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Teaching the Scientific Style of the Russian Language (Mathematics, Chemistry, Physics) to Foreign Students at the University

Enseñar la lengua rusa utilizando el método científico (matemáticas, química, física) a estudiantes universitarios extranjeros

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Contents

ABSTRACT:
This article is concerned with main problems of teaching the scientific style to foreign students. There is a need for careful selection of educational material when the teacher thinks over a particular algorithm for working with text in a foreign language using scientific and professional terms, basic grammatical and syntactical models that are typical of the Russian language. In a certain linguistic environment, nonative speakers actively acquire strong knowledge, eliminating linguistic difficulties during professional-oriented lessons.
Keywords: Russian as a second language, scientific style, language for specific purposes, technical university.

RESUMEN:
Este artículo trata sobre los principales problemas de la enseñanza del estilo científico a estudiantes extranjeros. Existe la necesidad de una selección cuidadosa del material educativo cuando el profesor piensa en un algoritmo particular para trabajar con texto en una lengua extranjera utilizando términos científicos y profesionales, modelos gramaticales y sintácticos básicos que son típicos de la lengua rusa. En un entorno lingüístico determinado, los hablantes no nativos adquieren activamente un conocimiento sólido, eliminando las dificultades lingüísticas durante las lecciones orientadas a profesionales.
Palabras clave: ruso como segunda lengua, estilo científico, lengua para fines específicos, universidad técnica.

1. Introduction

Taking into account the current trends in establishing international relations, Russian institutions of higher education are focusing on the internationalisation of the domestic educational system. The formation of professional competencies in professionally oriented activities of nonnative speakers is complicated since they need not only to master scientific terms but also go through "intensive social and biological adaptation and intercultural interaction" (Eremina & Eremina 2014). Then they should actively use professional vocabulary in an authentic environment.

Experts believe that the use of "a professionally oriented approach in teaching Russian as a second language virtually resolves all the psychological, linguistic and social difficulties associated with the formation of communicative competencies of a foreign language. Thus, conditions are made when students master speech activities in the process of handing professional tasks" (Bimurzina 2014).

In our opinion, the scientific style of Russian as a second language as it is taught at the university considers pedagogical and psychological aspects of the indicated direction. From the psychological viewpoint, we should take into account the specifics of the right hemisphere of the human brain that has a technical mindset responsible for analytical abilities.

On the one hand, this fact decreases the linguistic instinct of nonnative speakers. Furthermore, people of engineering specialties tend to focus on exact sciences neglecting the study of the language. "The lack of humanistic values is often manifested in ... the spread of technocratic snobbery ..., low speech culture, weak linguistic instinct" (Saifullaeva 2016) and the focus on mastering foreign vocabulary that decreases the efficiency of studying Russian as a second language for technical purposes.

On the other hand, the following aspects can become good incentives: an awareness of the usefulness of the subject under study, immersion into the linguistic environment, the desire to integrate into some profession within Russia or domestic companies working abroad, the prospective professional growth and a large salary and the status value of the Russian language.

We should also highlight the specific nature of the scientific style. It stands out among other functional styles and is characterized by greater autonomy (Grishechkina 2016). It is currently undergoing a transformation that should be taken into account in the process of teaching foreign students (studying natural sciences and the humanities) the scientific style. The results obtained by Yakovlev prove that "the semantic change in word-terms from the everyday linguistic consciousness to scientific is not always systematic" (Yakovlev 2016).

2. Methods

While teaching Russian as a second language in the framework of the subject "The Russian Language: The Scientific Style", the lecturer should solve the following tasks:

– Adjust subjects of each lesson with the vocabulary learnt by foreign students in accordance with their educational profile. On the one hand, we do not recommend choosing texts that repeat "entire courses of special disciplines" (Bimurzina 2014). On the other hand, it is necessary to isolate the basic scientific vocabulary in the main discipline reflecting the scientific orientation of foreign students. This orientation should be taken into account to select and sort the educational material which determines the mandatory lexical and grammatical minimum of teaching the scientific style for a certain specialty and optimises the learning process of Russian as a second language;

