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Translating Technical Terms of the Latin and Greek origin from English into Chinese and Ukrainian: Linguistic and Pedagogical Background

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Abstract: The Discourse of Science and Technology is represented in the viewpoint of its strategic and tactical vectors of manifestation**.** Some linguistic peculiarities characterising the discourse of science and technology are described; the appropriate translation techniques used while reproducing the content of the English technical terms originated from Latin and Greek in Chinese and Ukrainian are introduced. The constituents of the terminological competence as a component of the translator's competence are presented in the article. Some translation quality criteria which could be used for evaluating students' terminological competence are introduced. A set of teaching tools which could facilitate students' academic success in translating terminology is specified. The required outcomes that students are to demonstrate (assessment criteria) after finishing their translation course within their professional training are clarified.
Keywords: Terminology; Translation from English into Chinese and Ukrainian; Translation Techniques; Assessment Criteria.

[ch] 语言学及教育学语境下以拉丁语、希腊语为词源的专业术语的英-中、英-乌翻译研究

摘要：本文主要从战略和战术方面介绍科技语篇的翻译，介绍了科技语篇的主要语言学特征及在将英语中以拉丁语和希腊语为词源的专业术语用中文和乌克兰语再现时适用的翻译技巧。同时介绍了作为译者水平重要体现的术语翻译能力的构成，提出了一些可用于评估学生术语翻译能力的评价标准。此外制定了一套能够推动术语翻译教学不断发展的教学方法。明确了学生在完成了专业学习后应达到的专业要求水平（评估标准）。
关键词：术语学，英译中、乌，翻译技巧，评估标准。

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1. Introduction

The **relevance** of the study is determined by the scientific and technical progress alongside with the need of adequate reproduction of the essential information from one language into some other one in the context of globalization of economic relations between different countries of the world. An active trade as well as the cooperation in the spheres of science and technology between the P.R.C. and the EU countries, Ukraine in particular, stipulate a dynamic dissemination of the Chinese language within the designated domain. This fact conditions the need in the training of highly skilled specialists in the fields of both Germanic and Oriental languages in order to maintain favourable liaisons between cooperating countries, taking into consideration the peculiarities of the discourse of science and technology.

It should be noted that the Chinese "*Belt and Road Initiative*" and "A *New Silk Road*" projects have become the most significant ones in this regard. Therefore, the key issues on their performance are to be acknowledged, while training Ukrainian students majoring in Translation Studies, alongside with the main focus paid to the Ukrainian normative educational regulations such as the Laws of Ukraine "*On Education*", "*On Higher Education*", *the National Doctrine of Education Development, the National Strategy for the Development of Education in Ukraine for the period up to 2021*, which highlight culture-centricity, preservation and enhancement of

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national educational traditions, humanization of education and its integration into the world educational space. This orientation towards both western and eastern countries involves the recognition of the European and International qualification standards and teaching / learning regulations as follows: *Standards on Teaching Foreign Languages and Expected Education Outcomes* (Common European Framework of Reference for Languages: Learning, Teaching, Assessment, 2001), *Key Competencies in Education* (Rychen & Tiana, 2004), the main document of the European educational project on the standardization of translation-targeted education "*EMT*" ("European Master's in Translation"), *the Manual on the Implementation of Language Proficiency Requirements*, more widely known as Document 9835 (ICAO, 2004, 2010) and the key standards "Qualification and certification of translators" in Ukraine (СТТУ АПУ 001-2000), etc.

It seems to be expedient to consider the competence-based approach to teaching foreign languages as a basis for successful training of future specialists in the field of Translation Studies and in other spheres which need qualified specialists who can skillfully use a foreign language for specific purpose.

The evolving branches of science and technology as well as joint cross-governmental achievements confirm the demand for transforming Ukrainian pedagogical higher education platform where students are trained in foreign languages. To our great regret, the guiding principles of the efficient student (non-speaker) training in the sphere of terminology-based discourse translation within the language pairs "English ↔ Chinese" and "English ↔ Ukrainian" in terms of strategic and tactical ground have not been thoroughly studied in modern theory of Education.

