmatic competencies of translators in the engineering fields.

6. To propose methodological recommendations for teaching specialised translation of mechanical terms, considering the identified cognitive-pragmatic principles.

The scientific novelty of the study is:

- For the first time, a set of cognitive-pragmatic principles integrated into the didactics of specialised translation of mechanical terms are proposed.
- A detailed comparative analysis of the terminological system of solid mechanics in English, Russian and Kazakh languages is conducted, considering their cognitive-pragmatic features.
- Methods of terminology formation in the Kazakh mechanical terminology is identified and systematised, which is an important contribution to the development of Kazakh terminology.

The material for the study is presented in a type of abstracts taken from scientific and technical texts on Solid mechanics in English, Russian and Kazakh as well as textbooks of this filed.

The following research methods are used in the study:

- General linguistic methods like terminological analysis, comparative-contrastive analysis of terminological systems, component analysis, word-formation analysis
- Translation methods like contextual analysis, transformation analysis.
- Pedagogical methods like the method of modeling the didactic process, analysis of existing translation teaching methods.

The theoretical value of the study lies in deepening the understanding of the cognitive-pragmatic aspects of specialised translation and their role in didactics. The results of the study contribute to the development of the theory of terminology, translation studies and methods of teaching special translation.

The practical value of the work lies in the possibility of using the developed cognitive-pragmatic principles and methodological recommendations in the process of training translators of scientific and technical literature in higher educational institutions. The research materials can be used in the development of training courses, special courses, seminars on specialised translation, as well as in compiling terminological dictionaries and glossaries on Solid mechanics in three languages.

The article is devoted to the analysis of cognitive-pragmatic principles that can be effectively applied in the didactics of specialised translation of Solid mechanics' terms in English, Kazakh and Russian.

2. Theoretical Foundation

The study of terminology and specialised translation is an interdisciplinary field, or as E.N. Mishkurov calls transdisciplinary field (M. Novikova 2019) that combines linguistics, translation studies, cognitive science, and didactics. In this review, we will turn to key works

that form the theoretical basis for understanding cognitive-pragmatic principles in translation didactics.

General and special issues of terminology and translation studies are presented in the works of domestic and foreign scientists, like V.M. Leichik (2022), Ye. I. Golovanova (2024), A. Bakeyeva (2021), A. Chesterman (1997), E. Rosch (1975) and others. Sh. Kurmanbayuly (2014) notes that a term is an unambiguous, convenient, and compact unit that accurately conveys the meaning of an industry concept. However, as studies show, terminology may contain such phenomena as synonymy and multicomponentity, which, nevertheless, contribute to the accuracy of conveying the semantics of the term. A.S. Smagulova and A.K. Tussupova (2023) consider the structural and semantic paradigm of the terminological field in the aspect of translation, which emphasises the complex nature of terminological systems. Because of rapid development of engineering fields, it is important consider cognitive terminography, which includes the approaches of "frame-based terminology" (Faber et al. 2005), the sociocognitive model, and the prototype category theory (Temmerman 2000), which allow us to identify the cognitive and pragmatic aspects of engineering terms and their translation strategies.

An important place in understanding specialised translation is occupied by the concept of "communicative situation" considered by R.M. Shamilov and V.V. Sdobnikov (2019). Their works focus on the content-semantic aspect of translation, which is fundamental to the cognitive-pragmatic approach. S.N. Karpova (2012) emphasises the need to teach students specialised translation as the basis of interlingual professional communication, which confirms the relevance of the didactic aspect. In the context of translating scientific and technical literature, L.V. Vorobyova (2024) highlights the most used translation methods, such as calque (tracing), transcoding, and descriptive translation. These methods are actively used in the process of terminology formation according to our research, where tracing is the dominant way of forming terms in the Kazakh language, along with the use of native Kazakh units and hybridisation. Special attention in our study is paid to the cognitive-pragmatic aspect presented by F. Gallai (2022) who offers a comprehensive view of the role of relevance theory in translation activity, which is directly related to understanding the processes of perception and interpretation of meaning. N.G. Valeyeva (2018) deeply analyses the relationship between culture, cognition, and communication in translation, which is the cornerstone for the formation of cognitive-pragmatic principles in didactics. The issues of translation didactics are considered in detail by N.K. Garbovsky (2012) who proposes an approach oriented towards the translation goal (Skopos theory), which also correlates with the pragmatic aspect. A.V. Annenkova (2010)

explores the methodology of forming intercultural communicative competence in the process of academic translation, which is an important component for training translators of technical texts. In the field of translation of mechanics terms, Y. Farahsani et al. (2024) analyse the translation techniques used by engineering students, revealing the prevalence of literal translation and borrowings. N.N. Gavrilenko (2021) highlights necessity to use terminological cards in special translators training as a prominent tool for professional competence. This indicates the need for a more in-depth didactic development of translation strategies.