– Prepare "listeners to the perception and production of scientific texts" (Korolkova 2015). Students’ success in mastering special disciplines and even the level of their future proficiency greatly depends on how they are able to "memorize the information received from oral and written sources and produce their own written statements (notes, reports, abstracts, reviews) (Korchik & Kulikova 2008). While mastering natural sciences, it is significant to accurately capture the resulting text. For instance, if a mathematical formula,

physical theorem or chemical equation are recorded in a wrong way, the improper name of some reagent may entail a whole range of errors and shortcomings not only in the solution of problems and exercises, but also in the practical activity, i.e. in the process of carrying out experiments;

– Give the right Russian equivalents of each special word (including terms), "special phraseology, complex syntactic constructions (characterized by an ordered relationship)" (Letova & Yarkina 2005);

– Provide a proper definition of each special word;

– Indicate whether particular pairs of words and terms are etymological twins or have semantic differences (including connotations);

– Determine which of these words-pairs or terms-pairs are more preferable to use in the Russian language and why;

– Teach foreign students abbreviations relevant to the potential profession;

– Pay attention to popular naming units denoting the special vocabulary and their possible oral or written use in special, interdisciplinary and official areas of communication.

Nowadays there are a limited number of textbooks for foreign nonphilology students studying natural sciences (mathematics, chemistry, physics, biology, geology, etc.). Taking into account this situation, the Department of the Russian Language No. 1 at the Faculty of the Russian Language and General Educational Disciplines of the Peoples' Friendship University of Russia has recently published some textbooks and tests for teaching students of a technical profile the language for specific purposes.

The most popular among students of the Faculty are the following textbooks: "I Want to Know Everything!" (Bragina et al. 2017) and "Minitests on the Scientific Style: Technical Profile" (Galaeva, & Novoselova, 2009, p. 7). "I Want to Know Everything!" manual is addressed to foreigners who study Russian on their own without the teacher's guidance during their preuniversity training. Its lexical and grammatical materials meet the requirements for mastering the Russian language (B1) in the educational and professional sphere of communication. The manual contains QR codes that make the perception and understanding of sounding texts much easier. The provided minitests also meet all the requirements of the corresponding training stage of nonnative speakers of the natural-technical profile and help to reinforce skills of professionally oriented communication.

The teaching material should be formed on modern scientific discoveries and achievements and correspond to "leaps" in the progress of exact sciences. For example, "in the 1900s, all the results of global mathematical research could be written in 80 books. Now these data will be hardly fitted in 100,000 volumes" (Radchenko & Mozgovaya 2015). Thus, when selecting a suitable teaching material, the lecturer should differentiate the current vocabulary, archaisms and neologisms, emphasize borrowed words and their equivalents, and demonstrate etymological twins.

As a rule, while teaching the basic classification of the morphological category "Numeral" in Russian as a second language, lecturers mostly pay attention to "the peculiarities of numerals, the nature of their formation and changes in their forms, including their connection to a certain meaning" In addition to numerals, it is important to master other categories that express "quantitative values: *bolshinstvo (the majority),* , *mnozhestvo (the set)*; as well as countable nouns that are used in several meanings: figures (*dvoyka* (*two), pyatorka (five*)), marks (*tri/troyka (three/ satisfactory), pyat/pyatorka (five/excellent)*); quantities (*pyatok/desyatok (five/ a dozen of apples*); the number of persons or objects in the group (*chetvorka /four children, airplanes; troynya/ triplets were born*), etc.".

In our opinion, numerals and all their categories have the peculiarities that are relevant for all natural sciences and can be taught "in the isolated manner, i.e. in a phrase, in a syntagma, in a sentence", in a text. Meanwhile, numerals have the derived nominations (*dvoyak – 2, pyatok – 5, ochko – 21, etc.*) which are unknown to foreign students.

However, we do not recommend focusing only on the vocabulary and translation of scientific articles. Mechanisms of text structuring often fall out of the view of both teachers and

students. Therefore, experts recommend "teaching the analysis of scientific papers and structuring adequate answers" (Korchik & Kulikova 2008).

We have carried out the statistical research using the following methods: the statistical observation, the summary and grouping of the materials obtained through the statistical observation. The statistical observation was carried out at lessons of Russian as a second language among nonnative speakers studying at the natural scientific profile of the Faculty of the Russian Language and general educational disciplines of the Peoples' Friendship University of Russia. Throughout the experiment, we recorded the most frequently used forms of mastering the linguistic material. The summary and grouping of these statistical materials were conducted in the form of a survey which was then processed with computer software (Microsoft Excel 2010).

