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## Forming Linguistic Competence of Foreign Students at the Preparatory Department of a Technical University

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### Abstract

The article describes the technique developed by the authors to organize classroom lessons and independent work for foreign learners studying in Russian at the Preparatory department of a technical university. At the classroom lessons in Mathematics students worked with five types of tasks: sample tasks; text analysis; micro essay; model task; mastering mathematical symbols. During the independent work in the study of Mathematics, foreign students performed tests and teamwork tasks placed on the platform Moodle. We have carried out the experiments, which showed that the technique of organizing classroom lessons and independent work, developed by the authors, had a positive impact on the level of linguistic competence in Mathematics of foreign students of the Preparatory department.

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**Keywords:** Foreign students; pre-university training; linguistic competence; blended learning.

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### 1. Introduction

#### 1.1. The peculiarities of educational process for the foreign audience at Russian universities

In recent years we have seen the tendency of organized attraction of foreign citizens to study at Russian universities. National Research Tomsk Polytechnic University (TPU), as one of the leading research universities in Russia, is not an exception. Before enrolling in a bachelor degree at TPU foreign students pass a one-year course of Russian at the Preparatory department. They also study such basic disciplines as Mathematics, Computer science, Engineering graphics, Chemistry, Physics and Scientific style of speech. They start learning Russian from the beginning of the academic year (in September). The other disciplines are included into the educational process from November. Thus, foreign students have 7-8 months to study Mathematics and other natural science disciplines.

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During this time they have to master the basic concepts, terminology and symbols in each discipline, provided by the pre-university training program. According to the results of final exams students are enlisted to the first year at TPU, after which they can continue their education in the non-native language. So, foreign students have less than a year to master the Russian terminology of various disciplines which they had previously studied during 11-12 years in their native languages. Therefore, now the teachers of technical disciplines have a difficult task – to organize the educational process taking into account the requirements to the preparatory course graduates, i.e. to prepare them to further mastery of the basic bachelor programs in Russian. A series of studies in this field aims at increasing the level of students' linguistic competences in a non-native language; i.e. Russian.

## 1.2. Literature review

The analysis of current research in this area has shown that its main part deals with the optimization of teaching a foreign language by e-learning:

- the use of information and communication technologies (Jurickova, 2014; Lubis, Embi et al., 2010);
- the use of modern Internet technologies (service Voki (Aikina & Zubkova, 2015));
- the use of social networks: Facebook (Kao & Craigie, 2014), Social media (Faizi, Afia et al., 2014);
- the use of mobile applications (Berns, Palomo-Duarte et al., 2014; Wang & Shih, 2015).
- blended learning (traditional training together with online training) (Klímová & Poulová, 2014).

Part of the studies aimed at increasing the level of linguistic competence has been associated with the following approaches to learning:

- communication-oriented approach, contributing to the development of engineering communication skills (Bojović, Palurović et al., 2015);
- task-based learning, facilitating the reading speed efficiency (Tang, Chiou et al., 2015);
- interactive learning, which involves interaction between peers from different countries enrolled in one educational program through online resources (Tudini, 2015);
- competence approach based on the idea that the linguistic competence formation will be more successful if a learner finds out some historical and cultural aspects of language learning (Garayeva, 2015);
- intercultural approach based on communication between people from different cultures in one language through the Internet forums, Skype, blogs and e-mail (Chen & Yang, 2014).

Our article as well as that of Klímová B.F., Poulová P. (Klímová & Poulová, 2014), is devoted to the blended learning as a form of training in foreign languages teaching.

The aim that we have set for ourselves in our study was to introduce into the educational process efficient forms of organizing classroom and independent work of foreign students in order to form their linguistic competence in a studied discipline. One of the main tasks of teaching Russian in a discipline was to teach students to use Russian in its written and oral form at the math lessons so that they could continue their further bachelor training in Russian. It is also important to note that most of the foreign audience (93-95%) enrolled in TPU, come from Asia (Mongolia, Vietnam and China).

## 2. Methodology

The article presents the experience of organizing the classroom and independent work in Mathematics (using the didactic materials placed on the platform Moodle).

### 2.1. Objectives

The research has the following objectives:

- to introduce into the educational process efficient forms of organizing classroom and independent work of foreign students at the preparatory course;
- to create conditions for the formation of linguistic competences in a discipline at the classroom and independent work in Mathematics;

- to develop assessment methods for linguistic competences in a discipline.

At the first stage of the study we carried out the experiment. In 5 experimental groups the Maths lessons were held according to our methodology, in 5 control groups – according to the traditional methodology (speaking, listening, writing). In the traditional organization of the educational process, the independent work of students was held without use of the Moodle materials. The total number of foreign students taking part in the experiment was 97, number of teachers – 3.

## 2.2. Organization of class work with students of the Preparatory department

Here we consider our technique of organizing class work for students of the Preparatory department based on five types of tasks: sample tasks; text analysis; micro essay; model task; mastering mathematical symbols. The creation of these tasks for Maths was aimed at the formation of writing and speaking skills and also at the mastering of Mathematical terminology in Russian.