The analysis of both theory and practice of translators' training in Ukraine has revealed a number of **contradictions** between:

1) insufficient research in the sphere of Strategic and Tactical Vectors of the Science and Technology Discourse Manifestation and its reproduction means within the Language Pairs "English → Chinese" and "English → Ukrainian";
2) the demand for highly qualified sinologists-technologists / scientists who are capable to navigate in modern scientific domain, on the one hand, and the lack of innovative training / teaching methods aimed at developing future sinologists' skills in translating basic technical terms of the Latin and Greek origin from English into Chinese and Ukrainian, on the other;

The above mentioned factors stipulate the **purpose** of the study – to present some manifestation and reproduction means of the discourse of science and technology while translating it from English into Chinese / Ukrainian as well as teaching tools aimed at students' academic success in the designated field.

A better understanding of the issue under study involves the following **tasks**:

1) to describe main linguistic and extralinguistic markers of the discourse of science and technology;
2) to introduce the appropriate translation techniques while reproducing the content of the discourse under study within the language pairs "English → Chinese" and "English → Ukrainian";
3) to determine the constituents of the terminological competence in translation;
4) to specify the teaching tools which could facilitate the development of students' terminological competence in translation.

To correlate the tasks put forward, it is expedient to study the phenomenon "the discourse of science and technology" against the background of the concept "discourse". On the other hand, it seems to be of prime significance to determine the major constituents of the terminological competence in translation.

2. Discourse analysis

We should state the fact regarding some debatable aspects of discourse manifestation represented by scholars: different perception of certain pieces (we mean their connotative semantics) of discourse by the audience, the equating of discourse and the text, the negligence of the recipient's reaction, etc. Although, we can agree upon the scholars' opinion concerning the expansion of the notion "discourse" by including extra linguistic or paralinguistic components of communication (Serio, 1999: 14–53; Foucault, 1996; Bekhta, 2004; Greimas & Courte, 1983) alongside with the semantics of evaluative and attitudinal connotations (Habermas, 1981) into its structure; consideration of diverse speech genres (Batsevych, 2004: 138) and social orientation of speech (Karasik, 2000).

We share Bekhta's definition of *discourse* (Bekhta, 2004) who considers it to be a broader (a more diverse and global) notion which correlates with the categories of logic, psychology, philosophy and is aimed at human, their experience, knowledge, intellectual level, way of expressing knowledge about the world around.

We also agree upon another description of *discourse* suggested by Batsevych (Batsevych, 2004: 138): *discourse* is a type of communicative activity, an interactive phenomenon, a speech flow which has different forms of manifestation (oral, written, paralingual), *discourse* is actualized within a specific channel of communication and regulated by

its participants' strategies and tactics; *discourse* reflects synthesis of cognitive, linguistic and extralinguistic (social, psychic, psychological, *etc*.) factors that are determined by a specific circle of life forms dependent on the subject of communication, it involves generating various speech genres as a result.

The German scholar Habermas (Habermas, 1981) examines *discourse* in the framework of communication, defining it as a criterion for determining veracity or non-veracity of agreement which is reached in communication through reasoning. He highlights the importance of consensus in communicating.

Kont-Sponvil (Kont-Sponvil, 2012: 156) associates *discourse* with speech and communication abilities which guarantee successful results due to interlocutors' excellence in speaking.

Thus, we should observe the key markers of discourse when translating / interpreting, which enabled us to specify the notion "*discourse*" in our previous works as a type of communicative activity manifested in oral and written forms in accordance with the tactical and strategic orientation of communication; it is implemented through linguistic and extra-linguistic means of communication, the features of its actualization and cognition-based conflict-free interaction are reflected (Korolova & Popova, 2019).

Let us transform the discourse indicators into the sphere of science and technology.

2.1. The Discourse of Science and Technology

The Discourse of Science and Technology has been in focus of different scholars for more than forty years.

As our research covers pedagogical and linguistic issues, it is desirable to cite Trimble's ideas (Trimble, 1985) in this regard. The scholar oriented his study towards teaching EST for pedagogical purposes, with the focus on teaching procedures, applying a discourse approach; however, his "rhetorical analysis" showed that rhetorical functions and patterns were not linked to grammatical phenomena.