In addition, our research shows that in the terminology of Solid mechanics in English, there is a cognitive variability of terms with a clear semantic message, which may be absent in Russian and Kazakh languages due to the more universal nature of the terms. Thus, the presented literature review allows us to identify key aspects necessary for the development of cognitive-pragmatic principles in the didactics of specialised translation of mechanical terms. This study is based on an understanding of the specifics of terminology, communication processes in the professional environment, as well as the importance of cognitive and pragmatic factors in translation activities.

3. Research Methodology

Being a transdisciplinary study, the paper uses linguistic, cognitive, pragmatic, translational, and didactic approaches, which together help to achieve the purpose and tasks of the research. To begin with, analysing terminology systems in three languages and comparing them represents a linguistic method that assists in identifying differences and similarities among the observed systems. In addition, component term analysis as well as term-formation analysis are pure linguistic tools devoted to studying the terminological system of the field. Furthermore, translation studies employs contextual analysis to determine transformation patterns and peculiarities of translation. From a cognitive and pragmatic perspective, cognitive-discourse analysis allows us to determine the conceptual meaning of the terms in each language. Moreover, pragmatic analysis examines the function of each term and its implicative meaning. Finally, pedagogical methods are presented through induction and deduction: induction is used to analyse specific translation situations, while deduction is applied to verify hypotheses using empirical materials. Therefore, based on the observed regularities in term formation and translation patterns, we propose the following hypotheses:

H_0 (Null Hypothesis): The majority of Kazakh Solid Mechanics terms, similar to their Russian equivalents, are translated from English through calquing, resulting in minimal lexical or conceptual challenges in scientific and technical translation.

H_1 (Alternative Hypothesis): Kazakh terminological development in Solid Mechanics shows significant use of native and hybrid terms alongside calquing, which increases cognitive and pragmatic challenges in translation due to conceptual asymmetries and differences in term specificity.

The choice of these methods is due to the interdisciplinary nature of the study, the need for a comprehensive study of the mechanical terminology considering its linguistic, cognitive, and pragmatic features, as well as the goal of developing effective didactic principles for training translators.

4. Results and Discussions

Research in cognitive-pragmatic principles in special transition didactic of Solid mechanics terms allows to get some prominent results which are presented below.

The analysis of Solid mechanics' terminological system in Kazakh, Russian and English languages revealed both general patterns and specific discrepancies. As noted by Sh. Kurmanbayuly (2014), a special domain term should be unambiguous and compact. However, our study confirmed the presence of synonymy in the English-language Solid mechanics terminology, which, according to the same author, is not a drawback, but rather allows for an accurate transmission of the semantics of the term. For example, the concept "deformation" is represented by terms "strain" and "deformation" in English scientific discourse. The first equivalent "strain" is used to present a qualitative change in form and size of a body, while term "deformation" is used to denote a qualitative description of a change in shape or size. Such cognitive variability, absent in Russian and Kazakh languages, where terms are often more universal, is a serious didactic problem that requires developing in students a deep understanding of not only the denotative, but also the connotative and pragmatic meanings of terms.

The analysis of the 117 core terms of terminological system showed that the most common ways of forming terms in the Kazakh language is 38 hybridisations, the next is calque (36 terms). This is consistent with the findings of A. Akhmet et al. (2024), C. Kulmanov (2021), B. Momynova and U. Anessova (2019), who state that hybridisation is the most common way of term formation in Kazakh language due to "the products of hybridisation in modern Kazakh terminology are nouns in 90% of cases. The only exceptions are those rare cases when adjectives and verbs are formed in the process of hybridisation". In the author's opinion, this fact primarily indicates the nominative function of the term. As well as L.V. Vorobyeva (2024), A. N. Makhmutova & M. A. Yurova (2023) on the prevalence of calque (tracing) in scientific and technical translation of Russian language which influences greatly on Kazakh language

technical terminology. It is followed by, twenty-three so-called native Kazakh-originated terms, eleven borrowings and nine adaptations (see Table 1). It is worth noting that in the graph "so-called native Kazakh-originated terms" included terms with ancient Turkic and Arabic roots.

