

Multimedia as a Means of Integrating Professional and Linguistic Activity of Non-linguistic College Students

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Abstract—The paper aims at trying to justify the idea of integrating linguistic and professional training in non-linguistic colleges by means of multimedia. The data are taken from the experiment conducted within the framework of the project by a team of teachers from Kazakhstan. It particularly describes the multimedia complex «English for IT-specialists», designed for the development of professional trilingual competence in students of non-linguistic colleges. The achievement of the article will be a better understanding of the ways of using multimedia in training specialists in various fields creating integrated linguistic-professional environment.

Index Terms—multimedia, professional English, IT-specialists, modular technology, level training

I. INTRODUCTION

The changes taking place in modern society in all spheres of life, including professional foreign language education, confront teachers of specialized secondary and higher educational institutions with the task of training specialists of new formation, whose competence will provide their demand on the labor market.

The specialist of new formation is a competitive specialist with not only professional, but also specific language (linguistic) competences.

Thus, there is a need for integration of professional and language activities of future specialists in learning professional English.

The specificity of discipline "Foreign Language" is in its "irrelevance", which allows to fill the learning process with the content of the special field to which learning a foreign language is directed. In other words, when learning a foreign language in vocational education, not only foreign language competence, but, first of all, professional competence is formed, which is consistent with the training objectives (Loktyushina E.A., 2012).

To implement this task most effectively is possible by using computer technology in educational process, which in the modern sense is pedagogical technology with its own special methods, software and hardware (Guzeev V.V., et al., 2004). To multimedia most frequently used in the learning process belong online tutorials and manuals, training equipment and software testing, educational resources of the Internet, DVD and CDs, video and audio equipment, the interactive whiteboard. Multimedia allows to integrate all forms of information (text, graphics, animation, video, and audio) into a single information environment, and includes an interactive dialogue of the user with the system and various forms of self-studies (www.arsplus.ru).

Relevance of multimedia use in vocational education is due to the development of intellectual and creative potential of students (Moshkarova N.S., 2011). Multimedia technologies allow to create tools for educational purposes, which are fundamentally different from the print media, providing interactive mode between the learner and the "software product" (Anderson B. B., et al., 2007).

Didactic and methodological aims of a certain type of software tools reflect the purpose of its use in the learning process, as well as opportunities to help the transition of education to a qualitatively higher level. It provides creation of homogeneous interactive learning environment, involves the immersion of students in the field of developmental education, organizing for students independent information search and creative thinking in a constantly changing environment, provides a personalized approach, given the characteristics of students (based on the level differentiation of the educational process) (Polat E.S., 1999).

The main methodological points of software use, made by Robert I.V. (1994) involve: (1) individualization of the learning process (the possibility of differentiated learning the material); (2) diagnostics of the results of educational

activities; (3) self-organization; (4) computer visualization of educational information; (5) modeling and simulation of the studied or researched objects, processes and phenomena; (6) the use of information databases and access to network resources; (7) increased motivation of training; (8) the development of a certain type of thinking (e.g. visual-figurative, theoretical), and so on.

In the study of didactic potential of educational profession-oriented multimedia, it was found that they allow to implement the principle of visibility to a new level, by ensuring the unity of concrete and abstract, conceptual and visual, logical and emotional in the learning process; suggest the individualization of the educational process promoting adaptation of the content and process of learning to level differentiation; allowing each to build his own path to knowledge, increase the rate of assimilation of new material (Moshkarova N.S., 2011).

II. METHODOLOGICAL BASIS

A team of teachers of language and information subjects of a number of educational institutions of Ust-Kamenogorsk in the East-Kazakhstan region developed and implemented in the educational process multimedia complex «English for IT-specialists», for students of IT-specialties at non-linguistic colleges. Due to the current active use of three languages in the Republic of Kazakhstan, "The Kazakh language, the state language; the Russian language, the language of international communication; and the English language, the language of successful integration into the global economy" (Nazarbayev, 2011), the proposed complex is directed to the formation of professional trilingual competence of future IT -specialists.

Methodological basis for the development of the multimedia complex made:

- philosophies and educational theories of student-centered learning by Yakimanskaya I.S. (2002), subject-subject relations of the teacher and trainees by Vygotsky L.S. (2005), Leontiev A.N. (1994), Platonov K.K. (1986);
- linguistic ideas of the relationship between language, speech and speech activity;
- lingua-didactic theory of communicative and competence approach in language teaching (Bermus A.G., 2005; Verbitsky A.A., 2004), interconnected teaching bilingual and multilingual students a foreign language with the basic first language and the language of mediation;
- theoretical principles of modular design technology (Polat E.S., 2008), the noosphere technology (Maslova N.V., 2002), multi-level technology of language training;
- the doctrine of a holistic approach to the process of perception, processing, remembering and realization of speech in the society.