### Type I. Sample task.

This part of exercises was based on samples. At first students analyzed an example task, then performed 6-10 similar tasks independently. This type of work helped them to memorize certain mathematical phrases and replenished their mathematical terminological vocabulary in Russian.

### Type II. Text analysis.

In this type we distinguish three groups of assignments. After reading a text students answered the questions, wrote questions to the text, inserted the missing words into the text. Tasks of this type contribute to linguistic competence in a discipline: the ability to ask questions and mastering of speech forms and mathematical vocabulary in Russian.

### Type III. Micro-essay.

In the tasks of type III students read a mathematical statement, then wrote whether it was right or wrong. These assignments have been developed taking into account the formation of the following subject competences: mathematical vocabulary and argumentation skills in Russian written speech.

### Type IV. Model task.

These tasks were created together with the teachers of Russian as a foreign language. Foreign students made sentences in Russian according to given models. For example, “**Smth.** is called **smth.**” is a linguistic model for a mathematical definition. It helped students to learn constructions of theorems, definitions and statements in Mathematics in Russian.

### Type V. Mastering mathematical symbols.

Students learned how to read Russian mathematical symbols correctly, then described mathematical statements, definitions or theorems in Russian symbols. They also studied a mathematical statement, definition or theorem described in Russian symbols, wrote it in full words and told aloud in Russian. It contributed to such skills as mathematical writing with the help of symbols, reading mathematical formulas, wording of definitions and theorems in Russian.

## 2.3. Organization of independent work with students of the Preparatory department

Now we consider the organization of independent work. Using the platform Moodle the authors created a Math course with materials adapted for teaching foreign students. The following sections were represented at the platform: information about the course "Mathematics" and about the teachers, news forum, glossary, step-by-step instruction for working with the course, calendar of rating plan for the course, public forum.

After registering in the course, foreign students studied the Instruction. In the Calendar of rating plan they got acquainted with period of works given for each assignment and task assessment expressed in points. For each topic we provided theoretical material, presentations, video lectures, samples of Mathematical tasks, which focuses on mastering mathematical terms in Russian, learning outcomes for each topic - all placed on the platform Moodle. After reading this information the foreign student passed the entrance test and then performed the tasks on the topic studied in class.

The test tasks were of three types: open type tests, closed type tests and matching assignments. In the open type test the student typed the required value (word, sentence or number) on the keyboard. In the closed type test the student selected the correct answer from several choices. In the matching task the student connected each item from the left part of the window with one corresponding element in the right part.

At the last stage of work of the studied topic the teamwork task was provided. Each student could choose a topic for discussion, then wrote an essay about it and sent this file to the groupmates to discuss the expressed ideas. The participants then assessed the work of each other using the points provided for this task. This task was the most difficult because the topic was discussed in Russian (non-native language) and they had to assess the work of each other. The main problem for the foreign students was to formulate the discussion topic precisely; due to their limited knowledge in Russian, the groupmates could misunderstand the text.

#### *2.4. Experimental verification of the method effectiveness*

At the last stage of the experiment (at the end of the academic year) the linguistic competence level in the discipline was assessed. We identified the following levels: low (A), intermediate (B) and high (C).

Level A: students understand sentences and frequently used expressions related to school Mathematics, they are able to find an answer to a question in mathematics in the textbook and read it; they can answer the teacher's questions in Maths if they are pronounced distinctly and slowly. The students poorly understand the Russian speech of groupmates and are not able to write mathematical sentences in symbols. They poorly read mathematical formulas, definitions and theorems written in symbols.

Level B: students understand the general content of mathematical texts, they are able to make sentences on models, typical of Mathematics in Russian and answer the teacher's questions in Maths. They understand the Russian speech of group-mates and can read mathematical formulas, definitions and theorems written in symbols.

Level C: students understand any written text and oral speech in Russian. They can write mathematical sentences in symbols, and vice versa, find words quickly and build mathematical constructions when explaining theoretical material and solving problems in Mathematics. They can choose a topic on a Mathematical issue and discuss it with groupmates.

### **3. Results and discussion**

At the first stage of the research the following objectives have been set:

- to find out the difficulties experienced by foreign students at the Preparatory department - based on interview;
- to assess the methodical support of disciplines and educational forms - based on interviews with foreign students;
- to find out what resources were used by foreign students for their independent work.

Ninety-seven (97) foreign students attended the current interviews; of these, 26 students from Vietnam, 25 - from China, 35 - from Mongolia, 7 - from Africa, and 4 students did not specify their country of residence. They were of different age groups (from 17 to 21 years old), among them 63% of male respondents, 37% - female.