Table 1. Frequency of term formation methods in Kazakh terminology (Solid Mechanics)

Formation Method	Number of Terms	Percentage (%)
Hybridisation	38	33%
Calque (Tracing)	36	30%
Native Kazakh	23	20%
Borrowings (International)	11	9%
Adaptation	9	8%
Total	**117**	**100%**

Note. Data compiled from analysis of authentic Solid Mechanics corpora in Kazakh scientific literature.

According to our research hybridization, as for example, "Cyclic Loading" → "Циклическая нагрузка" / "Циклдік жүктеме" is transfers using hybridisation of kaz + rus: "цикл" (Russian) – means "cycle" to which it is added naturalised adjective ending "дік" and the noun "жүктеме" (Kazakh), reflects the interaction of languages and is the result of the adaptation of borrowed elements to the phonetic and morphological norms of the Kazakh language. In didactics, it is necessary to teach students to recognise such structures and understand their origin for a deeper understanding of the terminology.

Calque (or tracing) although it ensures accuracy, can lead to cumbersome constructions and make it difficult for those unfamiliar with the source language to understand, e.g. Age theory → Теория старения → Ескіру теориясы; Load-bearing capacity → Несущая способность материала → Материалдық көтеруші қабілет; Axial load → Осевая нагрузка → Өстік жүктеме; Bending moment → Момент изгиба → Июші момент; Boundary Conditions → Граничное условие → Шекаралық шарттар. In didactics, this means developing the skills of "unpacking" calques and understanding their internal logic, as well as learning to critically evaluate their appropriateness depending on the audience.

A prominent proportion of native Kazakh terms demonstrate the potential of the language for independent term-creation activity, which corresponds to the position of Sh. Kurmanbayuly (2014) on the compactness of the term. Training of translators and linguists should focus on their mastery and active use, contributing to the development of the national terminology fund.

Borrowing and adaptation also play a role, especially for universal international terms which rely to K. Zhubanov's position (1935). Training of translators should include the principles of adequate adaptation and wise usage of transcription and transliteration strategies.

These results confirm the thesis of A.S. Smagulova and A.K. Tussupova (2023) about the multicomponent nature and diversity of the terminological field and show that translation didactics should consider this spectrum of terminology methods for the formation of complex translation competence (see Fig. 1).

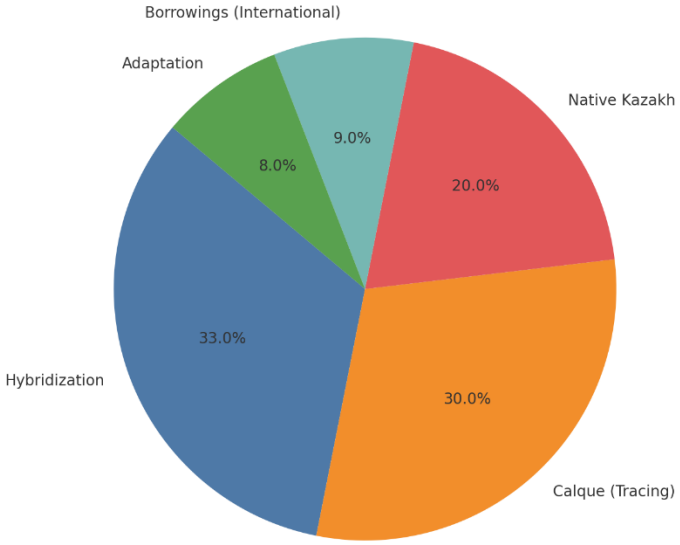

Figure 1. Distribution of Term Formation Methods in Kazakh Solid Mechanics Terminology

Note. Based on analysis of 117 terms extracted from trilingual technical corpus.

The data demonstrate that while calquing remains a key strategy (30%), hybridisation (33%) and native term creation (20%) indicate a shift toward greater terminological autonomy in Kazakh language. This diversity in term formation directly affects translation strategies and must be addressed in translator training.

