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PROFICIENCY OF TECHNICAL STUDENTS IN ENGLISH PROFESSIONAL COMMUNICATION

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Abstract

The article represents the experimental study results that show a change in the proficiency level of technical students' English professional communication. Initially, the levels of low, medium and high students' knowledge received at school were determined. For verification, a Complex Work was developed, the *Entrance Control* (EC), consisting of the tasks Vocabulary and Grammar, Reading, Speaking and Writing, which showed a low level of foreign language knowledge among future engineers. Then, the *English Practical Course for Engineers* (EPCE) was developed and introduced into the educational process for the engineering special ties students, consisting of a theoretical part and practical tasks. Particular attention was paid to working with technical texts, to compile a summary and annotation to the text, to correct translation of scientific and technical texts, to use correctly speech clichés, the correct structure of phrases in English, taking into account grammatical rules. At the end of the semester, after studying the English Practical Course for Engineers, the Complex Work, the *Frontier Control* (FC) was carried out, similar to the EC, which showed an increase of high level by 17.5 % and medium level by 23.4 % and low level by 40.9 % in the experimental group. Moreover, in the control group, the increase in the high level was only 5.1 %, the medium was 17.2 % and the decrease in the low level was by 22.3 %. Interpretation of data shows an increase in the technical profile students' number with a high level of proficiency in English professional communication.

Keywords: Technical students, proficiency, professional communication, language course.

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1. Introduction

Nowadays the Russian leadership attaches great importance to human resources. The government is aware that the country needs highly competitive specialists in the labor market and in any area of life. The specialists' competitiveness level will determine the Russian Federation economic and social development. Therefore, now, a new professionalism level is put in the first place, that is, the future specialists' ability to be ready to master knowledge in the constantly changing conditions of the labor market and various spheres of life. With a large number of specialists in the labor market, the future professional must continuously progress. In modern conditions, the specialist should be ready to solve problems that have not even been formulated. Proceeding from this, the future specialist should understand and be aware of his or her strengths and weaknesses and be competitive in the labor market. This awareness of a specialist's strengths and weaknesses allows achieving high labor results in the market environment, which makes future professionals competitive in the labor market. If the education quality is the basis of educational activity in the higher educational organization, and the quality indicator is the future engineer competitiveness, therefore, the competitiveness formation can be the educational activity basis (Subramaniam, 2019).

2. Problem Statement

According to the Federal State Educational Standard of Higher Professional Education in the direction of 05.11.01 Radio-electronic systems and complexes (specialty level) training, as a result of mastering the specialty program general cultural, general professional and professional specialized competencies should be formed (MinObr, 2014). In the case of general professional competencies, it is indicated that the future specialist should be prepared for oral and written communication in Russian and foreign languages to solve professional problems. During the study, at the first stage, a low level of foreign language knowledge was revealed among future engineers. Many students read satisfactorily, but they lack the ability to speak. Only a few students are proficient in working with technical literature in a foreign language.

3. Research Questions

The study was conducted from 2015 to 2019 based on the Black Sea Higher Naval Red Star Order School named after P.S. Nakhimov (Sevastopol). In total, the study involved 578 students in the civilian specialty 05.11.01 Radio-electronic systems and complexes.

In the study course, the program and educational and methodological support of the course Foreign Language (English) in the civil specialty 05.11.01 Radio-electronic systems and complexes were analysed (Black Sea Higher Naval School, 2019).

Three levels of technical students' proficiency in English professional communication are defined. *English Practical Course for Engineers (EPCE)* (Gordienko & Mezentseva, 2019a) is developed and implemented in the educational process for engineering specialties students. *EPCE* consists of a theoretical part and practical tasks. It increases the process efficiency of the forming a competitive technical specialist and provides a higher knowledge level of a foreign language in professional activities.

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4. Purpose of the Study

1. The proficiency level determination of the students in technical profile with English professional communication;

2. The English Practical Course for Engineers development for the engineering specialties students, consisting of a theoretical part and practical tasks, increasing the process efficiency of the forming a future engineer and ensuring a high professional activity level.

3. The *English Practical Course for Engineers* introduction into the educational process.

5. Research Methods

At the first stage, three levels of students' technical proficiency in English professional communication were identified (table 01).

