

Effectiveness of developing future specialists' communicative competencies in the process of natural science students mastering trilingual terminology

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Received: 28 August 2025; **Revised:** 04 December 2025; **Accepted:** 05 December 2025

ABSTRACT

At present, the acquisition of universal methods of professional activity by participants in the educational process is becoming an inextricable part of language education. Its key objectives are the formation and development of future specialists' foreign-language communicative competencies, research skills, and the skills to use contemporary information and communications technology in professional practice. The present study focuses on a search for new opportunities to improve the communicative competencies of future specialists as part of them mastering professionally-oriented terminology in English. The paper describes the prerequisites for the development of communicative competencies, including lexical competency. The conducted experimental study demonstrates that the introduction of an additional course focused on the mastery of trilingual professional terminology together with efforts to build greater motivation to master said competencies among the informal leaders of student groups ultimately promotes the improvement of communicative competencies of future specialists in the process of learning the foreign language.

Keywords: English language, Professionally-oriented foreign language, Lexical competency, Professional terminology, Students

Introduction

Foreign language learning is an integral component of all stages of specialist training. Therefore, a student learning a foreign language should be directed towards the opportunities for

practical application of the language in their daily life and professional practice. High proficiency in a foreign language is beneficial for career advancement, increases the specialists' level of intelligence and culture, and ensures easier adaptation in a foreign-language environment. The requirements of employers for professional knowledge and skills are constantly growing. This fact owes to the accelerated evolution of professional skills, the emergence of new professions, and the infiltration of technology into all spheres of life. These circumstances also put their imprint on requirements for the level of foreign language proficiency [1, 2].

According to the Common European Framework of Reference for Languages (CERF) [3, 4], a language user has to possess several general competencies (declarative knowledge, practical skills, existential competence, learning ability), linguistic and

Access this article online

Website: www.japer.in

E-ISSN: 2249-3379

How to cite this article: Sagnayeva Z, Aubakirova R, Sultanova N, Berikhanova A, Pigovayeva N, Sarsembenova O, et al. Effectiveness of developing future specialists' communicative competencies in the process of natural science students mastering trilingual terminology. *J Adv Pharm Educ Res.* 2025;15(4):172-9. <https://doi.org/10.51847/MQwM2Ysaqd>

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communicative competence, which comprises lexical, grammatical, semantic, phonological, orthographic, and orthoepic competencies, and the sociolinguistic and pragmatic competencies. Per this document, language proficiency levels are organized into three categories (A, B, and C), each divided into two sublevels. For each proficiency level, a list of requirements for the language user has been developed, based on which this level is recognized.

The requirements of universities in Kazakhstan for the foreign language competence of their graduates are described in model curricula for specialties in technical and vocational education [5, 6]. Foreign language competence is attributed to the specialist's general competences and encompasses knowledge of lexical, grammatical, and stylistic features of foreign vocabulary, professional terminology, and grammatical structures for understanding and producing oral and written foreign texts in the professional sphere, as well as the ability to communicate on professional topics in the foreign language, produce professional documentation in the foreign language, and read, understand, and apply foreign-language documents in professional practice. The requirements for the communicative competency of future specialists are formulated separately. Future specialists need to know and use lexico-syntactic models typical for professional communication and communicate orally and in writing in accordance with the goals and situations of communication.

The Model Curriculum for English for Special Purposes [7, 8], developed based on the CERF requirements and whose purpose is to develop professional communicative competence as a language behavior specific to the academic and professional environment, specifies that the minimum proficiency level of an undergraduate is B2 (threshold level) and for a graduate – C1 (advanced threshold level). Proceeding from industry standards for higher education and the descriptors of B2 by the CERF, the authors of the curriculum note that along with other professional abilities, an undergraduate has to be able to effectively communicate in the professional environment to discuss academic and special issues, prepare speeches and lead discussions, search for information in physical and electronic forms, analyze foreign-language sources, produce various texts, letters, and documents, and translate professional texts relying on various dictionaries.

The Model Curriculum provides no specific content of the discipline, which is explained by the diversity of directions of training and specialties at universities [9-11]. Accordingly, the authors of working programs, academic courses, and manuals for professionally-oriented English language have to gear toward the real needs of future specialists.

