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#### IMPLEMENTING READING AND SPEAKING ACTIVITIES FOR ESP STUDENT TEACHERS

L.R. Sakaeva (a)\*, E.Kh. Shamsutdinova (b), E.V. Martynova (c)

\*Corresponding author

(a) Kazan (Volga region) Federal University, Kremlyovskaya str., 18, 420008, Kazan, Russia,,  
liliyasakaeva@rambler.ru

(b) Kazan (Volga region) Federal University, Kremlyovskaya str., 18, 420008, Kazan, Russia,,enzhe\_86@mail.ru

(c) Kazan (Volga region) Federal University, Kremlyovskaya str., 18, 420008, Kazan, Russia,,  
katerinamarty@yandex.ru

#### *Abstract*

Changes in the Russian Federal State Educational Standard for the specialisation 44.03.05 Pedagogical education (with double majors: Mathematics + English) have placed new demands on bachelor graduates. Recently, state final examination involves not only passing final state exams in English, but the ability to explain Mathematics in English (including at the defence of a thesis). It means that teaching a foreign language as a part of mentioned major should be professionally oriented and therefore, teaching it in isolation from the majors is not ineffective. Consequently, complex tasks are put to both students and teachers. Students, besides mastering General English, must study English for specific purposes. Although in the curriculum there are the following disciplines: "English language in professional communication", "Professionally oriented English", "Translation of professional literature", but they are definitely insufficient for forming foreign language competence in professional activities. As for teachers, they must not only speak a foreign language and be familiar with teaching approaches, but also understand the essence and specifics of their major subject.

This article discusses teaching approaches of the practical course of the English language with a gradual, phased introduction of professional English language for mathematicians through the examples of exercises for developing reading and speaking skills. It is worth noting that innovations imply the modification of all system components of learning. In addition, long-term practice shows that training using traditional technologies allows us to develop the key core competencies for the specialty training, which suggests the need for change.

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**Keywords:** Education, student, teaching, English for special purposes, double majors, developing speaking and reading skills.



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## 1. Introduction

Since its early years in the 1960s, as A. P. R. Howatt noted, English for special purposes has taken its place among other spheres of teaching English (English as a Foreign Language, English as a Second Language, English for Academic Purposes, English for Speakers of Other Languages, etc.) (Howatt, 1984). Its appearance can be explained by a great number of reasons and factors, such as advances in the field of science and technology, global use of English as the language of international communication, and increasing numbers of international university students. English for Specific Purposes (ESP) differs from General English (GE) in teaching approaches and learning environment. Then, ESP and General English differ in the age of learners and their learning goals. Usually, they are the adults who already speak English at some level and want to improve their English so as to be able to use it in professional situations. An ESP course is therefore developed on the basis of the assessment of the learner's needs for English (the purposes for which the learner needs English are examined). ESP focuses more on different contexts (situations) in which the language is used (Rahman, 2015). It includes topics from various areas: tourism, physics, mathematics, computer science. The peculiarity of ESP is that it is integrated into a specific subject matter which is important to the learners. In teaching General English all skills, including reading, writing, speaking, and listening are equally crucial while in ESP it depends on the needs of the learners. For example, an ESP program may be focused on the development of writing skills of students who are preparing their graduate work. ESP can also be designed to develop communicative skills of students who are studying English in order to take part in international conferences.

A significant contribution to the development of the issue centered around developing reading and speaking skills was made by P. Strevens (1977), C. J. Moore (1983), J. C. Alderson (1984), M. A. Barnett (1988), D. Ferris, T. Tagg (1996), A. M. Johns (1997), P. L. Carrell (1998), P. Dooey (2006), M. Bojovic (2008). In Russian pedagogy and psychology the mentioned activities were developed by G.A. Kitajgorodskaya (1982), M.L. Vajsbrud, M.A. Arent'eva (2003), E.N. Solovova (2008), N.V. Gul' (2009), E.I. Passov (2010), T.M. Parieva (2011). T. Hutchinson and A. Waters (1987) outline that ESP initially takes into account students' need. In particular, T. Dudley-Evans & M. J. St. John distinguish absolute and variable characteristics of ESP: Absolute characteristics: ESP should meet students' requirements; ESP implements basic methodology of the subjects it is based on; ESP focuses on grammar, vocabulary, and text types when fulfilling the activities. Variable characteristics: ESP are developed for specific subjects, for example IT English; teaching approaches of ESP may differ from General English ones; ESP is aimed at adult learners; ESP implies mastering Intermediate or Advanced English. However, in some cases, Beginners may learn ESP (Dudley-Evans & John, 1998).