Another scholar Swales, on the contrary, introduced his genre analysis by dividing texts into different types within an overall linguistic frame (Swales, 1990). Khrushid Ahmad studies the discourse of science and technology through the prism of how corpus linguistics methodology can be applied in the study of metaphors in texts on particle and nuclear physics. In the author's opinion, scientists literally and metaphorically create a world of make-believe through a web of words, endorsing their own belief and suppressing the beliefs of others (Ahmad, 2006: 198). It should be noted that the discourse of science and technology is represented by monosemantic terminology in denotative meaning in compliance with particularities of certain scientific phenomena (their concept spheres, in particular).

Teresa Fanego and Paula Rodríguez-Puente assume that in data-driven language studies, there appears to be a paradigmatic shift, moving from computational science towards data-intensive scientific discovery (Fanego & Rodríguez-Puente, 2019). This approach is certain to contribute to the advancement of corpus-based research and proves the robustness of computer technology, including data collection and datafication within a particular discourse.

It is worth mentioning Andrea Peterlicean's approach to classifying texts belonging to the discourse of science and technology in terms of communication (Peterlicean, 2010): • expository texts which present general facts, show the relationship between facts and the methods used to establish these facts; • prescriptive texts which are normative, saying how things should be done by means of the imperative, the conditional, the future and the present subjunctive mood; impersonal constructions of the form *it is necessary that*; the modal verbs *must, should, need to, may*; • argumentative texts which are characterized by the use of logical and argumentative linking words, qualifiers; they contain inductive and deductive inferences as well as hypothesis; • narrative texts which are similar in function with historical accounts and are represented by adverbs of time and space, past tenses, temporal connectors, anaphoric or cataphoric reference; • descriptive texts which include references to concrete places, deal with spatial relationships between the objects and with concrete persons and their actions; use deictic and indexical expressions, contain stative verbs, articles, possessive adjectives, the present simple tense. These features are to be taken into account while reproducing the designated text types into other languages.

Having analysed the scholars' achievements in the issues under focus alongside with the needs of modern global society, we can propose this definition for the phenomenon "*discourse of science and technology*", taking into consideration its linguistic and extra-linguistic nature: *discourse of science and technology* is a science-driven discourse, the extra-linguistic background of which is associated with preconditions for initiating elaborations in the sphere of science and technology alongside intra-state development and intergovernmental cooperation. Its linguistic component is actualised at phonetic, lexical, grammatical, compositional and stylistic levels. The typical markers of the science and technology discourse are as follows: science-related issues, technological basis, accurate use of terminology, appropriate grammatical constructions, simple syntactic framework, orientation on progress and / or the / addressee, argumentation, motivation for scientific and technological innovations.

2.2. Strategic and Tactical Vectors of the Science and Technology Discourse Manifestation

Our strategic and tactic orientation study covers both social-educational and translation / interpretation spheres. Let us examine them.

The strategic direction of *the Science and Technology Discourse* comprises two vectors:

1) scientific-cooperative (conflict free) relations between natural and / or juridical persons (to initiate, maintain, and develop mutual scientific activity according to particular scientific needs);
2) information exchange (to obtain, give, inquire and process the necessary scientific information);
3) educative purpose of training future translator / interpreters in modern spheres of science and technology.

On the linguistic point of view, translation / interpretation of specific texts (science- and technology-oriented, in particular) is subordinated to the *strategy of communicative and equivalent translation / interpretation.*

These tactics and operations are likely to facilitate the adequate perception of the scientific message: • *the tactic of transference of cognitive information* (is performed by means of these *operations*: the use of interlingual and translation correspondences; the resuming of information, the omitting of communicatively irrelevant information, the use of explanations in the translation **/ interpretation** process); • *the tactic of correct information layout* (in accordance with norms of the target language); • *the tactic of reproduction of formal structural text characteristics*.

Let us observe which translation means are used when dealing with terminology.

3. Terminology

Terminology is associated with Terminology Science. English native speakers frequently refer to Terminology Science as Terminology Studies (Wright and Budin, 1997). It is defined as an interdisciplinary study of the principles and theoretical bases of concepts, concept systems and the designations of the concepts in scientific, technical and other professional fields (Nuopponen, 2003). It is well known that terminology is originated from the efforts to solve professional communication problems resulting from the internationalization of commerce, technology, science, and international collaboration practice in the 20th century. Two main processes accompany terminology: the emergence of new terms and the determinalisation of the existing ones. The latter is conditioned by a very rapid development of certain branches, which is reflected in the mass media and provides for the transferring of terms from the category "specific use" to "common words".

