

**ISMGE 2020****II International Scientific and Practical Conference "Individual and Society in the  
Modern Geopolitical Environment"****INTERDISCIPLINARY CONTEXT ROLE IN PROFESSIONAL  
VOCABULARY DEVELOPMENT AMONG TECHNICAL  
INSTITUTION STUDENTS**

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***Abstract***

The paper is devoted to developing professional terminological vocabulary among students of higher education technical institutions within professional foreign language studies. Organization of language courses for special purposes among students majoring in textile products technologies and design illustrates professional vocabulary development process. Interdisciplinary context as the integration of technical and humanitarian scientific disciplines is considered a leading factor in increasing motivation for learning, activating professional motives, and developing professional competence. Teaching a foreign language for professional purposes is based on the main principles of communicative and person-oriented approaches, integration of various disciplines achievements focusing on methods of improving professional knowledge and skills. From the perspective of educational tasks, professional language studies can be divided into three stages. The contents of the preparatory stage are to develop communicative competence based on general-interest or country-specific texts. The developing stage provides for the gradual transition to learning professional foreign language with general scientific, technical, and popular science texts used as teaching resources. The purpose of the practice-oriented stage is to develop professional language proficiency. The experimental aspect of teaching based on interdisciplinary integration is aimed at preparing various creative tasks providing students with an opportunity to acquire detailed professional information in a foreign language. The scientific research project on studying etymological basis of the most common textile terms illustrates a way of forming a motivated attitude towards professional vocabulary acquisition.

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**Keywords:** Interdisciplinary integration, professional terminological vocabulary, professionally-oriented studies, professional motives.



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## 1. Introduction

Development of communicative language teaching methods in the higher education system never stops. A determining factor in this process became the growth of foreign languages functional significance in the current context of wide intercultural communication. The main goal of foreign language teaching at a higher education technical institution is to form and develop professional competence of technical specialists in scientific, technical, industrial, and educational fields through foreign language studies. The issues of professional terminological vocabulary development among future industrial engineers, the role of interdisciplinary integration of related linguistic disciplines, and technical disciplines in increasing motivation to professional foreign language learning are considered in this paper.

Publications review of domestic and foreign scientists' works in the field of professional foreign language teaching, interdisciplinary integration of technical sciences and humanitarian knowledge, pedagogy, methods of foreign language teaching, linguodidactics (Ausborg, 2006; Bondarevskaya, 2000; Bushkovskaya, 2010; Gunn, 1992; Konysheva, 2007; Kreps, 2019; Leont'ev, 1991; Littlewood, 2007; Lysak, 2016; Raufelder et al., 2013; Richards, 2006; Skehan, 1996; Solovova, 2002; Superanskaya et al., 2012; Tarasova, 2017; Thompson, 1990; Yakimanskaya, 2000; Zimnaya, 1991) formed the theoretical basis of the study.

## 2. Problem Statement

Foreign language study at technical-science universities is focused on the formation of communicative competence that is of great importance to professional communication. Accordingly, professional education is based on humanitarian, natural science, and professional training of students (Markova et al., 2019). At present professional communication in the areas of science and technology uses the complex conceptual system and specific language. The need to master professional vocabulary in a foreign language only complicates the educational process. Integration and globalization resulted in establishment of diverse relations among foreign countries, which led to the formation of a special terminological system that assimilated numerous technical terms and concepts migrating from other foreign languages. The system of terminological vocabulary is understood as an organized set of terms in a special language that serves communicative needs of a certain field of knowledge (Golovin & Kobrin, 1987).

Professional language as a combination of linguistic means used by specialists of a certain science field has such distinguishing features as a large concentration of general scientific and highly specialized terminological vocabulary (Superanskaya et al., 2012). A term is a special word or word combination denoting a concept included in the conceptual system of a certain area of professional knowledge and used for special purposes (Superanskaya et al., 2012). Heterogeneity of the vocabulary in professional communication language creates the main difficulty in learning. Consequently, a system of didactic techniques for developing communicative skills in using terminology is required to overcome this difficulty.