As it was mentioned above, all four-language skills are crucial. In terms of teaching ESP for students majoring in Mathematics and English at Kazan Federal University, focus on developing reading and speaking has not been chosen by chance. By the means of reading, then speaking activities, new vocabulary and grammar can be introduced. Based on them, it is easier to form and develop listening and writing skills.

## 2. Problem Statement

Reforming system of higher education in Russia have led to significant transformations, including changes in Federal State Educational Standard for the speciality 44.03.05 "Pedagogical education (with double majors: Mathematics + English)" that place new demands on bachelor graduates. Currently, the state final examination involves not only passing the final state exam in English, but also the ability to use English when defending final qualification work. It means that the teaching of a foreign language should be professionally oriented and therefore, to teach it in isolation from the majors is not effective. We conducted a survey involving 150 students (70 first-year students and 80 second-year students) to establish their level of English and their opinion on different exercises presented in the course of lessons. The results of the questionnaire (presented as percentages) will be presented and discussed further. Consequently, complex tasks are put to students and to teachers. Students, besides learning the basic knowledge and skills in English, must study the English language for specific purposes. Although the curriculum includes the disciplines: "English language in professional communication", "Professional-oriented English", "Translation of professional literature", but they are clearly insufficient to form foreign language competence in professional activities. As for the teachers, they must not only speak a foreign language and know methods of its teaching, but also understand specifics of the major.

## 3. Research Questions

The research questions are exercises for developing reading and speaking skills in English with the aim of developing competence in mathematics within teaching practical English that should involve students in their own learning processes, improve students' language skills, stimulate their interest and cultivate their critical thinking, supply them with opportunities to develop speaking skills in two forms: monologue and dialogue, teach to interact so as to be employed or meet workplace needs.

## 4. Purpose of the Study

The present paper is aimed at describing methods of teaching the practical course of the English language with a gradual, phased introduction of professional English for mathematicians through the examples of exercises for developing reading and speaking skills. It is worth noting that innovations imply the modification of all system components of learning – goals, objectives, updating training content, the introduction of new teaching technologies, development and creation of new textbooks and manuals. Additionally, long-term practice shows that education with the use of traditional technologies allows us to develop the key core competencies for this specialty training, which suggests the need for change.

## 5. Research Methods

Research methods contain the questionnaire form for the students with open and close questions, which is aimed to define their level of English and their opinion concerning the mentioned activities on the lessons. The survey is held among 150 first-year and second-year undergraduate students of the N.I.

Lobachevsky Institute of Mathematics and Mechanics majoring in “Pedagogical education (with double majors: Mathematics + English)” at Kazan Federal University. The audience is of a various level of English knowledge. Second-year students have already practiced immersion and communicative methods in combination with reading activities on English lessons at the University whereas first-year students experience this for the first time. The methods above are used because earlier comparative analysis shows that they lead to better results in the language ability improvement among the students with non-linguistic majors.

## 6. Findings

The survey conducted among 150 respondents has revealed that the average level of English in the groups researched is between A2 and B2 (Fig.01). From the questionnaire given is seen that students clarify that the lessons contain various activities such as: studying theoretical issues of the English language, reading additional literature, translating, using multimedia equipment and practicing speaking skills in dialogues, discussions or games (Fig. 02).