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3. Results

In order to solve the above-mentioned linguistic and educational problems, we have conducted a sociological survey on the topic: "Studying the scientific vocabulary in a foreign language" among foreign students studying in the natural scientific profile of the Faculty of the Russian language and general educational disciplines of the Peoples' Friendship University of Russia on natural science professions. During the survey, we used the method of group questioning and quantitative processing of information. The survey involved 70 students over 18 years: 44 women and 26 men. Their level of language proficiency was B1-B2-C1. (see Table 1). They were asked the following question: when studying the scientific vocabulary of a foreign language (which is necessary for your profession), what form of mastering the language material is the most effective for you?

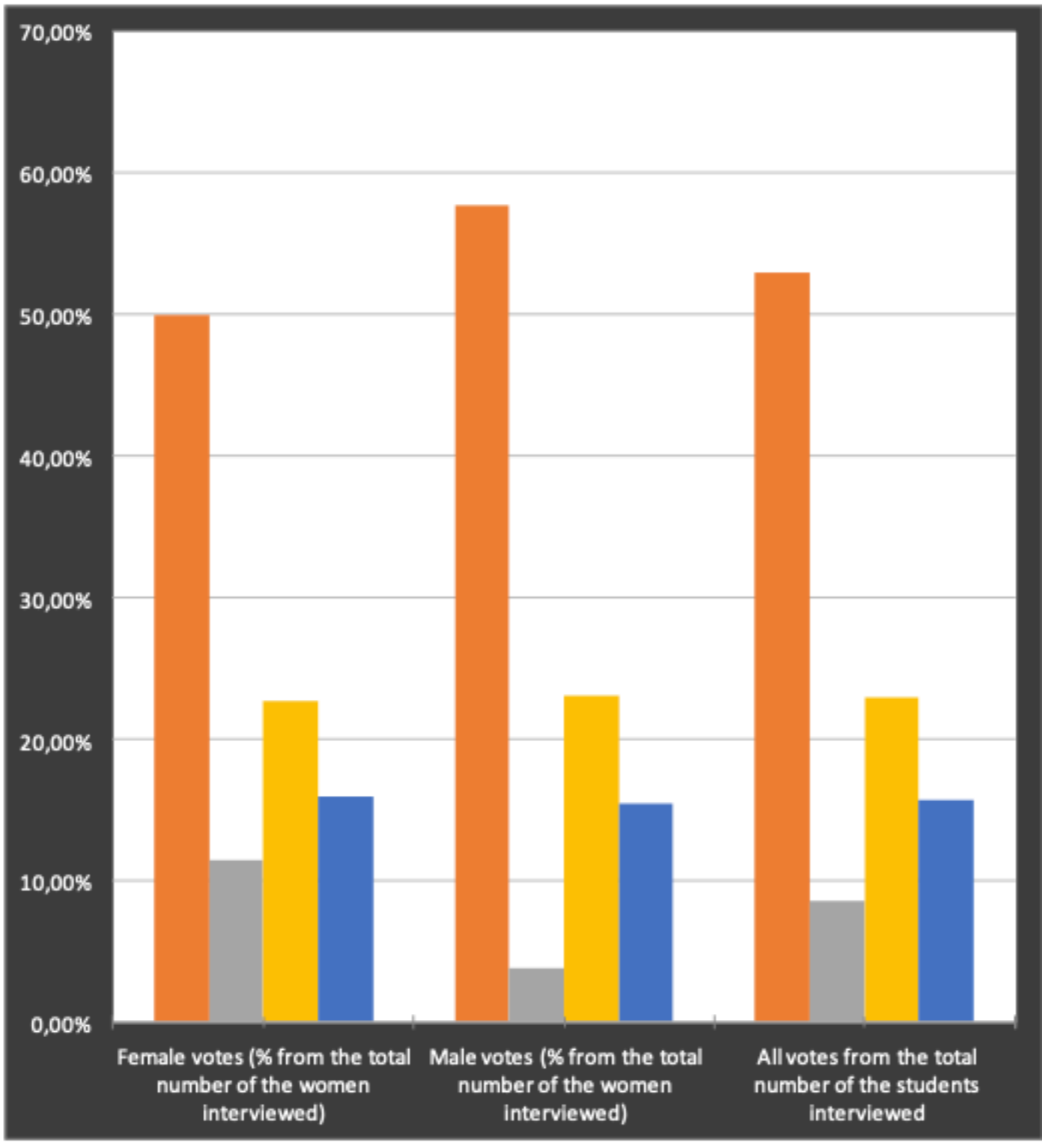
Table 1
Results of the personal survey on the topic:
"Studying the scientific vocabulary of a foreign language".