The terminology corpus constitutes terminography (terminological lexicography) and covers the activities dealing with terminology standardization, terminology planning, terminological information and documentation, terminology application areas and terminological training.

We support scholars' vision that Terminology Science consists of objects (of reference), concepts, the characteristics of concepts, concept relations and systems, terms and other concept presentations (definitions, LSP phrases, non-verbal representations), and the relations between concepts and terms (e.g., synonymy, polysemy, mononymy, homonymy, equivalence) (Nuopponen, 2003). It should be mentioned that these constituents are organized hierarchically and correlate with one another, some of them can simultaneously be elements of different fields (not necessarily the science- and technology-related fields). The above fact confirms the significance of defining terms correctly since a definition is to provide a link between the concept and its designation(s); to describe the contents and the essence of a concept in an unambiguous way in order to avoid the designated lexical phenomena (relations) and distinguish a concept from neighboring ones.

Thus, we can give this definition for *terms* as follows: *terms* are a precise linguistic designation of specialized concepts; terms are organized into systems within corresponding concept systems. Traditionally, terms are associated with nouns, though verbs and adverbs may also be terms. Borrowings, compounds and abbreviations are the linguistic phenomena terms are characterized by. Furthermore, terms comply with grammar rules of the language and are capable of producing derivations.

The way terminology functions within the language pairs "English → Chinese" and "English → Ukrainian" is described in *Sections 3.1. and 3.2.*

3.1. Terminology in Specialized Translation within the Language Pairs "English → Chinese" and "English → Ukrainian"

In the scientific and technical text, terminological vocabulary is assumed to be no more than 25 %, whereas the main part of the vocabulary contains general scientific, general technical and commonly used words. This can be explained by constant replenishment and mobility of the vocabulary due to the existence of polysemantic words, homonyms, synonyms, on the one hand; and the appearance of new ones as a result of developing science, on the other. Another source is authors' terms which become part of the discourse of science and technology.

Let us study some examples (see table 1).

Table 1. Syntactical transformations used when translating official academic letters from Chinese into English and Ukrainian

№	English – the original	Ukrainian – target language, translation means / transformations	Chinese – target language, translation means / transformations
1	2	3	4
1.	hi-tech	хай-тек (*transliteration*)	新 技 术 企xīn jì shù, zhú qǐ (*correspondence, equivalent translation*)
2.	platform	платформа (*transcoding*)	平台 píngtái (*equivalent translation*)
3.	mechanical device	механічний пристрій (*loan translation*)	机器装置 jīqì zhuāngzhì (*loan translation*)
4.	a "*live*" part (of some device)	відкрита частина (пристрою, що перебуває під струмом) (*contextual substitution*)	带电部件dàidiàn bùjiàn (*contextual substitution*)
5.	a protein *entity*	протеїнові утворення (*concretization*)	蛋白化合物dànbái huàhéwù (*concretization*)
6.	LaSalle convertible	легкове авто (виробник – General Motors Corporation) (*generalisation*)	General Motors 小汽车xiǎoqìchē (*generalisation*)
7.	SSC (Superconducting Super Collider)	Надпровідний Супер Коллайдер (SSC) (*descriptive translation*)	超導超大型加速器chāodǎo chāo dàxíng jiāsùqì (*descriptive translation*)

Translational practice shows that when translating English terms into Chinese and Ukrainian, some most common translation techniques were used: equivalent translation, loan translation, concretization, generalization, contextual substitution and descriptive translation. It should be noted that transliteration (or transcoding) is observed when translating terms from English into Ukrainian, in Chinese it is substituted by loan translation or equivalent translation due to the grammatical structure of Chinese. Modulation (or meaning development) and antonymic translation are the translation means which are not typical of the material under study.