An important note here is that in Kazakhstan, specialist training implies mastery of terminology in three languages – English, Russian, and Kazakh. However, to study special terminology, the student needs to first learn general English terminology. In this, students may face problems, as one English word can have several meanings both in Russian and Kazakh [12-14].

Thus, we note that for students at the S. Seifullin Kazakh State Agrotechnical University studying in the specialties "Hunting and

fur farming" and "Aquaculture and aquatic bioresources", the discipline "Professionally-oriented foreign language (English)" involves mastering trilingual special terminology – Kazakh, Russian, and English. However, there is no universal approach to teaching professional terminology. This gap is further aggravated by insufficient educational and methodical support for the basic disciplines of polylingual education of university students in Kazakhstan.

The relevance of our research topic is determined by the need for students in non-linguistic groups to master trilingual terminology as part of the "Professionally-oriented foreign language (English)" course and the need to expand university educational programs to train highly qualified specialists.

The problem of developing communicative competencies in non-linguistic students has long been a focus of research attention. Professional communication in a foreign language poses a problem for most students in non-linguistic specialties and does not deliver the desired results. Until a few years ago, the goal in foreign language classes for non-language majors was to study general science literature [15, 16]. However, with the development of society's needs, the emphasis in foreign language learning in universities has shifted, and the formation of foreign-language communicative competencies has become a pressing need [17, 18].

In addition, to make the learning process more engaging and productive, it needs to have a communicative orientation, which serves as a prerequisite for students' successful practical mastery of the foreign language [19, 20]. Research findings show [21, 22] that this focus greatly contributes to an atmosphere of collective interaction based on communicative situations. These situations stimulate students to perform communication-motivated speech acts, while communication in these situations helps students consciously learn foreign-language material.

In a general case, communicative competencies are considered by researchers as students' practical mastery of speaking skills at a level sufficient for foreign language communication in four types of speech activities: listening, speaking, reading, and writing in typical situations [23-25]. One of the objectives in developing foreign language communicative competencies is to acquire a foreign language speech attitude, which is rooted in the following factors: the habit of communicating predominantly in the foreign language in class; the external language situation created in a specially equipped classroom [26, 27]; the use of authentic materials in lessons; gamified activities in the conditions of creating the foreign language speech attitude [28, 29].

Lexical competency is a component of communicative competencies that is vital for proper communication [30, 31]. The importance of developing this specific aspect of communicative competencies is emphasized in various studies: on the process of functional mastery of vocabulary by students considering the regularities of speech utterance generation [32]; on the methods and techniques of uncovering the meanings of foreign-language words [33, 34]; on the operation of the lexical mechanism in different types of speech activity [11, 35]. Thus, in

the search for ways to optimize the learning process, university teachers are faced with the task of creating an effective method of developing linguistic competency in non-linguistic students.

The objectives singled out by researchers in the aspect of developing future specialists' lexical competency include: obtaining knowledge of professional terminology to ensure understanding and developed speech on professional topics of varying difficulty [36, 37]; development of the ability to search various sources for analytical, statistical, and normative information on professional issues [38, 39]; formation of the skills necessary for further assessment, comparison, and analysis of phenomena and events using professional terminology [40, 41]; preparation of writing business documents, reports, and presentations in the foreign language [42, 43]; development of the ability to maintain professional correspondence with foreign counterparties [44].

The development of lexical competence is an important component in future specialists' professionally-oriented communicative competence as it ensures the understanding of other people's speech and communication itself [45, 46]. In this respect, the teacher needs to efficiently shape the content of professional foreign language education for students to cover the following components: the spheres of professional communication; the types of professional communication; typical topics; practical situations.

The article explores whether it is possible to enhance proficiency through specialized foreign language training programs, how language competencies can be improved in non-linguistic groups, and what strategies could be implemented to increase motivation for learning foreign languages in such classrooms. These questions aim to understand the effectiveness of targeted educational approaches in non-linguistic disciplines and their impact on language acquisition.