No.	Possible answers	Female votes (% of the total number of women)	Male votes (% of the total number of men)	All votes from the total number of the students interviewed
1.	Visual representation (for example, certain formulas or names of geometric figures in the study of mathematics; tasks, photographs or drawings of experiments in the study of chemistry or physics, etc.)	50% (22 students)	57.7% (15 students)	52.9% (37 students)
2.	Authentic texts (original texts written by native speakers for native speakers)	11.4% (5 students)	3.8% (1 student)	8.6% (6 students)
3.	Adapted text with some special words, including terms (an abridged version of the text)	22.7% (10 students)	23.1% (6 students)	22.9% (16 students)
4.	Learning the foreign special vocabulary, including terms, special phraseology and complex syntactic constructions (characterized by an ordered relationship)	15.9% (7 students)	15.4% (4 students)	15.7% (11 students)

Total:	**44**	**26**	**70**
Level of the statistical significance (p)	0.063	0.120	0.082

Generalized data of the group survey are provided in the form of Figure 1.

Figure 1
Results of the sociological survey on the topic
"Studying the scientific vocabulary in a foreign language"



4. Discussion

The survey results demonstrate that the preferred method for learning new special words for both women and men is the principle of clarity, i.e. Ya.A. Kamensky's golden rule of didactics representing the language as an abstract sign system that reflects the diversity of the surrounding world. The scholar believed that "the mechanism of mastering the language lies in the development of a new semantic system in the mind of students, namely, in the formation of connections between the sign and the concept, in the development of the ability to apply these relationships into interpersonal communication ensuring a continuous cognitive activity" (Shcherbakova 2013). According to this theory, the language study is efficient when consciousness is supported by senses.

Regardless of the gender of the students interviewed, adapted texts were popular among

22.7% of females and 23.1% of males. We should note that modern scholars doubt about the effectiveness of adapted texts in the study of a foreign language, including the mastery of its scientific style. However, the practice has shown that it depends on the preferences of students. Nevertheless, if nonnative speakers begin learning a foreign language with complex texts, they can lose confidence in their own abilities and the motivation to master the language.

15.9% of females and 15.4% of males preferred to study the foreign special vocabulary by memorizing words. They explained it in a way that this method significantly reduced the time spent for studying. Modern scholars think that the memorization refers to the category of the least effective and primitive ways of teaching a particular style of speech since differently constructed sentences rather than separate words are used in the process of communication. Therefore, the knowledge of one or another scientific term or special vocabulary is not enough for communication, which, in turn, significantly reduces the understanding of lectures on profiling disciplines.

The least popular place was the usage of authentic texts taken from original sources and not initially intended for educational purposes. 3.8% of males and 11.4% of females used this method. However, this method was chosen by the students with Level C1 who already possessed the well-formed linguistic, linguocultural (sociocultural) and communicative competences. They also noticed that they would still willingly combine authentic literature with variants 1 and 4 (the principle of visualization and memorization of foreign words). The main motivation among the respondents was the time-saving factor for studying Russian as a second language. A relatively short authentic text can contain a considerable number of complex professional words and expressions.

5. Conclusion

Therefore, the scientific style is one of the functional styles of the literary language serving the sphere of scientific and technical literature and relevant for students of the natural scientific profile. The special training of a potential researcher is based on linguistic and speech competencies. Thus, the scientific style implies a strict and careful selection of the teaching material and takes into account the educational profile of students. In order to reinforce the skills of working with scientific texts, including the translation and analysis of scientific literature, students learn to provide structured responses to a given topic, which greatly improves the learning process of Russian as a second language. At the same time, the principles of human thinking determine the way of mastering the scientific style regardless of the students' gender and the nature of their mindset (technical or humanitarian), which also determines the teaching of Russian as a second language.

The survey based on the practice of mastering the scientific style by foreign students has shown that the most relevant and convenient way to memorize the Russian special vocabulary for nonnative speakers is the principle of visibility.

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