English one-word terms usually retain their structure in Ukrainian (*nozzle – форсунка*). In Chinese representation, they may consist of two or more hieroglyphs-symbols (*nozzle – 喷嘴 pēnzuǐ*). English terms-word-combinations are transferred into Ukrainian and Chinese by means of similar word combinations (loan translation, equivalent translation, analogue), e.g. *steel production – виробництво сталі – 钢产量 gāng chǎnliàng.* In Ukrainian, as a target language, elements of nominative word combinations undergo conversion (change their word order). We can also observe complex translational operations like loan translation + analogue, loan translation + equivalent translation, equivalent translation + descriptive translation: *Power Line Communication circuit – Power line通信电路 电源线通讯 tōngxìn diànyuánxiàn tōngxùn – схема ліній електропередач (***ЛЕП***).*

At the morphologic level, the nominative, verbal and attributive terms-word-combinations that are more frequently used in the languages under analysis.

Thus, the complex linguistic features of English, Ukrainian and Chinese are to be taken into account when dealing with terminology.

Another factor to be considered is borrowings which, in certain degree, are subordinated to original linguistic rules. Let us study the specificities of the Terms Originated from Latin and Greek their translation means within the Language Pairs "English → Chinese" and "English → Ukrainian" (see *Section 3.2*.).

3.2. Specificities of the Terms Originated from Latin and Greek and their translation means within the Language Pairs "English → Chinese" and "English → Ukrainian"

Historically, a number of terms originated from Latin and Greek. Their roots, stems and prefixes are the markers of loan words. We would like introduce some of the terms-borrowings which are most commonly used in English and present possible variants of their translation into Ukrainian and Chinese (see table 2).

Table 2. The English terms originated from Latin and Greek and their translation means within the language pairs "English → Chinese" and "English → Ukrainian"

Greek and *Latin* roots, stems and prefixes	Meaning in English	Example	*Chinese* – target language	translation means / transforma-tions	*Ukrainian* – target language	translation means / transforma-tions
ac-	sharp or pointed	acupuncture	针科 zhēnkē	descriptive translation	**акупунк-тура**, **голко-терапія**	transcoding (transliteration + transcription), descriptive translation
acr-	height, summit, tip	acrobatics	空中跳伞 kōngzhōng tiàosǎn, 打dǎ, 把子bàzi	descriptive translation + addition, concreti-zation concreti-zation	**акроба-тика**	transcoding (transliteration + transcription)
aqu-	water	aqueduct	水道桥 shuǐdàoqiáo	loan translation	**акведук**	transcoding (transliteration + transcription)
basi-	at the bottom	basis	基础 jīchǔ	concreti-zation	**основа, базис**	equivalent, transcoding (transliteration + transcription)
con–, co–, col–, com–, cor-	with, together	cooperation (collabora-tion)	合作 h**é**zu**ò**, 协作 xi**é**zu**ò**	loan translation	**співпраця, коопе-рація**	loan translation transcoding (transliteration + transcription)
eu-	well, good	euphoria	欣快 xīnkuài	equivalent translation	**ейфорія**	transcoding (transliteration + transcription)
-oid	like	asteroid	小行星 xiǎoxíng xīng	descriptive translation + equivalent translation	**астероїд**	transcoding (transliteration + transcription)
poly-	many	polyester	聚酯 jùzhǐ	descriptive translation + equivalent translation	**поліестер**	transcription
retro-	backward, behind	retro-spective	回顾 huígù	loan translation	**ретроспек-тива**	transcoding (transliteration + transcription)
quasi-	pseudo, resemble	quasi-impulse	准冲量zhǔn chōngliàng	equivalent translation	**квазі-імпульс**	transcoding (transliteration + transcription)
sub–, su–, suf–, sug–, sus-	below	suffix	后缀hòuzhuì	loan translation	**суфікс**	transliteration
top-	place	toponym	地名 dìmíng	loan translation	**топонім**	transliteration

The examples given above show that when translating from English into Ukraine these translation transformations prevail: transcoding (transliteration + transcription), transliteration, transcription, loan translation and descriptive translation. Among the analysed examples, we have not encountered any transcoding, transliteration or transcription. We can assume that the designated translation means are not typical of the Chinese language; loan translation, equivalent translation and descriptive translation are the translation means to be used when dealing with the "English → Chinese" translation of the Latin and Greek terms.

These observations constituted the basis of the experimental teaching (linguistic corpus, exercises, teaching tools, assessment criteria) aimed at improving students' skills and abilities to translate terminology. See further Sections.