4.1. Empirical Results of The Cognitive-Pragmatic Approach In Special Training

The consideration of the cognitive-pragmatic approach as an effective tool in the translation of specialised texts received experimental confirmation in the study, which resulted in the publication of the article "Effectiveness of Cognitive-Pragmatic Approach in Special Translation: Experimental Study" (Iskakbayeva et al. 2025). The research was aimed at identifying the advantages of cognitive-pragmatic analysis in the translation of engineering terms in the field of geological terminology and comparing the results of the translation performed by two groups of students using different methods. In the work, the term is considered not as an isolated linguistic unit, but as a reflection of the cognitive model, including

mental, cultural, and pragmatic parameters. It is proven that the analysis of these factors allows avoiding errors associated with homonymy, polysemy, and terminological ambiguity.

The experimental study involved working with two groups of third-year students of the educational program “Intercultural-communicative translation” (15 female students aged 19-21), who translated scientific and technical texts on the topic of geodesy, which considered as a part of engineering field. The first group (A) used the cognitive-pragmatic approach, while the second (B) relied on traditional linguistic methods. Both groups analysed texts taken from the Encyclopedia Britannica, identifying terms by checking their frequency and pragmatic use in the BNC and COCA corpora. To assess the accuracy of the translation and the semantic relevance of the terms, Group A used Word Sketch and Google Ngram Viewer, as well as the Lasswell model for analysing the communicative parameters of the text. The main attention was paid to terms with a high probability of homonymy and synonymy. Also, the key element of Group A’s methodology was the use of cognitive maps and analysis of terms taking into account prototypical semantics; conceptual boundaries; cultural differences in categorisation; mental models of perception; homonyms and metonymies.

The results showed a clear advantage of Group A, which used the cognitive-pragmatic approach. In the result their translations were accurate, had a reasonable choice of terminological equivalents, and complied with the genre and pragmatic requirements of the source text. Group B, which focused exclusively on dictionary meanings, made typical interpretation errors due to ignoring the context and terminological consistency as well as checking the frequency of usage the terms in corpora-based programs. One of the key examples was the interpretation of the term “surveying”. Students in Group A correctly identified it as “геодезическая съемка” (geodetic survey), while Group B mistakenly chose the term “маркшейдерия” (mine survey), relying on a formal coincidence without taking into account conceptual differences. Similar errors were also observed when trying to translate syntactically complex units, such as “a vertical wooden A-frame with a plumb bob”, where Group A preserved the full semantic structure of the term, while Group B decomposed the term into unrelated elements. The context “There is no record of any angle-measuring instruments, but there was a level consisting of a vertical wooden A-frame with a plumb bob supported at the peak of the A so that its cord hung past an indicator, or index, on the horizontal bar” has difficulty translating the term “a vertical wooden A-frame with a plumb bob”, which refers to an ancient Egyptian device. The translation error here was caused by inadequate term extraction by Group B. To analyse and translate the term “a vertical wooden A-frame with a plumb bob”, we must consider:

- Conceptual understanding – “A-frame” is a structure known for its stability. “Plumb bob” is a tool used to construct vertical lines.
- Mental model: Both terms are well established in the languages.
- Metaphorical use: “A-frame” metaphorically describes the shape of the structure.
- Metonymic use: “plumb bob” is metonymically related to the concept of verticality.
- Empirical evidence: “A-frame” resembles the letter “A”, and “plumb bob” is a tool for testing verticality.

By understanding these cognitive-pragmatic aspects, we can translate the term while preserving the meaning and cultural nuances. The translation and analysis of the term is presented as “вертикальная деревянная А-образная рама с отвесом”. This translation preserves all the key elements and concepts of the original term. After conducting the cognitive-pragmatic analysis, Group A correctly identified the term and its meaning. This demonstrates the effectiveness of the approach, especially with complex compound terms. While Group B incorrectly divided it into smaller parts. This led to inaccurate translations such as “А-образная опалубка” (A-shaped formwork); “А-образная опорная рама” (A-shaped supporting frame); “А-образная несущая конструкция” (A-shaped supporting structure). These translations, although related to construction, are not adequate to the context. The inaccuracy arose partly due to the limited information in the corpus (BNC, COCA) providing information on the construction of houses of this type, A-frame type of houses. In addition, the students’ experience of industrial training in an architectural firm influenced their interpretation. The term “A-frame” was misinterpreted due to its changing use over time - from engineering to architectural use (see Fig. 2).