Table 01. Proficiency Levels of Technical Students in English Professional Communication

Low Level	Average Level	High Level
The vocabulary volume (professional units) is insufficient to provide an elementary answer to a question in a specialty.	The vocabulary volume (professional units) is almost sufficient to provide a complete and meaningful answer to the question in the specialty.	The vocabulary volume (professional units) is sufficient to provide a complete meaningful answer to the question in the specialty.
The answer contains a significant amount of gross errors (such as irregular verb form, mistakes in the sentence word order) that may interfere with direct understanding, or errors that impede answer understanding.	The answer contains single gross errors (such as irregular verb form, mistakes in the sentence word order) or a small number of minor errors that do not interfere with direct understanding.	The answer does not contain gross errors, but contains single minor errors (for example, misuse of articles, prepositions, number of nouns, etc.).
Speaking fluency is unnatural and is characterized by very frequent uncertainty cases. The pronunciation is incomprehensible or slurred.	Speaking fluency is natural, but characterized by infrequent cases of uncertainty. Pronunciation can cause some difficulties for direct understanding.	Speaking fluency is natural, isolated instances of uncertainty are possible. Pronunciation does not impede understanding.

To identify the professional communication proficiency levels, a residual knowledge control was carried out after the secondary education.

The control was carried out in the form of Complex work (entrance control), for the students of the 05.11.01 Radio-electronic systems and complexes specialty, civilian specialty is electrical engineering, radio engineering and communication systems, qualification − engineer. Form of study is full-time, in the discipline Foreign Language (English) in order to determine the initial proficiency level in professional communication of the 1st year technical profile students.

Complex work consists of the following tasks: Vocabulary and Grammar, Reading, Speaking and Writing.

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1. The task Vocabulary and Grammar. The student must choose the correct answer to twenty questions, 1 point for each correct answer. Total is 20 points;

2. The task Reading. The student needs to read the text and answer in writing to five questions to the text, 2 points for each correct answer. Total is 10 points;

3. The task Speaking. The student needs to give an oral correct and complete answer to eight questions, 5 points for each correct answer. Total is 40 points;

4. The task Writing. The student needs to write an essay of 200–250 words on the given topic. Total is 30 points;

For an incorrect answer or response lack, 0 points are set. The maximum points' number for the complex work is 100 points. 90 minutes are given to solve the complex work tasks.

Table 02 shows the correspondence of the proficiency technical students' levels in the English professional communication to the number of points.

Table 02. The Proficiency Levels Correspondence of the Technical Profile Students with the English Professional Communication to the Number of Points

Level	Points' Number
Low	0 – 33
Average	34 – 64
High	65 – 100

To conduct the pedagogical experiment, experimental and control groups were organized. Prior to the experiment, the professional communication level in these groups of students was approximately equal: high (12.8 and 13.1 %), medium (23.7 and 24.1 %) and low (63.5 and 62.8 %).

Classes in the experimental group were conducted according to the new methodology using the *English Practical Course for Engineers (EPCE)*, which included a 2-part textbook, two workbooks for each textbook part, and *English-Language Short Course Physics Tutorial. Electricity*, a reading book and grammar reference book *English Technical Grammar*: A grammar guide for the technical students became the basis for experimental work. The feature of *EPCE* is that the selection and educational material structuring reflected the global trend, in which the specialist language training is considered as the basis of his or her professional competence. In world practice, the foreign language study is carried out within the framework of the concept *Textbook. English for Engineers*. Therefore, the training material presented in the textbook was selected taking into account its professional significance for the technical profile students. The texts presented in this textbook successfully complement the English language program material and are selected in accordance with the Federal State Educational Standard. The presented texts and other educational material can be used both in the classroom and in the process of students' independent work and as part of extracurricular activities in the English language (Buragohain, 2016).

The following points form the basis of the *English Practical Course for Engineers*:

- the idea of communicative competence, the speech behavior adequacy in a certain situation of professional communication;
- focus on high personal technical specialist qualities, in demand of the modern society;

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- variability in the content selection and structuring of the subject *Foreign Language* depending on the training stages, multi-stage and the specialist' level training.

The *EPCE* includes a visual tutorial *English: A Short Course in Physics. Electricity* (Gordienko & Mezentseva, 2019b). It is designed to teach specialized speaking English to the students of engineering specialties in the higher educational organizations. It can be used both for working during the lessons and for the independent work with the aim of forming and developing oral speech skills, repeating and consolidating lexical and grammatical material.