4. Terminological Competence in Translation

The multifaceted nature of discourse stipulates the content of the discourse competence depending on its type and subject areas, which determines the choice of translation strategies, tactics and means when rendering the authentic text into target language.

Thus, we would like to highlight the contribution of the scholars who elaborated the structure and contents of the translator's competence. Komissarov (Komissarov, 2002) singled out four constituents of the competence under study: (comprehensive) linguistic, communicative, text-forming and technical competences; however, the scholar seem to have underestimated the significance of skills and abilities to navigate within two foreign languages in science- and technology-related areas. Chernovaty (Chernovatyi, 2014) refers bilingual, extra-linguistic, translatorial, personal and strategic competences to the key components of the translator's competence but we would suggest that the strategic component should be expanded by tactical aspects. Other scientists (Fraser, Schäffner, & Adab, 2000;

Kautz, 2000) focus on peripheral, pre-translatorial, translatorial competences, though the difficulties that might occur when dealing with non-related languages are not considered.

The Chinese scholars (Zhu, Gao, Wu, & Wang, 2019) draw attention to the translational approach to developing terminological competence for student pilots attending a terminology course tailored to ICAO standards, which contributes to language training in the framework of Language for specific purpose (LSP) programmes and allows focusing principally on those features of the language that are required to undertake a particular task. We support the viewpoint of Wang (Wang, 2013) who carried out a component analysis of translation-oriented terminological competence proposed an industry-teaching-research integration mode for terminology education.

The Ukrainian educators analyse the professional competency in Chinese-Ukrainian machine translation and attach importance to these skills and abilities: to perform machine translation using the (systems) programs Pragma, Google, SDL Trados, etc. on the material of English, Chinese, Ukrainian; to undertake linguistic analysis of the source (original) texts and target (translated) texts; to perform pre- and post-editing of texts; to use electronic dictionaries in the genre-marked context; to choose appropriate lexical units in computer dictionary sources in compliance with the branch of knowledge the text belongs to, etc. (Bogush, Korolova et al., 2019).

The fact that modern developments in knowledge representation, cognition, sociolinguistics, discourse analysis and the visual aspects of LSP texts are closely linked to terminology studies (Ahmad & Rogers, 2007: 9–10) enables educators to review syllabi / curricula contents, assessments criteria and methodological support aimed at training Bachelor / Master course students both in translating / interpreting and foreign languages for specific purposes.

In this context, we have revised the structural components of the translator's competence which comprises linguistic, communication- and speech-centred, translatorial, discourse-oriented, linguosociocultural, specific-technological competences (Popova, 2016) and enhanced the practical significance of the discourse-oriented competency in terms of developing students' abilities to "process" and translate the terminology of the Greek and Latin origin from English into Chinese and Ukrainian.

4.1. Assessment criteria

Taking into account strong links between psycholinguistics and translatology, a set of psycholinguistic, general scientific and general linguistic methods has been used. *Analytical introspection* helped us to analyse the markers of the Science and Technology Discourse and to find the adequate means of reproducing the terminological corpus under examination in the target languages on the basis of the existing associative links.

The techniques of *direct word interpretation* made it possible to find out actual relations between the lexical meaning and the internal form of the discourse components under analysis.

The methods of induction / deduction (inductive and deductive reasoning) enabled the researchers to analyse and generalise the theoretical and normative bases on the investigated issues, to systemise the results of the study.

It should be noted that the efficiency of the practical outcomes of the initiated study were experimentally proved on the platform of the State institution "South Ukrainian National Pedagogical University named after K D. Ushynsky" during the first term of 2019–2020 (academic year). 25 Master course students majoring in Translation Studies, 4 qualified English ↔ **Chinese** translators and 4 qualified English ↔ **Ukrainian translators** were involved into the *experiment*. The purpose of the experiment was to evaluate the students' translation quality of terminology within the Discourse of Science and Technology.

The integrity of theoretical and practical training of future translators was provided through the translation quality evaluation criteria which were observed when assessing students' academic outcomes connected with translation of terminology (see table 3).