The learning process with this multimedia complex is based on the use of a set of modern interactive approaches, methods and principles. These multimedia technologies meet general principles of education - auditory and visual clarity; intensive character of learning process, allowing the teacher to use the time more efficiently, focusing on the most difficult passages of educational material in the study of linguistic disciplines.

To implement the formation of key competences (linguistic and professional) in the learning process of students of IT professions using the multimedia complex, a set of approaches was used.

The most important component of the multimedia complex is the use of the competence approach, which promotes the formation of students' foreign language communicative competence.

Using the multimedia complex also takes into account communicative activity approach (Galskova N. D., 2000; Passov E. I., 1991), as the main task of learning a foreign language at the present stage is the formation of foreign language communicative competence. The latter is regarded as a certain level of language, speech, compensatory, socio-cultural competencies that allow the learner to vary the speech behavior depending on the functional factor of foreign language communication.

The multimedia complex is also based on the profession-oriented approach, as learning a foreign language is an integral part of the process of formation of professional competence. Using profession-oriented approach helps students master communication skills for purely professional purposes (Galskova N. D., 2000; Passov E. I., 1991).

Transformation of learning and cognitive activity into professional competence is implemented by means of contextual approach.

The learning process under this multimedia complex involves the inclusion of a student-centered approach, which allows to use and disclose personal experience of each student, his individual and psychological characteristics, causing the effectiveness of training activities, their interaction with each other and with the teacher.

To implement the above approaches in teaching professional English, the most effective teaching methods are used: audio-lingual, linguistic and socio-cultural, communicative, situational, role-playing, project method (Polat E.S., 2008; Galskova N. D., 2000).

The basic principles of task selection and design are the following:

- the principle of professional-communicative orientation;
- the principle of taking into account individual characteristics of students;
- the principle of student activity;
- the principle of rational combination of students' training and creative activities;
- the principle of system and consistency in presentation of educational material;
- the principle of relativity of materials;

- the principle of academic character of tasks.

The use of principle of a foreign language integration in the curriculum and professional activity is due to the need to create a multicultural environment in the learning process.

III. STRUCTURE AND CONTENT OF MULTIMEDIA COMPLEX

Multimedia complex "English for IT-specialists" is an electronic educational resource of modular architecture. Each training module is an autonomous, complete multimedia product with its content, theme, and functions that solves certain educational goals and objectives.

Presented multimedia complex integrates the capabilities of various educational software: tutorial, reference book, trainer, testing unit.

To design the multimedia complex, Flash technology, which allows to realize all the basic elements of multimedia was chosen. It also combines many powerful technological solutions in the field of multimedia presentation of information.

This technology is a good choice for developing electronic educational resources for a variety of reasons, among which are the following:

- the opportunity to realize all the basic elements of multimedia: images, text, movement, video and audio, interactivity, without help of additional programs;
- compactness: the size of resulting programs is minimal and the result of their work is not dependent on the resolution of the user's screen;
- Flashplayer is very prevalent and is freely available;
- if necessary, the content can be published as stand-alone executable application that allows to distribute it, without requiring FlashPlayer on the user's computer.

Multimedia complex meets the following requirements:

- the possibility of posting and viewing via the Internet; information volume of each training module is about 9 MB, so getting it to the network request is not a fundamental difficulty even for low-flow computer networks;
- easy to use;
- easy navigation system, which allows to quickly navigate through the material of the module;
- ergonomic design.

The modules are interconnected by learning logic; each one has a definite topic, grammatical and lexical material. Each module consists of four sections: Language, Grammar, Reading and Speaking, Test.

Since learning any foreign language is based on the analogy with the native language, the formation of speech competence in the multimedia complex occurs through integration of content in English, Kazakh and Russian languages with professional component of such disciplines as "Operating systems and software of computing systems", "Basics of algorithms and programming", "The hardware complex".