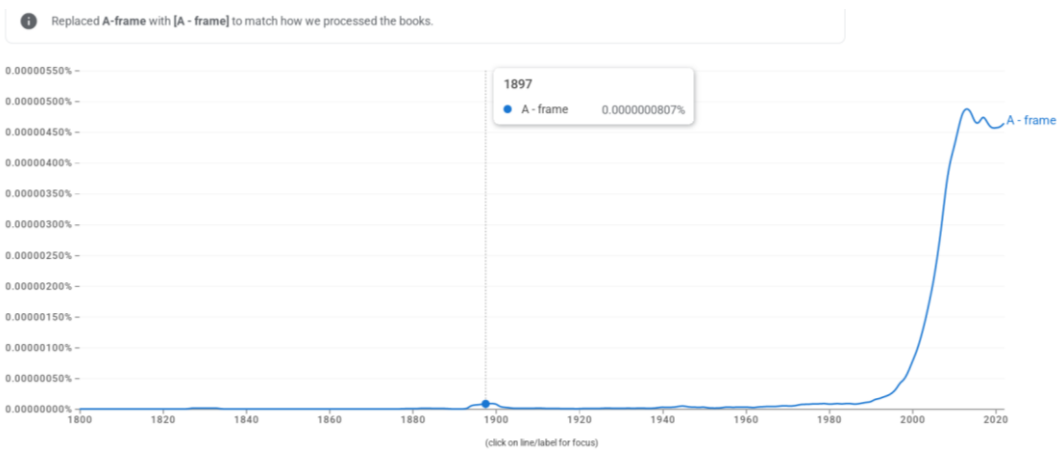

Figure 2. Frequency of use of "A-frame"

To understand how the term “A-frame” is used in the modern context, we used the analysis of the text corpus on the COCA (Corpus of Contemporary American English) platform. This analysis showed that at the moment the term “A-frame” is used to a greater extent in architectural discourse to refer to houses with a sloping roof in the American style (see Fig. 3).

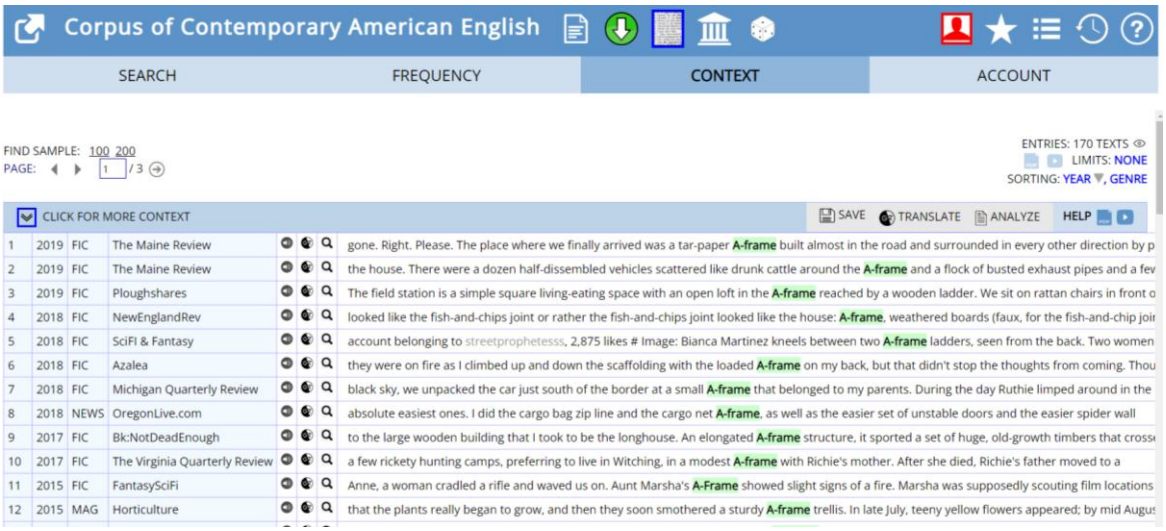

Figure 3. Results of “A-frame” search in COCA

Thus, the experiment demonstrated that the use of the cognitive-pragmatic approach not only contributes to the accuracy and adequacy of translation, but also forms the skills of pre-translation analysis, critical thinking, and professional terminological competence in students. The findings of the study confirm the need to include cognitive-pragmatic analysis in the system of training specialists in scientific and technical translation, especially at the early stages of training, when background knowledge and professional intuition have not yet been formed or in conditions of limited time, as well as when working with texts saturated with polysemantic and culturally marked terms. The modern trend of using corpus analysis tools may sometimes be untenable, since it demonstrates the modern use of words that could change their semantics with imputation.