Table 3. Translation quality evaluation criteria

Criteria Level	Identification of terms among other lexical units	Correlation of terms with a branch of science (scientific area)	Linguistic correctness and translation adequacy	Mark	
				National grade	ECTS scale
Adequate (good translation)	Terms are recognised among other lexical units without any difficulty. Their etymological and morphological features are clearly specified.	The meaning of terms is fully correlated with a branch of science they belong to. The semantics of each term corresponds to specificity of the context.	The authenticity and semantics of terms are appropriately reproduced in target language. Terms laconically fit into the scientific context; sentences containing terms are grammatically correct. Terms originated from Latin and Greek are translated adequately.	Excellent	90–100, A
				Good	74–89, B, C
Satisfactory translation	The majority of terms are recognised among other lexical units. Their etymological and morphological features are partially specified.	In most cases, the meaning of terms is correlated with a branch of science they belong to. The semantics of most terms corresponds to specificity of the context.	The authenticity and semantics of terms are generally reproduced in target language. On the whole, terms fit into the scientific context; some grammar mistakes are observed in sentences containing terms. Most terms originated from Latin and Greek are translated adequately.	Satisfactory	60–73, D, E

Criteria Level	Identification of terms among other lexical units	Correlation of terms with a branch of science (scientific area)	Linguistic correctness and translation adequacy	Mark	
				National grade	ECTS scale
Inadequate (poor translation)	Terms have not been recognised among other lexical units. Their etymological and morphological features have not been specified.	The meaning of terms has no correlation with a branch of science they belong to. The semantics of terms does not correspond to specificity of the context, which causes distortion of information in target language(s).	Due to the translator's linguistic and / or terminological incompetence or ignorance of the subject matter, he / she makes distortions of the authenticity and semantics of terms. There is a lack of equivalency when comparing certain segments (sentences) containing terms within the source (original) and target texts. Terms originated from Latin and Greek are neither recognized nor translated correctly.	Bad	35–59, FX

The established criteria contribute to the improvement of the translator's profession profile in the framework of modern developing society and international cooperation. Based on the scholars' studies (Chernovatyi, 2014; Fraser, Schäffner, & Adab, 2000; Kautz, 2000; Zhu, Gao, Wu, & Wang, 2019 et al.), we find it essential to expand the translatorial competence by these components: terminological, tactical and strategic. They are associated with students' learning acquisitions in the sphere under analysis. Let us specify their actualisation (table 4).

Table 4. Translatorial competence components

Markers Components	**Knowledge (awareness)**	**Skills (abilities)**
terminological	• knowledge of etymological, semantic and morphological features of terms as linguistic units of a foreign language / languages (Chinese, English) and Ukrainian; • awareness of the linguistic and extra-linguistic markers of the science and technology discourse; • knowledge of spelling and hieroglyphics rules.	• practical experience to identify terms among other lexical units representing Chinese, English and Ukrainian; • skills to "navigate" in the discourse of science and technology; • practical experience to process and use spelling and hieroglyphics rules.
tactic and strategic	• psycholinguistic and cognitive erudition; • awareness of the structure and functions of reference-lexicographic / information sources, monolingual and multilingual (online and printed) dictionaries (English ↔ Chinese Linguee, English-Chinese Dictionary of Computer Terms, English to Chinese translation glossaries, English-Chinese and Chinese-English Glossary of Transportation Terms: Highways and Railroad, Google Translate, Pipeline Valves Terminology – 2014 (English-Russian-Ukrainian), Pharma-ceutical Dictionary – 2016 (English-Russian-Ukrainian), English-Ukrainian Glossary of Computer Terms – 2006, English-Ukrainian Math and IT Dictionary, etc.);	• mastery of using adequate translating tools (strategies, tactics, operations, transformations, etc.). • practical experience in translation analysis (all stages – pre-translation analysis, analytical variable search, analysis of translation results); • practical experience in semantic, lexical and syntactical prediction; • skills to use referential, encyclopedic, special literature, dictionaries of various types (thesauri; special idiomatic, explanatory, etymological, mono- and multilingual (online and printed); dictionaries of synonyms, antonyms, homonyms, foreignisms, abbreviations, Personal nouns, etc.); information technologies in order to search for the needed information within English, Chinese, Ukrainian; • practical experience in working with terminology data bases.

We highlight the necessity of awareness and practical skills of using referential, encyclopedic, special literature, dictionaries of various types and information technologies when dealing with terminology data bases.