Section «Language» contains lexical material of modules, international words, word-forming elements and consolidation exercises. Since the complex is designed to train IT professionals, its themes correspond to the specifics of the profession and therefore lexical section involves mastering professionally specified vocabulary. Glossary is made in English, Kazakh and Russian. Students are given the opportunity to listen to not only words, but also thematic texts, which contributes to the development of a perception skill as a component of foreign language communicative competence.

Since the core of the proposed complex is professional English training, the content of section «Grammar» is based on English grammar and includes three-level mastery of the English language. Learning the Kazakh language presupposes the basic level. Thus, the content includes grammatical models of the Kazakh language, sufficient for the formation of communicative competence in accordance with the basic level of training.

Section «Reading and speaking» contains thematic texts and exercises for them, aimed at building skills of reading and speaking. The number of texts in different modules varies from one to three.

In the media complex, there are different types of interactive exercises. These are tasks with multiple choice (the student chooses the correct answer (answers) from the set of answers); supplement tasks (the student makes a brief or detailed response); matching tasks (to find the relevance between the elements of two sets); tasks to establish the correct sequence, logical connections among the proposed elements; tasks to intensively memorize key words. The tasks are provided with testing system. After completing the task, one must click 'Check'. Control of creative tasks is carried out by the teacher. On doing creative exercises, the student can print them or save to a file for further transmission to the teacher (USB, LAN, e-mail).

Testing includes a number of tasks on listening comprehension and lexical-grammatical tests in section «Test» of each module.

Intended learning outcomes of teaching Professional English using the proposed multimedia complex are presented in the form of a multi-level system of basic types of speech activities: listening, speaking, reading, and writing. This system consists of three levels: basic, intermediate and advanced. The criteria for each level are developed, which allows the instructor to evaluate students' learning outcomes, and students - to self-assess their knowledge and skills.

IV. IMPLEMENTATION RESULTS OF MULTIMEDIA COMPLEX

Multimedia complex «English for IT-specialists» was piloted in the college of Kazakh-American Free University and Polytechnic College in Ust-Kamenogorsk, East-Kazakhstan region. The aim of approbation was to confirm the effectiveness of using multimedia complex «English for IT-specialists» for developing trilingual competence of students of non-language colleges majoring in IT.

To participate in it, a preliminary selection of educational institutions in accordance with the following criteria was made:

- territorial availability of educational institutions participating in the project;
- willingness of administration and subject teachers to participate in the experiment;
- possibilities to create experimental groups;
- necessary equipment of colleges with ICT tools (a sufficient number of computer labs equipped with modern facilities, including audio output devices, printers, multimedia projectors, as well as a broadband connection that provides access to the Internet for lessons in groups participating in the experiment);
- size of groups involved in testing; at least 10-15 students;
- the possibility to involve control groups with characteristics similar to those of experimental groups.

Thus, professional English teachers, 23 KAFU college students and 30 students of Polytechnic College, participated in testing the multimedia complex. Of these, control groups made 11 and 15 students. Experimental groups consisted of 12 and 15 students respectively.

During testing, the following activities were carried out:

(1) The analysis of existing institutional and regulatory-legal framework was made: the programs are in accordance with state educational standards and curricula of the specialty.

(2) Advisory Council with the appropriate expert group was chosen: colleges' method experts, heads of Methodical centers of linguistic and information subjects, teachers of Professional English, Kazakh Language and Computer Studies.

(3) Methodological instructions for teachers on the use of the multimedia complex in the learning process were worked out.

(4) Diagnostic system of educational achievements of students participating in the project was built: on the basis of entrance test, experimental and control groups were formed, control test was designed to determine the level of language skills: listening, speaking, reading, writing.

(5) Data on the use of the multimedia complex in learning process, teachers' reviews and students' survey results were collected.

(6) Overall analysis of the test results and the effectiveness of the use of the multimedia complex in educational process was fulfilled.

Based on the results of the experiment the following was carried out:

(1) Analysis of the development of trilingual communicative competence of students of experimental and control groups.

(2) Analysis of teaching, methodical, educational and other opportunities of the use of multimedia complex in educational process.

(3) Analysis of the socio-economic benefits of the use of multimedia complex in educational process.

(4) Hygienic safety analysis.

To identify the level of development of trilingual communicative competence, the main types of speech activities: listening, reading, speaking, and writing were tested. Tests on Professional English and Professional Kazakh were standardized tests, consisting of four sections (listening, reading, speaking and writing). Professional English test involved monitoring at three levels: basic, intermediate and advanced. Test on Professional Kazakh controlled basic level. Based on the test results (Tables I, II), it can be concluded that using multimedia complex «English for IT-specialists» is effective. The figures show an increase in performance and quality of knowledge in experimental groups of both colleges, despite the fact that initially the groups had approximately the same percentage of achievement and the quality of knowledge before the experiment.