The significance of the study lies in its demonstration of effective strategies to improve English language proficiency in non-linguistic groups, which is a crucial skill in modern life. This research is particularly important because such studies have not been conducted previously in Kazakhstan. The findings will contribute to the development of more comprehensive educational programs across various fields of study, addressing the growing demand for foreign language skills in a globalized world.

Materials and Methods

Research design

The experimental study was carried out based on the Department of Foreign Languages of the S. Seifullin Kazakh Agrotechnical University with students in non-linguistic specialties studying in the Kazakh and Russian languages in Bachelor's degree programs in agriculture. The students studied in the specialties "Hunting and fur farming" (directions of training "Forestry" and "Agriculture and bioresources") and "Aquaculture and aquatic bioresources" (directions of training

"Fisheries" and "Agriculture and bioresources"). The studies were carried out in the framework of the discipline "Professionally-oriented foreign language (English)".

An additional program focused on the mastery of trilingual professional terminology was developed to improve students' communicative competencies.

On the one hand, the introduction of this additional program was expected to resolve the problem of raising the efficiency of learning specialized vocabulary and increasing proficiency in English among students with due consideration of the features of students mastering trilingual professional vocabulary, aimed at mastering the professional vocabulary in Kazakh, English, and Russian.

On the other hand, practical experience shows that the psychological and pedagogical features in the study of professional concepts need to be considered in the process of foreign language learning in non-linguistic student groups. To address this problem, the factors of forming interest among students and creating practical value for them have to be accounted for. The experience of working with students in groups where gender bias prevails, especially if the adolescent's socialization took place in rural areas, demonstrates that students' leadership qualities play a major role. In this connection, we believe that a possible solution to this problem can be additional work with students who are informal leaders in their groups to build their motivation to improve communicative competencies and master professional vocabulary. This change in motivation among leaders will result in a greater interest in developing professional competencies and mastering special terminology among other students.

Thus, the hypothesis of the pedagogical experiment can be formulated as follows: as a result of the introduction of the additional program focused on the mastery of trilingual professional terminology and building greater motivation to improve competencies among informal leaders in academic student groups, the level of communicative competencies of future specialists in the process of learning a foreign language and professional vocabulary will increase.

Methods used

The primary research method chosen for our experimental study on the development of communicative competencies of future specialists in the process of foreign language learning was a pedagogical experiment.

Participants

The participants in the pedagogical experiment were 122 2nd-year students grouped into the control and experimental groups based on pre-existing academic groups. For studies utilizing the pedagogical experiment method, a sample size of 122 students is deemed sufficient. For instance, in the study conducted by Shichkin *et al.* [47, 48], the sample consisted of 104 second-year students. Although these students were not divided into control and experimental groups, they participated in a pedagogical

experiment which lasted one semester. Following the flipped classroom experiment, the participants' performance was evaluated through a survey.

Stages of research

The pedagogical experiment was organized as follows:

- the control group (CG, N = 61) was taught professional terminology following the traditional curriculum;
- experimental group 1 (EG1, N = 31) was taught professional terminology with the use of the additional program focused on the mastery of trilingual terminology, which used a multi-level gradation of the mastered tasks consisting in the study of different semantic and direct translations used in the terminology in Kazakh, Russian, and English;
- experimental group 2 (EG2, N = 30) was taught professional terminology with the combined use of the additional program and psychological and pedagogical influence on student leaders to increase their motivation to improve communicative competencies.

To compare the initial results and the final results of the pedagogical experiment to determine the level of development of future specialists' communicative competencies in the process of mastering professional terminology in English, appropriate control measures (preliminary and final testing) were organized in the form of tests (oral and written) to determine the level of oral and written communication in the three student groups.

The prepared tests (completing oral and written tasks) to assess the level of knowledge of professional terminology consisted of 20 tasks each and were rated on a 100-point scale.

Validity and reliability

Special attention should be given to control in the experiment, which involves quality observation of the experiment and directly affects its effectiveness. Based on the context of our study, the objects of control were chosen to be knowledge of professional terminology and the skills and ability to use it in oral and written communication.

Data analysis

To test the research hypothesis, mathematical processing of the results of preliminary and final tests was performed using the Kruskal-Wallis H-test and subsequent posterior (pairwise) comparisons using the Mann-Whitney U-test.