4.2. Teaching tools which could facilitate students' academic success

The above mentioned translation quality evaluation criteria and translator's professional competence components stipulate us to propose a set of teaching tools which could facilitate students' academic success in translating terminology from English into Chinese / Ukrainian. *Cooperative learning, professional development, technology and problem solving* are proved to be the most efficient ones. Both traditional and new interactive forms, methods and means seem to be likely to fulfil the set tasks.

Cooperative learning, which is aimed at helping students to develop their abilities to work together in groups and to enhance critical thinking skills, can be represented by *the Lecture-briefing "Science and Technology: New Dimension"*. During the lecture-briefing, students – "experienced translators / reporters" – ask the lecturer and his / her team – the other group of students – relevant questions regarding innovations in the fields of science and technology which are the latter to answer. Experienced translators present their reports, prepared in advance, and answer the reporters' questions covering interesting achievements (principles of functioning, structural arrangement, advantages and disadvantages, *etc*.) in science and technology like pedometers, sensor devices, drones, etc. Some translation tips

are given to provide the translation of their specific features and particulars from English into Chinese / Ukrainian. After that, students swap their roles. At the end of the lecture, students sum up technical specificities of presented gadgets and propose translation techniques for rendering them into target language(s).

The method of professional development manifests itself during *the Terminological Workshop "Find the Match"*. University professors are invited to comment on their students' academic success in "professional translation" and "scientific and technical collaboration". Due to the well-organised mode of teaching / learning, students have an excellent opportunity to select Ukrainian and Chinese correspondences to the English terms: *midlet, billing currencies, AS IS, parapetroleum, barrier tape, booms, separatrix, anti-finger, pseudomorph(s), Shield Hauler, burst rate, power, ROC test, carbon footprint, etc.* and to group them according to a scientific branch, commenting on their meaning and translation solutions. This method facilitates the creation of a dynamic and motivational environment for students (*technology and problem solving*).

It should be also noted that students are encouraged to compile scientific and technical vocabularies for certain branches. This process is proved to be efficient as it stimulates students' inquiry profession-oriented activities.

The above-proposed educational tools were used to train students in translating science- and technology-related terms. The students involved into the training obtained positive marks for their academic outcomes (improved knowledge and skills in the sphere of science and technology, practical experience in translating terms, etc.)

To sum up, the appropriate methodological support facilitates students' academic success, which is actualised in their developed skills, abilities and other profession-related qualities.

5. Conclusions

Summing up the results of the research, the following can be noted:

- The Discourse of Science and Technology is represented in the viewpoint of its strategic and tactical vectors of manifestation. We define it as a science-driven discourse, the extra-linguistic background of which is associated with preconditions for initiating elaborations in the sphere of science and technology alongside with intra-state development and intergovernmental cooperation.
- The typical markers of the science and technology discourse are as follows: science-related issues, technological basis, accurate use of terminology, appropriate grammatical constructions, simple syntactic framework, orientation on progress and / or the /addressee, argumentation, motivation for scientific and technological innovations.
- Translation / interpretation of science- and technology-oriented texts is subordinated to the strategy of communicative and equivalent translation / interpretation. These tactics which are likely to facilitate the adequate perception of the scientific message are as follows: • the tactic of transference of cognitive information; • the tactic of correct information layout (in accordance with norms of the target language); • the tactic of reproduction of formal structural text characteristics.
- When translating English terms into Chinese and Ukrainian, some most common translation techniques are used: equivalent translation, loan translation, concretization, generalization, contextual substitution and descriptive translation.
- We expand the translatorial competence by these components: terminological, tactical and strategic (skills and knowledge / awareness).
- Cooperative learning, professional development, technology and problem solving are proved to be the most efficient teaching tools (both traditional and new interactive forms, methods and means).
- The integrity of theoretical and practical training of future translators was provided through the translation quality evaluation criteria: adequate (good) translation, satisfactory translation, Inadequate (poor) translation.

The prospect of efficient translator / interpreter training at Ukrainian tertiary schools is seen in elaborating methodological support which could meet modern qualification requirements for proficiency of multilingual specialists who are able to effectively use translation tools in various fields of science and technology, within The Chinese "Belt and Road Initiative" and "A New Silk Road" projects in particular.

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