TABLE I.
THE DIAGNOSTIC RESULTS OF PARTIAL ANALYSIS OF KAFU COLLEGE STUDENTS' ENGLISH LANGUAGE SKILLS

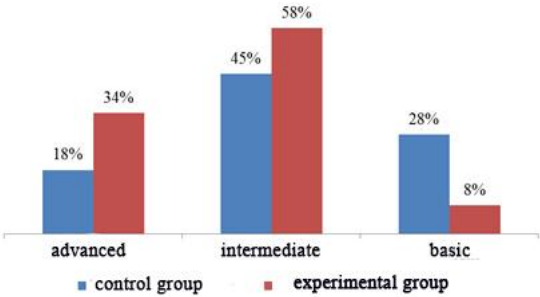
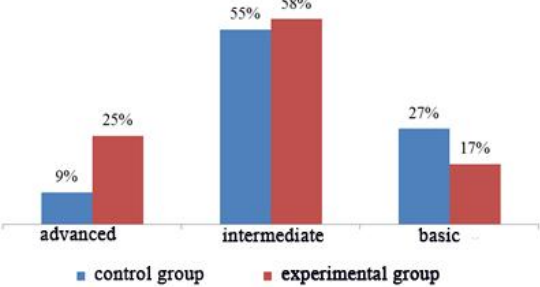
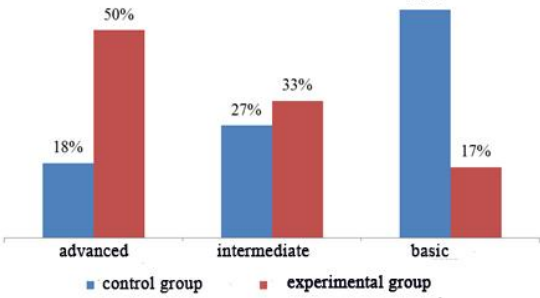
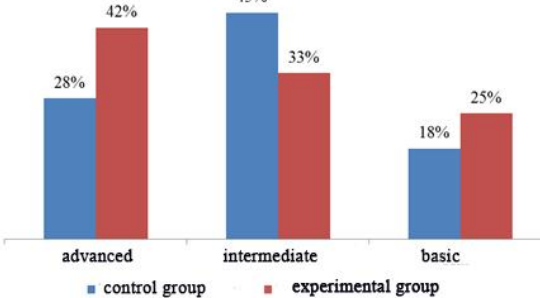
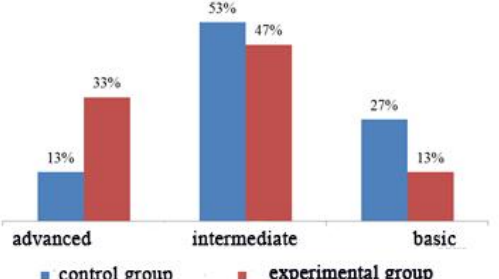
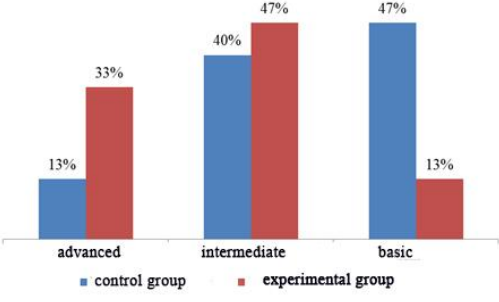
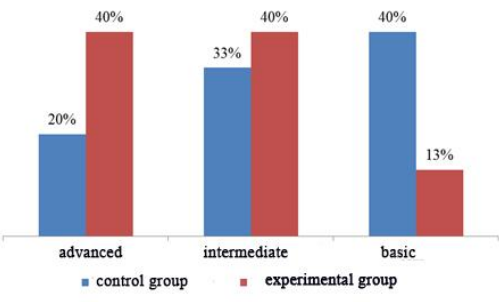
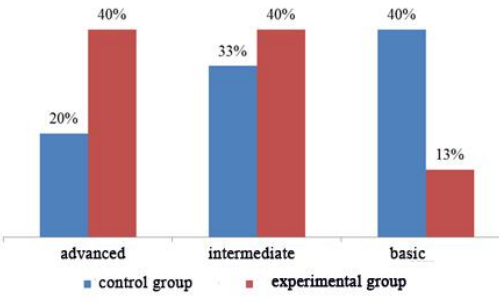
Tested activity	Results of partial analysis, %												
1	2												
Listening	 <p>A bar chart showing the percentage of students in the control group (blue bars) and experimental group (red bars) for the Listening activity across three proficiency levels: advanced, intermediate, and basic. The data is as follows:</p> <table border="1"> <thead> <tr> <th>Proficiency Level</th> <th>Control Group (%)</th> <th>Experimental Group (%)</th> </tr> </thead> <tbody> <tr> <td>advanced</td> <td>18%</td> <td>34%</td> </tr> <tr> <td>intermediate</td> <td>45%</td> <td>58%</td> </tr> <tr> <td>basic</td> <td>28%</td> <td>8%</td> </tr> </tbody> </table>	Proficiency Level	Control Group (%)	Experimental Group (%)	advanced	18%	34%	intermediate	45%	58%	basic	28%	8%
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Reading	 <p>A bar chart showing the percentage of students in the control group (blue bars) and experimental group (red bars) for the Reading activity across three proficiency levels: advanced, intermediate, and basic. The data is as follows:</p> <table border="1"> <thead> <tr> <th>Proficiency Level</th> <th>Control Group (%)</th> <th>Experimental Group (%)</th> </tr> </thead> <tbody> <tr> <td>advanced</td> <td>9%</td> <td>25%</td> </tr> <tr> <td>intermediate</td> <td>55%</td> <td>58%</td> </tr> <tr> <td>basic</td> <td>27%</td> <td>17%</td> </tr> </tbody> </table>	Proficiency Level	Control Group (%)	Experimental Group (%)	advanced	9%	25%	intermediate	55%	58%	basic	27%	17%
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TABLE II.
THE DIAGNOSTIC RESULTS OF PARTIAL ANALYSIS OF POLYTECHNIC COLLEGE STUDENTS' ENGLISH LANGUAGE SKILLS