Inclusion of the results of this study in the educational process and practice of specialised translation contributes to the improvement of translator training and, as a result, ensures a more accurate intercultural transfer of scientific knowledge.

4.2. Theoretical Recommendations Based on Cognitive-Pragmatic Principles

Based on the identified features of terminology systems and translation difficulties, we formulated cognitive-pragmatic principles of teaching:

1. Teaching should be aimed not only at memorising terms, but also at deeply understanding the scientific concepts behind them. This implies the analysis of terms in their conceptual fields,

as proposed in the studies of Shamilov R.M. and Sdobnikov V.V. (2019) on the communicative situation and the content-semantic aspect of translation. Students should understand how "strain" and "deformation" are cognitively different, and not simply consider them as synonyms.

2. Translating terms should always be pragmatically oriented considering the target audience and the functional purpose of the translated text. As Romina Marazzato Sparano (2024) notes, adapting technical content for a wide audience requires certain translation strategies. This is consistent with the Skopos theory discussed by N.K. Garbovsky (2012), where the purpose of translation determines the choice of translation decisions.

3. Training should include a systematic comparison of terms in English, Russian and Kazakh, identifying their equivalents, gaps and possible discrepancies in semantics and pragmatics. This contributes to the formation of "trilingual terminological thinking" as contemporary most concepts come through Russian language. But in future, it is better to develop sophisticated Kazakh technical language without intermediary language.

4. Developing metacognitive skills of translator which brings to ability to take translation decisions, anticipate possible difficulties, and choose optimal translation strategies. This includes the ability to identify and overcome the difficulties noted by Evgrafova Yu.A. and Kosichenko E.F. (2023) in the context of training and translation.

5. Training should be aimed at developing all components of terminological competence: linguistic (knowledge of word formation, grammar), conceptual (understanding of the subject area), search (ability to work with terminological databases) and pragmatic (ability to choose an adequate translation depending on the situation).

The application of these principles in the didactic process requires a transition from mechanical memorisation to meaningful translation. This involves:

- Using authentic scientific and technical texts rich in mechanical terminology.
- Developing skills in terminological search and working with electronic dictionaries, terminological databases, as well as development of professional technical Kazakh-English/English-Kazakh dictionaries.
- Analysing translation errors from a cognitive-pragmatic point of view including assignments for multi-variant translation with subsequent discussion of the pragmatic determinacy of each option.

To support the idea, we add illustrative example which assists to apply the cognitive-pragmatic principles in a classroom context, thus students are given assignments that require both conceptual analysis and strategic translation decisions. For example: Task: Translate the

following sentence from English into Kazakh, identifying key terminology and explaining the translation strategy used.

“Axial load causes deformation in the longitudinal direction under cyclic stress. ”Students are expected to:

- Identify terms: axial load, deformation, longitudinal direction, cyclic stress;
- Compare Russian/Kazakh equivalents;
- Justify translation strategies: calquing, hybridisation, functional substitution.

Expected translation:

In Kazakh language: Өстік жүктеме қайталанатын кернеу әсерінен бойлық бағытта деформацияға әкеледі.

In Russian language: Осевая нагрузка вызывает деформацию в продольном направлении под действием циклического напряжения.

Discussion point: Analyse cognitive nuances between “strain” and “deformation”, and how Kazakh may generalise them.

Teacher has a didactic focus:

- Recognise and conceptually differentiate key terms (axial load, deformation, cyclic stress);
- Study what strategies are used in recommended sources (Terminkom.kz) and what strategies can be applied additionally to transfer cognitive semantics (e.g., descriptive translation, translator’s comment, etc.);
- Reflect on the pragmatics of scientific expression across languages.