The analysis of the interview has shown that more than 95% of foreign students have difficulties in learning at a Russian university. The main reason for the difficulties was poor knowledge of Russian, which was indicated by 72% of respondents. 24% of respondents indicated the lack of educational materials and literature adapted for foreign students. Learning of a large number of new words from different disciplines in Russian within a short time was the cause of learning difficulties for 24% of students. The new organization of educational process, unusual for foreign students, caused difficulties for 17% of students. About 20% of students noted that they had spent too much time for their independent study of incomprehensible material. About 15% of respondents said that their poor school training was the cause of problems in their university education. Only 5% of students reported no difficulties in their learning.

Then we found out the following educational forms used in teaching technical disciplines in class:

- teacher's monologue (at lectures);
- dialogue, discussion (at lectures and practical classes);

- solving problems and doing written exercises (in practical classes and lectures, when performing tests and individual assignments);
- presentations, media, audio and video.

Also, foreign students noted that in their study of technical disciplines they used notes (44% of respondents), manuals (48%), handouts (21%), electronic resources (5%) and the Internet (16%), while some students indicated their use of several other information sources.

When assessing manuals in Mathematics in Russian, the students noted the following drawbacks:

- incomprehensible text in the manual – 53%;
- lack of examples for solving tasks with explanations in Russian – 31%;
- lack of tables, schemes, figures, graphs – 13%;
- lack of exercises for independent work – 3%.

It is important to note that according to the working program of Mathematics more than 50% of learning time was given for the independent work (to study theoretical material, do homework and individual tasks, prepare for tests, exams, public speaking and student conferences). The students noted that they had used electronic resources for the independent work: often – 29 %; if they had no printed textbooks – 16%; seldom – 25%; never used – 17%, the remaining respondents did not answer this question.

During the independent work 57% of students found the examples for solving tasks in the Internet, 45% – in lectures, 34% – in electronic manuals, 32% – in tests and tasks. Most of the students took guidance from the program of the course, manuals, glossaries and electronic dictionaries. We note that 100% of the Chinese students used electronic dictionaries at the lessons.

The analysis of the interview has shown that searching new forms of classroom and independent work for foreign students in order to form linguistic competence in a discipline is relevant to the present day.

In addition, in the course of our study we tried to understand what students themselves expect from teachers and what form of learning communication and feedback they would prefer. Accordingly, 78% of respondents noted that it is important for them to receive feedback at the lessons, when the teacher points out their orthographical mistakes in Mathematical terms. About 63% of students said that it is better if the teacher explains their mistakes individually. About 12% said that it is enough for them when the teacher explains the mistakes to all the group at the classroom board. Foreign students with a poor mathematical background (15%), studying on a commercial basis, preferred paid individual and joint consultancy. These comments of students were important for the work of the teacher.

The second stage included the experiment on the developed method of teaching Mathematics to foreign students in non-native language. We tested the effectiveness of this method with the help of linguistic competence levels discussed in paragraph 2.4. The distribution of foreign students from the experimental and control groups by their linguistic competence levels are given in figures 1 and 2.

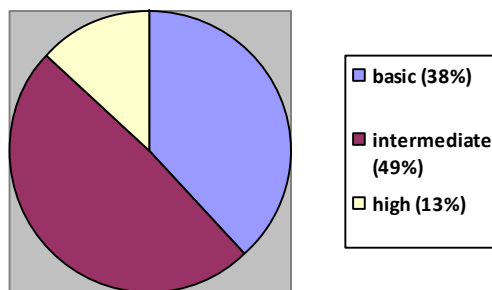


Fig. 1. Levels of linguistic competence in the control group.

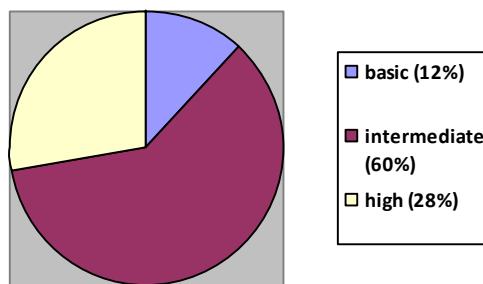


Fig. 2. Levels of linguistic competence in the experimental group.

The analysis of the data given in figures 1 and 2 has shown that the total linguistic competence level became significantly higher in the experimental group of foreign students than in the control group. The results have shown that the use of five types of tasks at the lessons and three types of tests (placed on the Moodle platform) in the independent work combined with teamwork tasks has a significant impact on the development of formation of linguistic competence in a discipline.

#### 4. Conclusions

Once again we note that blended learning is one of the most effective forms of teaching foreign languages in a discipline. Work with the course “Mathematics” on the educational platform Moodle introduced foreign students to the structure of courses, developed in Tomsk Polytechnic University. This acquaintance will help them in the future to learn quickly to work with other educational courses in Russian.

The performed experiments have shown that the method of classroom and independent work on Mathematics developed by the authors has a positive effect on the linguistic competence formation level in Mathematics of foreign students at the Preparatory Department.

This method is recommended for use in teaching technical disciplines to foreign students of the Preparatory Department.

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