This tutorial outlines a short physics course in the Electricity section. The manual consists of twenty topics in Russian and English, the thematic glossary and the applications. Topics are supplemented by visual materials, formulas, diagrams, tables, etc. A visual teaching aid allows developing successfully the students' willingness to communicate verbally in English to solve professional problems and to form communication skills in English. As a result of working with a visual teaching aid, students learn and remember stable English expressions, cliché phrases, special terminology, remember the constructing specific phrases principles of scientific terminology in English, which allow technical specialties students to speak English with ready-made speech units. Visual aid is intended for teaching English to the engineering specialties students of higher educational organizations.

The linguistic (phonetic, lexical and grammatical) material selection, as well as oral-speech topics and situations for the dialogical speech skills formation was carried out on the basis of a functional-role approach to the professional activities content of a technical specialist.

At the semester end after studying the *English Practical Course for Engineers*, a comprehensive work was carried out (Boundary control).

The Complex work is similar to the integrated work of the entrance control. Integrated work of the Boundary control consists of the assignments of four speech activity types (*Vocabulary and Grammar*, *Reading*, *Speaking* and *Writing*), which take into account the specific training content, the Federal State Educational Standard of Higher Professional Education requirements in specialty 11.05.01 Radio-electronic systems and complexes, as well as the standardized international language levels.

90 minutes are given to solve the complex work tasks, including:

- solving tasks on *Vocabulary and Grammar* − 10 minutes;
- solving tasks on *Reading* − 25 minutes;
- up to 25 minutes are allotted for solving tasks on *Speaking*, 1-2 minutes per student with the groups number of 15 people;
- solving tasks on *Writing* − 30 minutes;

The final grade of the student is determined by the total points' amount that he or she received for performing the Complex work. The tasks' solution in the discipline is evaluated according to table 03:

Table 03. Integrated Work Content and Evaluation

N	Tasks Content		Points' Number for 1 correct answer	Total points
1	«Vocabulary and Grammar»	*Translate words* −20 words. *Connect the words* −5 words. *Translate the sentences*−5 sentences	0,5 points; 2 points; 3 points	10 points 10 points 15 points

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2	«Reading»	*Read the text and answer the questions* − 5 questions. *Write whether the statements are true or false*−5 statements	2 points; 3 points	10 points 15 points
3	«Speaking»	*Answer the questions* − 5 questions	2 points;	10 points
4	«Writing»	*Write an essay (200–250 words) on a given topic in the specialty*		30 points
				Total: **100 points**

Table 04 shows data on the levels of students' technical profile with English professional communication after completing the Complex work in table 3.

Table 04. Technical students' proficiency levels in the English professional communication in the experimental and control groups before and after studying the *English Practical Course for Engineers* (in %)

Levels	Experimental Group		Control Group	
	At the beginning of the experiment	After the experiment	At the beginning of the experiment	After the experiment
High	12.8	30.3	13.1	18.2
Average	23.7	47.1	24.1	41.3
Low	63.5	22.6	62.8	40.5

There is an increase in the high-level group from 12.8 to 30.3 by 17.5 % and in the average group is from 23.7 to 47.1 at 23.4 % and a decrease in the low-level groups from 63.5 to 22.6 at 40.9 % in the experimental group. Moreover, in the control group, the increase in the high level was only 5.1 %, the average is 17.2 % and the decrease in the low level is by 22.3 % (Gordienko & Mezentseva, 2019b).

6. Findings

The data interpretation obtained as a result of the experiment shows an increase in the number of technical students with the proficiency high level in the English professional communication. This can be explained by the fact that the visual textbook, the workbook and the Russian-English technical speech parallels; the videos were used in the educational process of the experimental group. Particular attention was paid to working with technical texts, which allowed a student to read, understand, isolate the topic and idea of such texts more fluently, write a summary and abstract to the text, and carry out scientific and technical texts competent translation. In the learning process, students learned how to use speech cliches correctly and build phrases in Englishcorrectly, taking into account grammar rules. As a result of which, therefore, the foreign communication level was increased.

7. Conclusion

The study results showed that the experimental group students showed higher results of foreign language communication and that they have a conscious approach to the foreign language learning as a way to increase professionalism. A foreign language can be a powerful means of forming a number of competitive technical specialist qualities.

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