Tested activity	Results of partial analysis, %												
1	2												
Listening	 <table border="1" data-bbox="501 331 1002 609"> <caption>Listening Results</caption> <thead> <tr> <th>Level</th> <th>Control Group (%)</th> <th>Experimental Group (%)</th> </tr> </thead> <tbody> <tr> <td>advanced</td> <td>13%</td> <td>33%</td> </tr> <tr> <td>intermediate</td> <td>53%</td> <td>47%</td> </tr> <tr> <td>basic</td> <td>27%</td> <td>13%</td> </tr> </tbody> </table>	Level	Control Group (%)	Experimental Group (%)	advanced	13%	33%	intermediate	53%	47%	basic	27%	13%
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advanced	13%	33%											
intermediate	53%	47%											
basic	27%	13%											
Reading	 <table border="1" data-bbox="501 627 1002 927"> <caption>Reading Results</caption> <thead> <tr> <th>Level</th> <th>Control Group (%)</th> <th>Experimental Group (%)</th> </tr> </thead> <tbody> <tr> <td>advanced</td> <td>13%</td> <td>33%</td> </tr> <tr> <td>intermediate</td> <td>40%</td> <td>47%</td> </tr> <tr> <td>basic</td> <td>47%</td> <td>13%</td> </tr> </tbody> </table>	Level	Control Group (%)	Experimental Group (%)	advanced	13%	33%	intermediate	40%	47%	basic	47%	13%
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It can be also stated that training with the multimedia complex allows significantly increase the linguistic and professional level of students. The number of advanced students in experimental groups is by 14% more than in control groups in both colleges; the number of intermediate students is by 13% more in KAFU College and by 17% - in Polytechnic College, than in control groups. The number of students who speak English at a basic level, decreased by 20% in Polytechnic College and by 19% in KAFU College due to their transition to higher levels. Regarding Kazakh language, basic level testing showed that the quality and performance of students of experimental groups is higher than in control groups.

Analysis of the test sections showed that both groups of students in general had successfully coped with the task of listening. However, the students of experimental groups showed a more detailed understanding of the text. Reading, with a total coverage of the content was not difficult for students. However, students of experimental groups more successfully read the text with detailed understanding. The task for "speaking" revealed a better mastering of lexical and grammatical material of the students of experimental groups; they also demonstrated better abilities to apply it in speech. Those students largely used logic for building monologue utterances, demonstrated creativity, and expressed their own opinions. In writing task, students of experimental groups made smaller number of grammatical, lexical and spelling errors.