Scientific and technical terminological system is a special principle of coding, storage, and transfer of collective scientific knowledge. Professional technical language is a means of communication in living

conditions of modern society, a complex of language structures dynamically functioning in specific communicative situations. Technical vocabulary includes the following groups of lexical units: basic general terms (basic vocabulary), for example: eng. unit of measure, ger. Maßeinheit; eng. particular properties, ger. Sondereigenschaften; eng. scientific research, ger. wissenschaftliche Untersuchungen; terms borrowed from various fields, disciplines as a result of their interaction with industrial and technical spheres, for example: eng. location of production, ger. Standortverteilung der Produktion; eng. product life cycle, ger. Produktlebenszyklus; eng. environmentally-friendly technology, ger. umweltfreundliche Technologie. Technical vocabulary system in terms of structure consists of not only monosyllabic terms, but also terminological word combinations, and the number of the latter prevails over the first group. Thus, professional terminology identified as a complex system includes both general scientific and highly specialized lexical terminological units and rules for their combination and use, as well as knowledge of professional communication principles to ensure an unambiguous understanding in a certain professional field.

The task of lexical skills development as knowledge of the rules for choosing words and patterns of their compatibility in various contexts should take centre stage in the formation of the future specialists' professional communicative competence. Monitoring of special terminological vocabulary learning included the most frequent terms related to the topics under study and selected from technical terminological dictionaries, as well as from English and German textbooks for technical-science universities (Aleshchanova et al., 2019).

In many cases professional terminology teaching boils down to introduction of new lexical units from special texts that are considered information carriers of the studied science field. Therefore, the need to optimize the process of teaching terminological vocabulary becomes apparent. Specialized texts comprehension in the light of cognitive sciences focusing on mental processes is complicated by the textual substantive features. Significant concentration of unfamiliar or completely unknown to students terminological vocabulary is characteristic for such texts. The solution to this educational problem should be based on close interdisciplinary interaction with majors departments, discussions of the developed foreign language teaching materials with teachers in majors, rational organization of educational process on the principle "from simple (studying general scientific, adapted texts) to difficult (more complex special authentic texts)".

### **3. Research Questions**

Professional linguistic needs require acquisition of proper terminological vocabulary for specific situations of professional communication during the university education period. Professional vocabulary learning should be divided into three stages. The contents of the preparatory stage are to develop communicative competence based on general-interest or country-specific texts. The developing stage provides for gradual transition to learning a professional foreign language with general scientific, technical, and popular science texts used as teaching resources. Criteria of authenticity, the relevance of information, compliance of the topics with the syllabus requirements were used for selection of the texts. From the perspective of linguodidactics, the educational text should be, on the one hand, a sample of scientific prose by its linguistic and stylistic characteristics, and, on the other hand, it should conform to

the language course stage, the level of foreign language proficiency, programs in majors and methodological goal. In addition, the second stage includes a preparatory part when a list of special terms for educational professional texts is compiled, and training lexical exercises containing these words are developed. The purpose of the practice-oriented stage is to develop professional language proficiency. Learning activities in practical acquisition of highly specialized professional vocabulary constitute the substantive content of the third stage. Professional texts study helps to develop students' active and passive vocabulary, as well as grammar skills acquired at an earlier stage of learning a foreign language basic course. The formation of the lexical aspect of students' communicative competence is based on the development of the skills in recognition and understanding of special texts vocabulary, international words, multivalent words, synonymy, conversion, collocations and stylistic difference of words, use of contextual language guess, a clear idea of foreign language word-building models, etc. (Rogova et al., 1991). The interdisciplinary interaction of specialized technical and humanitarian disciplines is an important condition for quality professional education in the third stage. In this paper interdisciplinarity is defined in the pedagogical context of teaching industrial engineers a professional foreign language as the integration of scientific achievements of related linguistic disciplines, humanitarian disciplines, and specialized technical disciplines to achieve the educational tasks.

### **3.1. Experimental aspect**

Experimental aspect of teaching based on interdisciplinary integration is introduced at the third stage. It is aimed at preparing various creative tasks providing students an opportunity to acquire detailed professional information in a foreign language. Formation and development of a motivated attitude to the study of professional foreign vocabulary is illustrated through participation in project activities and preparation of creative tasks among the students majoring in textile products technologies and design. The students' informed participation in organized independent work using creative learning technologies was tested previously in the framework of such practice-oriented projects as "The project of the language Tandem partnership", "Practice Firma", "Creative writing", etc. (Aleshchanova et al., 2018a). One of the recent scientific research projects on studying etymological basis of the most common textile terms illustrates a way of forming a motivated attitude towards professional terminological vocabulary acquisition. The related scientific linguistic discipline data gives us a different view of the problem of mastering professional terminology (Bushkovskaya, 2010).

Etymology is a branch of comparative historical linguistics covering diachronic word-formation relationships among words, their original word-formation structure, and original meaning. The research methodology used to study the history of a word origin (or a morpheme) allows us to put forward hypotheses about the origin of a particular word. The basis of etymological research is the comparative historical method, which focuses on the laws of phonetic changes, patterns, and trends of morphological, word-building, syntactic and lexical levels of the language (Prokhorov, 2020).