Statistical hypotheses were posed as follows:

H0: the two studied groups have no statistically significant differences in performance in written and oral tasks.

H1: the studied groups do have statistically significant differences in performance in written and oral tasks.

H2: statistically significant differences in performance in written and oral tasks are observed in pairwise comparisons of the studied groups.

Table 1. Internal consistency reliability of biology test

SN	Indicator	Value
1	Number of Item	60
2	Kuder Richardson (KR-20)	0.620
3	Cronbach's Alpha Based on Standardized Items	0.617
4	Mean Item Difficulty	0.56
5	Mean Item Difficulty	0.4

Results and Discussion

The results of preliminary and final testing in the three groups are presented in **Table 2**.

Table 2. Comparison of the results of preliminary and final testing in the three groups (mean values)

Group	N	Oral tasks	H-	Written tasks	H-
		performance	test	performance	test
Preliminary testing					
CG	61	66.5		65.6	
EG1	31	67.2	4.287	66.4	3.322
EG2	30	66.8		65.9	
Final testing					
CG	61	70.5		72.4	
EG1	31	74.4	16.836	74.7	14.317
EG2	30	80.5		82.4	
Increase, %					
CG	61	4.9		9.1	
EG1	31	11.9	-	13.8	-
EG2	30	20.5		24.9	

Table 2 demonstrates that before the pedagogical experiment, the three groups of students had no statistically significant differences in performance in test tasks (both oral and written) ($H = 4.287$, $H = 3.322$, with $H_{cr} = 5.991$, $p < 0.05$). This suggests that students in these groups were at the same level of development of oral and written communication.

Table 2 shows statistically significant differences in the performance of test tasks (both written and oral) between students in the three groups after the pedagogical experiment ($H = 16.836$, $H = 14.317$, with $H_{cr} = 9.21$, $p < 0.01$). This indicates that after the completion of the experiment, the students in the three groups showed different levels of development of written and oral communication.

The assessment of students' results in the testing (**Table 2**) also demonstrates that an increase in indicators was achieved in all three groups. However, the greatest progress was found in the performance of oral (+ 20.5%) and written (+24.9%) tasks in EG3. In this group, professionally-oriented vocabulary was taught with the combined use of an additional program and psychological and pedagogical influence on student leaders to build their motivation to improve communicative competencies. To test the statistical hypothesis that statistically significant differences in performance in written and oral tasks will be observed in pairwise comparisons of the studied groups, the results of final testing were subjected to the Mann-Whitney U-

test. **Table 3** shows the pairwise comparison of final testing results in the three groups.

Table 3. Pairwise comparison of final testing results in the three groups

Group	N	Oral tasks performance	U _{emp}	Written tasks performance	U _{emp}	U _{crit}
CG	61	70.5	165.48	72.4	184.33	627
EG1	31	74.4		74.7		
CG	61	70.5	76.32	72.4	97.18	651
EG2	30	80.5		82.4		
EG1	31	74.4	44.76	74.7	59.22	303
EG2	30	80.5		82.4		

Table 3 shows the presence of statistically significant differences between the three groups in performance both in oral tasks (UCG-EG1 = 165.48 (U_{cr} = 627, p < 0.01), UCG-EG2 = 76.32 (U_{cr} = 651, p < 0.01), UEG1-EG2 = 44.76 (U_{cr} = 303, p < 0.01)) and written tasks (UCG-EG1 = 184.33 (U_{cr} = 627, p < 0.01), UCG-EG2 = 97.18 (U_{cr} = 651, p < 0.01), UEG1-EG2 = 59.22 (U_{cr} = 303, p < 0.01)). This result evidences that after the methodical experiment, each of the three student groups demonstrated results different from the other two groups.