In our opinion, these results were achieved due to including of a large number of special training and communicative exercises aimed at the development of skills. Selection of the content provided professional orientation in language teaching, creative assignments, the presence of illustrations, audio and other types of visibility enhanced the absorption of material.

Thus, the students of experimental groups showed a higher level of the development of trilingual communicative competence.

Analysis of teaching, didactic and other opportunities of using the multimedia complex in educational process showed, that training offered by the multimedia complex allows to:

- implement a student-centered approach to learning;
- develop system thinking;
- be aware of linguistic phenomena, form linguistic abilities, create communicative situations, automatize language and speech actions;
- ensure intensification of students' independent work;
- improve the practical focus of learning process, enhance students' motivation, develop intellectual and creative abilities, ability to independently acquire new knowledge, since the tasks included in the training complex, involve seeking additional information necessary to perform a particular exercise;
- train various kinds of speech activity and combine them in different ways (monologue and dialogue speech, listening, writing, reading);
- organize perception of educational material through activation of not only sight (text, color, still images, video, animation), but also hearing (speakers' voices), that allows to create necessary emotional background, which increases the efficiency of training;
- fill up the main part of the program with new material: vocabulary and types of exercises;
- organize students' work in the classroom as communication with the teacher, through interactive computer programs and audiovisual media;
- apply modular-credit and distance learning technologies.

As for hygienic safety of the multimedia complex, it should be noted that it is lighter than traditional paper textbooks, it contains no allergen - paper dust. In addition, the colors of illustration material are presented in soothing tones that do not harm the students' eyesight. The presence of hyperlinks and various types of exercises allows to frequently change activities and not to accumulate fatigue.

The socio-economic benefits of using the multimedia complex in educational process are achieved through the development of students' communicative trilingual competence, as well as integration of professional and language training. As a result, students become more mobile and competitive on labor market.

V. CONCLUSION

Integration of professional and linguistic components by means of using multimedia gives much more opportunities for training competitive specialists with a set of competencies, which are required by state educational standards on one hand, and job market on the other hand.

In this respect, the multimedia complex "English for IT-specialists" proved main methodical and didactic ideas of advantages of combining different teaching aids. According to the results of approbation, teachers' reports, reviews and interviews, it contributed to college IT-students' developing trilingual linguistic competence and abilities, automating language and speech actions, training different types of language skills and combining them (monologue and dialogue speech, listening, writing, reading). They developed system thinking, learned how to analyze, collate, and summarize the facts; intensified independent work in learning linguistic phenomena and creating communicative situations, tested themselves using built-in test systems, which provide instant control of gained knowledge.

Teachers managed to create subject-subject learner-teacher interaction in the classroom, mediated through interactive computer programs and audiovisual media, implemented the learner-centered approach to teaching. Thanks to the interactive computer program, learners had the ability to manage the process of learning the language. Individualization was reflected in self-selecting the material complexity (level) and the sequence of exercises. Online mode also allowed learners to take control of the rate of studies; branched structure of hyperlinks made it possible to receive information from the glossary and grammar handbook. Also, practical orientation of learning process increased, and students were motivated to develop their intellectual, creative abilities and abilities to acquire new knowledge, as the tasks included in the multimedia complex, involve seeking additional information necessary to perform a particular exercise. In addition, the tasks imply the creation of booklets, computer presentations, videos or movies using computer programs (PowerPoint and others). It is possible to add new material to the main part: vocabulary, texts, or types of exercises. Colorfully decorated teaching aids, such as text, graphics, drawing with animation, audio, video were used. Perception of educational materials was activated through eyesight (text, color, still images, video, animation) and hearing (actor's or presenter's voice, music, or noise in the background), that created a predetermined emotional background, which increased the efficiency of learning process and met the principles of didactics—using audio and visual aids. Overall, a favorable social and psychological atmosphere in the classroom was created, as learners could evaluate their knowledge through self-control, avoiding censure, were able to choose for themselves the level of training that gave them

confidence.

Thus, the proposed multimedia complex "English for IT-specialists" is focused on the new historical conditions and the needs of today, as it is aimed at the development of trilingual competence, which ensures equal access to knowledge in the field of professional English both for students speaking official language, and for students who speak Russian. The complex is recommended for the classroom, students' independent work and distance learning in the Internet environment.

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