Use of comparative historical information additionally contributes to strengthening the interdisciplinary interaction of technical and humanitarian knowledge. The study of the textile subject realities emergence within a particular historical context, observation of changes in the morphological composition of words in different languages, comparative analysis of those changes with diachronic word changes in the native language was carried out with educational and cognitive goals. The conducted study

contributed to actualization of cognitive, social, value, and communicative motives, which resulted in their transformation into professional motives (Aleshchanova et al., 2018b).

### 3.2. Role of the etymological aspect

The role of the etymological aspect in positive motivation formation for mastering the professional component of a foreign language course was tested in practical classes. Students were to do specially prepared creative, research tasks as part of extracurricular independent work and present the results of historical study of a specific textile term origin and its temporal change. This type of work involved recommended educational literature and informational educational resources (electronic textbooks, electronic libraries, etc.) study, an independent search for additional materials on the topic under study using various search engines and use of information at specific electronic addresses, search and systematization of audio and video files for creating computer presentations. The outcomes of the study are reflected as written semester assignments, computer presentations of the above comparative historical studies, research projects preparation, as well as further participation in various research competitions, and publication of articles.

The research project aimed at tracing the origin of the main textile materials names can be taken as an example. The idea of mutually conditioned influence of historical development of society and language served as a theoretical basis for research. Enquiry into the historical development of words helps to understand the ways of a particular word origin and its lexical meaning and morphological features development in a particular language, changes in these categories in the process of using the word in the language. The research project was devoted to historical comparison of the origin of the main textile materials names in English, German, Russian and some other languages.

The study of the origin of the above terms in the historical context was conducted with the help of professionally-oriented educational materials developed by teachers (Aleshchanova et al., 2019) and electronic information resources.

According to historical data, Arab traders brought cotton seeds from India, where cotton has been cultivated for many millennia. Yarn is made from its fibers, and nowadays most of the clothes are made using this material - cotton. The word comes from Arabic "qutun"; this word is probably of Egyptian origin (fre. "lecoton", from Old French "coton" (the 12th century), ita. "cotone", dut. "katoen", ger. "Kattun", spa. "algodon", por. "algodo", eng. "cotton"). Cotton began to be imported to Britain in the 14th century. It was then that the Arabic name "qutun" turned into English "cotton". From the same Arabian root there is an outdated term "acton" (a quilted cotton jacket worn under chain mail) (Harper, 2020; Nuefeldt & Guralnik, 1984).

The origin of the word "cotton" in Russian is associated with the suffix derivative from the "khlop" which meant "waste, hair, fiber of hemp, flax", hence, "khlopok" literally means "something that was separated by carding, spinning" (Shanskiy, 2020). In other Slavic languages, the etymology of the word "khlopok" is opaque, unclear. There are existing options as cze. "chlup" ("short hair"), "chlupaty" ("hairy"), slo. "chlp" ("clump"), "chlpit" ("to tear, shag"), pol. "chłupy" ("pile") (Fasmer, 2020).

As for the word "flax", the modern meaning of the Russian word is a well-known herbaceous plant, from the stems of which a spinning fiber is obtained. In Germanic languages the word dates from the beginning of the 14th century and means "fabric from woven linen fiber". The forms of this word

underwent changes at different historical stages, for example, Old Russian “l'n”, Old Slavic “linu”, bel. “lyen”; ukr. “l'on”, “lyen”, bul. “len”, slv. “lân”, cze. “len”, slk. “l'an”, pol. “len”. Here it is possible both an ancient cultural borrowing and natural kinship, for example, lit. “linaĩ”, lav. “lini”, Old Prussian “linno”, alb. “lĭni”, lat. “lĭnum”, got. “lein” (“canvas”), iri. “lĭn” (“flax”), Old English “lin”, ger. “Leinen”. The Old English form of “lin” comes from Proto-Germanic “linam” (source also of Old Saxon, Old High German “lin”, German “Leinen”, Gothic “lein”) and is, apparently, an earlier borrowing from Latin “linum” (“flax, linen”), which, along with Greek “linon” is from a non-Indo-European language. Original identity is possible, however, since the cultivation of flax in Central Europe is very old. Greek and Latin variants most likely come from the Mediterranean word. Latin or Germanic origin of Slavic words is unbelievable due to the difference in the number of vowels. In fact, Russian word “lyen” and Latin “linum” have different origins, and their outward resemblance is apparent. Scientists believe that Proto-Slavic ideas of “lyen” (“flax”) should be considered more ancient (Harper, 2020; Nuefeldt & Guralnik, 1984).