Considering that the greatest improvement was observed in EG2, where students were taught professionally-oriented terminology using both an additional program and psychological and pedagogical influence on student leaders to build their motivation to improve communicative competencies, we can argue that this methodology of teaching was the most efficient, while traditional teaching (CG) proved to be the least efficient. The conducted study proves that optimal conditions for the development of communicative competencies in future specialists while mastering professionally-oriented foreign language terminology are provided by the combined use of an additional program and psychological and pedagogical influence on student leaders to raise their motivation to improve their communicative competencies. This finding aligns with the opinion of other researchers that the efficiency of communicative competency development is determined by several psychological and pedagogical factors that affect the development of communication in future specialists [23, 49]. These success factors rely on the structure of educational activity, which allows correlating these factors with the structural components of creating conditions for the development of intrinsic motivation to develop communicative competencies [36, 50] and for the improvement of the educational process using the introduction of additional training materials proceeding from students' professional activities [43, 51-53].

Furthermore, researchers confirm that the development of communicative competencies in students of non-linguistic specialties is provided primarily through the content of education and its thematic organization focused on the given category of future specialists [25, 54]. Consistent work on improving pronunciation and expanding vocabulary [55, 56],

interdisciplinary connections with core disciplines, and the use of the Internet [57], newspapers, and magazines are all factors that facilitate students' mastery of the linguistic component of communicative competency in the educational process [28, 58]. In addition, students' knowledge of trilingual terminology acts as an additional linking agent between specific concepts in the terminology of agricultural specialties, which have terms and words exclusive to them. Thus, the scope of learning specific terminology expands and the definition of the main term is consolidated with the addition of specialization and narrowly specialized directions of the profession [59].

Literal and semantic translations differ in the disclosure of the term. General terms applied not only in the studied specialty may describe processes or names that carry different meanings. Their alternation with difficult professional terms makes it easier for students to learn the translations of words [60].

Foreign language teaching also needs to account for the fact that one English word may have multiple translations both in Russian and Kazakh. Mastering polysemous terms provides an overview of words that have a common meaning in trilingual learning. Asllani and Paçarizi [61] pointed at the same problem in his study and proposed conducting a specialized program with regard to this issue.

Furthermore, the terms that have several different meanings and pronunciations must be distinguished in the teaching process and are thus used only when thinking of the process at a given time and place. However, when developing the communicative competencies of future specialists, it is also essential to account for the psychological and pedagogical challenges and the features of professional terms in foreign language learning. Aljasir [62] in his study claims that risk taking is a key aspect of language learning – so motivation and detailed feedback are also claimed significant [63].

Thus, the study provides clear practical implications for improving foreign language instruction in non-linguistic specialties. The introduction of an additional program focused on the mastery of trilingual professional terminology, combined with psychological and pedagogical work to increase student motivation, proved to be highly effective. One more practical implication is integrating targeted motivational strategy with respect to leadership qualities to address the unique needs of students in non-linguistic fields. This approach can be used to design more effective educational programs that enhance professional language skills, preparing students for real-world professional communication in multilingual environments.

The study contributes to the theoretical understanding of how communicative competencies develop in non-linguistic groups through foreign language education. The research also fills a gap in the literature, particularly in the context of Kazakhstan, where studies on trilingual education and the development of communicative competencies in non-linguistic disciplines have been limited. These theoretical insights pave the way for further research into pedagogical strategies that combine linguistic, psychological, and cultural components in higher education.

Conclusion

Foreign language learning in university education is a complex and multifaceted process. On the one hand, the organization of the academic course needs to be strictly regulated and must comply with industry standards. In addition, the number of academic hours allocated for the discipline in non-linguistic universities is much smaller than the time proven by practicing teachers to be necessary to reach the necessary proficiency level. Moreover, the requirements of future employers for the knowledge, skills, and experience of applicants are constantly growing.

Therefore, professional foreign language courses at universities need to focus on practical communication. What can allow future specialists to attain the required level of communicative competencies is teaching professional foreign language with the combined use of an industry-specific curriculum for the study of professional terminology coupled with an additional program focused on teaching trilingual professional terminology and psychological and pedagogical influence on student leaders to foster their motivation to improve communicative competencies.

Prospective areas of research in this area include the study of the experience of the world's leading universities in the development of communicative competencies to improve professional foreign language courses for future specialists in agricultural engineering.

Acknowledgments: None

Conflict of interest: None

Financial support: None

Ethics statement: None

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