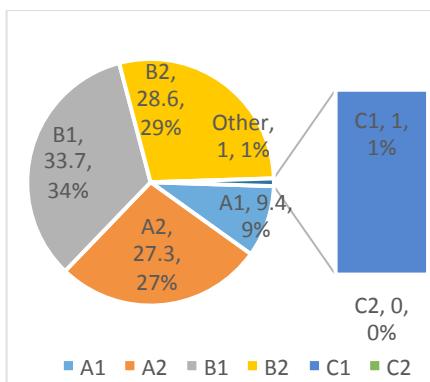


Figure 01. Level of English of students

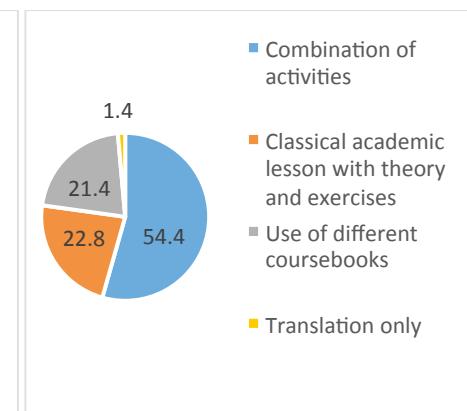


Figure 02. Types of English classes

Students themselves acknowledge that using the mixture of different kinds of activities makes lessons more effective, especially when they have chance to work in pairs or groups (Fig. 03). From the questionnaire given it is clear that the students believe English classes are more effective and interesting when is used combination of tasks (Fig. 04).

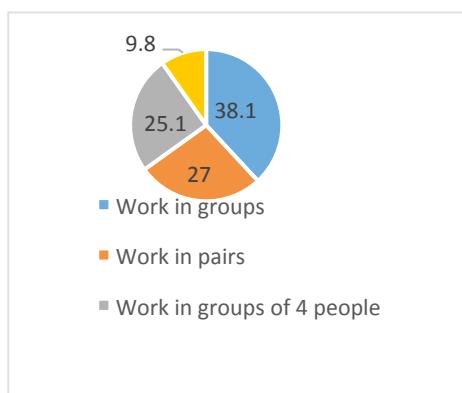


Figure 03. The most effective work on the lesson of English of mixture of tasks]

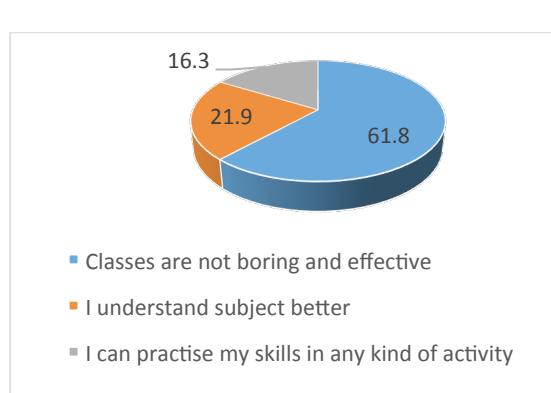


Figure 04. Students attitude to insertion

ESP lesson should involve the following activities, such as: oral presentations, watching lectures (listening comprehension), note-taking activities, writing CVs, abstracts, reviews, reading different articles, and oral or written analysis of the article given, etc. As didactic resources for ESP are not so many, developing activities is one of the main targets. Designing didactic materials by teachers means the usage of both authentic and adapted resources. According to Tomlinson (1998, p. xi), a teacher can use anything in order to teach activities for students (Tomlinson, 1998). The texts for reading can be taken from authentic and adapted resources. To A.C. Velazquez and Redmond (2007), both types of resources and texts are of great importance. Though, he points out that gradually adapted texts can help prepare students for reading more complicated, authentic texts (Velazquez & Redmond, 2007). While S. Bax (2003) states, for material developers... , authenticity has played a focal role (Bax, 2003). V. Baghban and Z. Zohoorian, as well as Lee (1995), Peacock (1997), Shei (2001), Lin (2004), suppose that students benefit from using authentic texts because authentic resources are more motivating (Baghban, Zohoorian, 2011).

L.V. Karpova (1999) has designed a list of the criteria when implementing authentic resources: 1. the content of authentic materials should take into consideration learners' age, needs and aims. 2. tasks should be organized so that the learners may use their knowledge. 3. There should be cooperation between a teacher and a learner (Karpova, 1999).