The Old Russian form of the word “wool” is “sierst” (“wool”). The word “wool” was widely used in the language in the 13th century. This word is Slavic and it most likely originated from the root “sierst” under the influence of the word “rough”. Initially, the word “wool” denoted a rough, wool fabric. It is possible that this word originated from the same root as Latvian “sars” (“stubble”). Related words are ukr. “sherst”, slv. “sřst” (“animal hair, bristles”), pol. “siers”, lit. “šerỹs” (“bristles”), lav. “sars” (“stubble”).

The art of weaving wool is known to come to the British Isles from the ancient Romans. In the 4th century AD Roman soldiers opened a wool factory in Winchester, Britain to provide themselves with clothing. It was after this that the indigenous people of Great Britain found out the value of wool (Oxford English Dictionary, 2020). It should be noted that the English word “wool” is among modern words related to the noun “fiber” (Old English “wloh” “fiber”), dating back to the common Slavic basis “volk”. In addition, such variants of the Old High German as “hursti” (“cristas”), iri. “sarraĥ” (“covered with scabs, stony”) are found in Germanic languages. Another theory of this word origin connects it with the Old English version of “wull”, the Middle English form of “wolle”, similar to the German word of the same period “wolle”, iri. “wel” (“hair, overgrown”), lat. “vellus” or “villus” (“thick hair”) (Krylov, 2020; Nuefeldt & Guralnik, 1984).

#### **4. Purpose of the Study**

The relevance of the topic depends on the requirements for students' language training within the professional orientation of language courses at technical-science universities and their future professional activities (Aleshchanova et al., 2018b).

The object of the study is the process of mastering professional scientific and technical terminology in a foreign language among students majoring in textile products technologies and design.

The purpose of the study is to define the conditions, methods, and means of increasing motivation in organization of foreign language teaching as an integral part of technical students' professional foreign language competence development.

Monitoring of education process proved that formation of positive motivation in foreign language classes should be based on rational organization of teaching, including many external situational and

contextual factors and internal factors associated with personal psychological characteristics and individual attitudes (Aleshchanova et al., 2018b). Demonstration of steady interest in educational activities, the subject, contents, and significance of the study provided substantial assistance in achieving education goals and objectives. The above factors are closely related, as a rule, to the positive assessment of language training effectiveness in classes.

## 5. Research Methods

The choice of research methods resulted from the purpose set above. In this work we applied a theoretical analysis of psychological, pedagogical and methodological literature on the research topic, sociological diagnostic methods (observation, testing, questioning), analysis of students' educational activities outcomes, analysis of lexical data, the method of comparative historical analysis, statistical methods of research outcomes processing.

The methodological basis of the work was a communicative and activity approach and person-oriented approach to teaching a foreign language. The object of teaching and learning within broader understanding of the communicative and activity approach in professional education is speech activity in its four main forms (listening, speaking, reading, and writing). Therefore, from the perspective of the above approach, the main attention is paid to the development of learning need for communication with acquisition of valuable professional and general cultural information. The methodological contents of the communicative and activity approach are methods of implementation of such educational activities that are related to solving problems in learning situations simulating practical activities (Viskova, 2020). The person-oriented approach focuses on a differentiated approach to learning. The following personal characteristics as students' intellectual and moral development level, individual social and psychological characteristics are taken into account. The goal of a person-oriented education is to provide an opportunity for self-development of a person in social and professional fields (Bondarevskaya, 2000; Leont'ev, 1991; Serikov, 1999; Tulenkova, 2019; Yakimanskaya, 2000; Zimmaya, 1991).

In the study, we have applied an integrated approach based on the methods of various disciplines studying the issues of increasing the effectiveness of professional foreign language teaching to technical-science university students: psychological, pedagogical, communicative, sociolinguistic, psycholinguistic analysis, which helped to examine the ways of using purely linguistic disciplines in increasing future industrial engineers' interest in a deeper study of professional terminological vocabulary within a foreign language course.

## 6. Findings

The experimental research project above based on interdisciplinary integration helps to look at the problem of optimizing professional terminology learning from a new point of view. Acquisition of professional vocabulary by various teaching methods contributes to design a new way of understanding the subject, which is an important condition for students' quality professional education. According to our observations, positive motivation formed for learning a foreign language creates a favorable pedagogical

situation, marked by students' positive reactions to the use of new teaching methods and means to improve learning outcomes.