Such tasks are aimed at developing the cognitive, conceptual, and pragmatic competencies of the technical translator, as well as at forming a conscious strategic approach when working with scientific and technical terminology in a multilingual context. Development of such training materials provides a conceptual understanding of terms, not just their dictionary equivalents. The results of the study emphasise that effective teaching of specialised translation of mechanical terms requires not only language knowledge, but also a deep understanding of the subject area, as well as the cognitive and pragmatic aspects of interlingual communication. Taking these principles into account in didactics will allow us to train translators who can ensure a high level of accuracy and adequacy in the transmission of scientific and technical information.

5. Conclusion

This study devoted to cognitive-pragmatic principles in the didactics of specialised translation of Solid mechanics terms, made it possible to achieve the set goal and solve the formulated

problems, contributing to the development of the theory and methodology of specialised translation.

Main conclusions of the study:

1. The Solid mechanics terminology system is characterised by a high degree of complexity and multicomponent nature. Cognitive variability of English terms such as “strain” and “deformation” was revealed, which does not always have direct equivalents in Kazakh and Russian. This emphasises the need for a deep conceptual understanding of terms, and not just their lexical equivalents.

2. Analysis of terminology formation methods in the Kazakh showed the prevalence of hybridisation, which corresponds to general trends in the formation of Kazakh terms in different domains. Along with this, calque / tracing (36), native Kazakh terms (31), borrowing (11) and adaptation (10) are actively used. This indicates the dynamic nature of the formation of the terminological fund and requires the translator to be flexible in used approach.

3. It is substantiated that effective didactics of specialised translation should be based on cognitive-pragmatic principles. This includes not only linguistic knowledge, but also an understanding of the cognitive processes underlying the conceptualisation of terms, as well as the pragmatic tasks that the translator must solve in a specific communicative situation.

4. A set of principles is proposed, including conceptual understanding, contextual conditioning, interlingual terminological comparison, development of metacognitive skills and formation of terminological competence. These principles are designed to ensure a deeper and more conscious training of translators.

5. The developed principles and methodological recommendations can be used in higher education institutions to improve specialised translation training programs, create specialised courses and teaching materials on translating mechanical terminology into English, Kazakh and Russian.

The analysis confirmed that hybridisation (33%) and native Kazakh terms (20%) together make up more than half of the entire terminology base in the field of Solid mechanics while calques account about 30%. Thus, the main hypothesis (H_0), according to which calques are the dominant method of translation, was not confirmed. At the same time, the alternative hypothesis (H_1), which assumes the terminological independence of the Kazakh language due to the active use of hybrid and autochthonous units, was fully confirmed. The data obtained indicate a tendency to expand the national terminology pool and more flexible use of language resources in translating engineering terms. However, Kazakh terminological system still suffers from lack

of definite terms' equivalents which transfer cognitive and pragmatic meaning of English terminological units.

The theoretical value of the study lies in expanding the understanding of the interdisciplinary nature of specialised translation, integrating cognitive linguistics and pragmatics into the didactic process. The practical value is expressed in the possibility of directly applying the obtained results in educational practice, which helps to improve the quality of training of translation personnel.

It is important to note that the presented paper is conceptual and methodological. While it refers to experimental testing published by the author in another article which was conducted within educational settings in it, the developed didactic principles are built on linguistic, cognitive, and pragmatic analyses and are intended as a foundation for development didactic methodology as well as may be used in curriculum development.

In general, the study confirms that specialised translation, especially in such a complex area as solid mechanics, requires from the translator not only language proficiency, but also a deep conceptual understanding of the subject area, as well as the ability to adapt the translation to specific pragmatic goals. The introduction of cognitive-pragmatic principles into translation didactics is a key condition for the formation of such highly qualified specialists.

Future research may involve empirical testing of the proposed didactic principles in classroom settings with translation students. Pilot studies or controlled experiments could provide further insight into how conceptual competence and pragmatic awareness develop in trilingual translation training.

To achieve a comprehensive understanding, researchers could employ mixed-method approaches, combining quantitative assessments (e.g., pre- and post-tests, standardised translation quality evaluations, or comprehension tasks) with qualitative methods (e.g., student interviews, reflective journals, classroom observations). These methods would help analyse how students' conceptual understanding of source and target texts evolves, as well as their pragmatic awareness in handling cultural and contextual nuances in translation. By implementing such empirical study, researchers can identify specific pedagogical strategies that foster deeper conceptual and pragmatic skills, ultimately contributing to the refinement of translation pedagogy in multilingual and multicultural contexts.

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