The tasks developed for the course "Academic English for Mathematics" by L.R. Sakaeva and E.Kh. Shamsutdinova are based on authentic resources and implements both traditional and communicative approaches: **Activities for reading** consist of different types of reading-comprehension exercises of texts, e.g. scanning, skimming, extensive reading, intensive reading, etc. It should be noted here that while practicing reading activities students should find new topical vocabulary related to mathematics, know the meaning of the new words and their contextual usage. It is well known that vocabulary cannot be separated from reading. Technical lexis should be taught so that learners may use new vocabulary in their speech (Rao, 2014). On the example of texts, grammar constructions are explained. **Activities for speaking** include simulation, role-play, debates and group discussions on Mathematical issues. In addition to them, speeches/presentations, reviews of the articles are also included. As V.C. Rao noted, a favourable communicative environment is created to develop students' speaking skills, especially to encourage their interaction, and to allow practicing a foreign language (Rao, 2014).

Taking into consideration that students' level of English can vary from A2 to B2, including A1, the stages of teaching reading and vocabulary can be divided into several parts. At the beginning of the course, students are introduced to basic notions of Mathematics on materials connected with reading mathematical expressions, formulae and symbols and do simple tasks. Before starting the topic, students are asked to answer questions related to topic. For example, Greek letters in Mathematics:

*Can you read some of these letters?  $\alpha, \beta, \gamma, \delta, \epsilon, \vartheta, \mu, \pi, \sigma, \omega, \varphi, \tau, \rho$*

*Match the following Greek letters and their representations in Math.*

$\alpha, \gamma, \vartheta, \pi, \varphi, \rho$

- Archimedes' constant, the ratio of a circle's circumference to its diameter
- Euler's totient function in number theory
- the independence number of a graph
- the third angle in a triangle, opposite the side C

- the angle to the  $x$  axis in the  $xy$ -plane in spherical or cylindrical coordinates the rank of a matrix

Then, basic rules of reading common fractions, decimal fractions, mathematical operations, involution and evolution and others are explained. In the end, tasks to strengthen their skills are given.

### ***How to read the following expressions in English?***

- $\cos(x + 2p) = \cos x.$
- $\cos(-x) = \cos(x)$
- $\sin(-x) = -\sin(x)$

***Guess how these mathematical operation are called in English:***

—  $s\_b$  \_\_\_\_\_  $n$   
 +  $a\_d$  \_\_\_\_\_  $n$   
 :  $d\_v$  \_\_\_\_\_  $n$   
 \*  $m\_l\_p$  \_\_\_\_\_  $tion$

At the next stage, students start reading popular articles, with gradual introduction into scholarly articles. Teacher should use special strategies and activities so that students may understand and remember the text to be read (Baron, 2013). These tasks are intended to direct attention, identify paragraph structure, guess the meaning from the context, connect or use background knowledge, infer, ask questions about the passages and then look for answers. In this respect, it is important to overcome difficulties connected with comprehension. The structure of the lesson can be the following:

- 1) Warming-up: A teacher introduces the topic so that the students can understand the topic;
- 2) Pre-reading: They may find out new words and expressions by means of pictures, or they may do tasks, such as matching, guessing, and scrambling. In addition to it, these activities are designed to prepare students for further reading.
- 3) While- reading: The article can be read with a teacher, in pairs or groups.
- 4) After-reading: Students fulfil comprehension activities in pairs or groups. Then, students can do speaking activities to reinforce new topical vocabulary.