Two experimental groups studying a foreign language course (1-4 semesters) were formed to identify the dynamics of language competence and educational and cognitive motives growth.

The first group included students studying English or German with an initial level of proficiency A1-A2. The participants of this group took part in interdisciplinary project activities. Students studying a foreign language according to the traditional program (level A1-A2) formed the second group.

Similar test materials, questionnaires were developed and records of observation were prepared for each experimental group. The conducted control test and subsequent questionnaires made it possible to establish that students' answers and assessments showed dynamic growth of their general and professional language level. Control tests provided for identification of the ability to recognize and use in communication lexical units related to general, basic vocabulary, general scientific terminological vocabulary, and special professional terminology. Development control and assessment materials were based on the assertion that after completing foreign language studies, students must acquire a lexical minimum of the elementary level in the amount of 1200 words. In accordance with this goal, the following types of reading were suggested:

- skim reading aimed at the overall coverage of the text contents (the first semester);
- reading for detail developing an analytical comprehension of the text contents and forming the ability to overcome difficulties in understanding a foreign language independently (the second semester);
- revision reading used for presentation of the text information as an annotation or abstract (the third semester);
- reading for specific information, focused on finding both basic and additional information on a specific problem in professional texts with sufficient completeness, accuracy, and depth (the fourth semester).

Thus, professional terminology teaching and students' knowledge monitoring was based on work with authentic text material selected on the criterion of increasing semantic charge and consistent change in reading strategy (Galskaya, 2020). The text material included some functional varieties (narration, description), as well as mixed text types, adapted or authentic texts with simple content and language, informative texts (messages, announcements), professional texts of 600-700 words with relevant topics. The number of unfamiliar words in the texts was 3% - 4% of the total vocabulary. Reading time was half an hour.

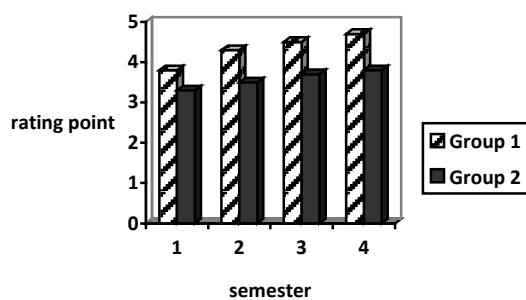
In the first semester the overall rating for understanding text material was approximately the same in both groups. It was 3.8 (group 1, hereinafter referred as 1) points and 3.3 (group 2, hereinafter referred as 2) points out of 5 points possible.

The second semester showed the result of 4.3 (1) and 3.5 (2) points out of possible 5 points.

The indicators of the third semester were 4.5 (1) and 3.7 (2) points, respectively.

The data of the fourth semester are fixed at 4.7 (1) and 3.8 (2) points (Figure 01).





**Figure 01.** Rating of professionally oriented text material understanding

The graphs of the first group answers show a clear positive attitude towards effectiveness and feasibility of using project activities in educational process. It should be noted that most students in the first experimental group learnt almost twice as much active professional vocabulary as the students of the second group who did not take part in creative project work. Students participating in the experiment described their independent creative scientific research projects as activities reducing stress factor caused by individual difficulties in learning a foreign language in general and vocabulary development in particular. It can be concluded that the use of research projects both in the classroom and in independent work means a significant increase in professional motivation and overcoming communication difficulties. From the perspective of linguodidactics and methodology of teaching a foreign language for professional purposes, we consider the obtained outcomes as positive, despite the fact that the conducted research project did not do without certain organizational difficulties.

## 7. Conclusion

Teaching a foreign language at technical-science universities provides for consolidation and further improvement of the basic general educational level of language proficiency in combination with in-depth specialized language learning to meet professional needs, realize personal and business contacts, and further self-education. Professional linguistic needs make it necessary to develop professional vocabulary in the process of university education. Therefore, a systematic and integrated approach to the selection of teaching methods and means is required to solve the problem of improving foreign language proficiency of future industrial engineers.

Experimental research project on interdisciplinary integration of etymological data and professional foreign language study helped to form positive motivation, intensify educational activities, improve learning outcomes, create a favorable pedagogical situation, marked by students' positive reactions to the use of new teaching methods and means.

The results of sociolinguistic and pedagogical research in the form of studying history of the main textile terms, as well as the stages of textile industry development, interviews with students about factors increasing interest in such language training, reflect this methodological and didactic technique effectiveness in optimizing professional foreign language study.

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