*Before reading the text, work with a partner and ask and answer the questions below. Base your answers on your possible knowledge of the topic: 1) What role do you think calculus plays in a society? 2) What gave birth to calculus? 3) Can you name the person who developed the foundations for calculus?*

**Next, reorder the words in the questions below: 1) did What periods go development through calculus? 2) include Do fields graph theory and of discrete mathematics the theory of computation?**

*Match the highlighted words from the text with their definitions:*

**Computation** - a division of a number, for example  $\frac{5}{8}$

**Fractal** - any of a series of numbers set out in lists which make it possible to work out problems.

*Fraction by adding and subtracting instead of multiplying and dividing*

*Using the topical vocabulary, translate the sentences from Russian into English: 1) Арифметические действия над натуральными числами и дробями встречаются в ранних математических текстах. 2) Вавилонские математики умели решать квадратные уравнения. 3) Евклидова геометрия занималась изучением простейших фигур на плоскости и в пространстве, вычислением их площади и объема. 4) Целые числа - это натуральные числа, целые отрицательные числа и ноль*

Developing speaking skills is very crucial. The learners are intimidated by the academic speaking tasks, including both formal presentation tasks and small- or large-group class discussions. The reason for this intimidation may stem from the lack of sufficient linguistic competence. Another reason for such difficulties might be due to the lack of adequate speaking activities and tasks. So, the tasks include answering questions and providing solid reasoning, writing article reviews, creating presentations, surveys, interviews, quizzes, games and projects.

**Work in small groups and discuss the following questions using useful expressions:** 1) What does Trigonometry study? 2) What are The Law of Sines and the Law of Cosines used for?

**Can you match the years with the events? Compare your answers with the rest of the class. Try to explain your choice.**

**1616-1703      1854-1912      1792-1856      1768-1830**

- The British scientist John Wallis contributed towards development of calculus, originated idea of number line, introduced symbol  $\infty$  for infinity, developed standard notation for powers
- The French scholar Joseph Fourier studied periodic functions and infinite sums in which the terms are trigonometric functions
- The Russian scientist Nikolai Lobachevsky developed theory of hyperbolic geometry and curved spaces independently of Bolyai
- The French scientist Henri Poincaré contributed to partial solution to “three body problem”, foundations of modern chaos theory, extended theory of mathematical topology, Poincaré conjecture

**Think of one of the latest discoveries in the field of Mathematics. Prepare a short presentation providing detailed information about them, such as key dates, inventors, areas of application, usefulness, and some other interesting information. Use the Internet if you need to check the information. Present your information to the rest of the class. Use the useful expressions given below:**

- Good morning, ladies and gentlemen...
- Introducing yourself
- Let me introduce myself; my name is .....(and I am responsible for ... )
- Introducing your presentation...

**Look at these three newspaper headlines. What do you think the story is behind each one?**  
**Discuss your ideas with a partner:** 1) Mathematics to help diagnose cancer 2) Mathematical advance in describing waves 3) Mathematics as tough as steel.

**Paraphrase the following quotations. Which one do you agree with the most? Why? Discuss in small groups.**

“The study of mathematics, like the Nile, begins in minuteness but ends in magnificence.”  
(Charles Caleb Colton)

“We in science are spoiled by the success of mathematics. Mathematics is the study of problems so simple that they have good solutions.” (Whitfield Diffie)

**Imagine that you are going to pass an examination at a foreign university and you have to make a review on the article. Get acquainted with useful set expressions to complete this task successfully.**

## 7. Conclusion

As research shows, the approaches used to teaching students with double majors at Kazan Federal University provide interactive and communicative activities related to specific purposes of students, considering the socio-cultural dimensions of the language and the specific content, instructing students with strategies that they need to learn languages for specific purposes, using authentic learning materials, encouraging collaborative and group learning, making it possible to learn language skills more easily. Moreover, it creates learner-centered training, adapts both teachers' and students' learning styles, and provides appropriate tools for giving feedback and assessing students' language knowledge. It should be concluded that the English language competence in the sphere of professional activities of the students are effectively formed through various research exercises, situational-playing exercises, problem situations and project-oriented approaches. Teachers need to learn innovative exercises and training techniques purposefully because they develop the basic competence of the student form required for the profession skills, creating premises for psychological readiness to implement in actual practice mastered skills. As a result of our study it should be noted that the development of reading and speaking skills in the field of professional communication plays a huge role in learning because training system of a new generation improves every year. Having discussed educational activities with colleagues, we came to the conclusion that the tasks of our class, in addition to language learning is: formation of foreign language competence in the professional field in terms of the practical course of the English language through the increasing interest in English language.

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