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English for Specific Purpose for Future Engineers: Software Application

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Abstract

The paper studies pedagogical reasons to apply training software and suggests software technology for learning ESP in technical higher schools. The main part of the article is devoted to the particularities of multimedia training course introduced at the first stage of foreign language training, as well as software to test students' ESP skills during further training.

Key words: training software, English for Specific Purpose (ESP), assessment software program, foreign language behavior, foreign language speaking activity, multimedia.

Introduction

The current reforms in Russian higher education are aimed at developing a system that would meet the requirements of modern information society, which implies efficient introduction of information and communication technologies (ICTs) in learning activities.

Article 15 of the Russian Education Act defines e-learning as the implementation of the education programmes via partial or full application of ITs and communication systems including Internet. Universities can use e-learning and distant learning in all their education programmes.

The aim of the article is to examine pedagogical reasons for application of software in foreign language training. In particular, we study multimedia software and e-learning test used in the first year of study and assessment software program based on e-learning that is applied in the frame of ESP courses (second year of study) in a technical higher school.

Theoretical background

One of the obvious advantages of e-learning is the development of students' information culture that is urgent for their future professional activities in the information society. Life-long learning implies the developed skills of "self learning via efficient information processing" [1, p. 193].

Most of ICTs have not been developed for educational purpose; however, ICT application causes great changes in training procedures, forms and methods. Thus, the issues related to ICT didactic characteristics, and methods of its application in learning are of great topicality. It is proved by a great number of research works both in Russia and abroad (A.A. Andreev, N.V. Ivushkina, P.I. Serdyukov, I.E. Grechikhin, S.A. Beshenkov, S.G. Grigor'ev, V.P. Demkin, A.A. Kuznetsov, M.P. Lapchik, S.V. Panyukova, T.S. Feshchenko, I.V. Robert, K. Evelin, B. Oliver, J. Higgins, S. Papert, T. Russel et al.).

A.A. Andreev defines the following types if ICTs applied in learning [2]:

- Training software (electronic courses and manuals, simulators, tutors, laboratory practicum, testing systems).
- Training systems based on multimedia software.
- Intellectual and training expert systems.
- Databases.
- Communication software (e-mail, teleconference, data-exchange networks).
- E-libraries, distributed and centralized publishing systems.

The relevance of multimedia application in NNSTU n.a. R.E. Alekseev is conditioned by the requirements for multi-level training. Most of the training multimedia software ("Focus on Grammar", "Reward", "Talk to me") provide such opportunity.

Individual learning ensured by interactive training form is one of the main advantages of learning in a computer class. Technical and didactical opportunities of the training software provide indirect management of training, and conditions for students to "interiorize" new skills and knowledge while solving language and communicative tasks independently.

In this case, the primary aim of a teacher is to make students understand the purpose of their activity, accept the learning task, and fill it with personal content [3].

Practical part

We use multimedia software "Focus on grammar" [4] to train first-year students. The study focus at this stage is to revise and advance grammar and communicative skills in academic and social communicative situations.

The multimedia course is a part of a training kit and is applied along with the basic set of training books [5; 6]. The educational materials developed by Russian authors are applied in ESP training since they have a number of advantages:

- They are developed with taking into account a culture dialogue principle according to which communicative competence in ESP is developed in learning environment that ensures study of both native and foreign languages and cultures based on comparative analysis [7, p. 21; 8, p. 220].
- They include personally important information that is relevant and clear for Russian students ("My native city", "NNSTU n.a. R.E.Alekseev", "The faculty of marine and flight technologies" etc.).
- They are developed on the basis of authentic textbooks with account for particular language level of the students in a particular technical higher school.
- They take into account students' psychological particularities of foreign language acquisition.

It should be noted that «Focus on grammar» is incorporated in the structure of the ESP course and has content and technological correlations with it, thus, serving as an informational support of the course. This property meets one of the basic methodical requirements reflecting the principle of integrity [9, p.33; 10, p.17].

A teacher has the leading role in learning management and uses software as a part of a particular technology. The options of the training software provide a teacher with indirect management that can be implemented in the following ways [11, p. 31]

- Content of learning activity.
- System of tasks and exercises.
- Messages of the system as a feedback to students' activity, questions and comments.
- Recommendations related to task fulfillment and mistake correction.
- Assessment (formal or informal).

The course consists of different parts that offer various exercises focused on grammar, listening, reading or writing. Independent learning is aimed at developing key competencies in the structure of ESP communicative competence.

One of the functions of the training course «Focus on grammar» is indirect management of learning activity in the process of grammar training. A wide scope of grammar modules allows practicing grammar not only for general English but also for ESP learning (the second year).

The interaction between the courses (the basic and computer ones) allows choosing the exercises aimed at particular learning objectives. For example, it is recommended to train Continuous tense forms by studying paragraph 3 and 7. (Fig. 1) [4].

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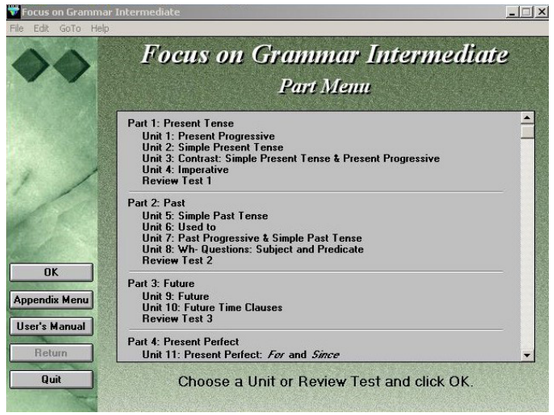
Fig. 1. Scope of grammatical exercises



The menu "Recognize" "Identify", "Practice A/B/C/D/E/F" in the part "Discover the grammar" provides the opportunity to choose automated exercises of different levels.

To understand and drill grammar material, it is recommended to do a number of simple tasks focused on identification and choice of a correct grammar form (menu "Recognize" "Identify") (Fig. 2) [4]. To make the grammar skills automated, it is advisable to perform more difficult tasks aimed at correct use of the particular grammar form in a particular context (menu "Practice") (Fig. 3) [4].

It should be noted that "human-computer dialogue" involves students in active learning. Task fulfillment, immediate computer's assessment of the student's answer, and further recommendation require continuous subjective efforts. The visual design contributes to efficient learning as well (Fig. 2, 3) [4].

To ensure formative assessment of grammar skills, it is recommended to apply e-learning tests. Teachers compose and upgrade tasks with multiple choice and open-ended tasks via the tools "Tasks".

Table 1 shows the ways to apply training software and e-learning tests in grammar training.

The training software «Focus on Grammar» can ensure intensive learning aimed at developing listening and reading skills. It is possible to choose some particular speech samples in the frame of social and cultural topics ("Me and my environment", "Way of life", "City. Transport. Urbanization").

Menus "Focus", "Recall", "Guided dictation" in part "Listen" provide students with the choice of automated exercises of various difficulty levels.

To train general reading comprehension, it is advisable to practice simple tasks aimed at identification and choice of the main facts mentioned in the text (menu "Focus") (Fig. 4) [4]. Further, it is reasonable to practice more complicated tasks implying paying reader's attention to details (specific information) related to the main facts (menu "Recall") (Fig. 5). "Guided dictation" offers open-ended tasks [4].

The advantage of the software is elaborated feedback element that serves as a means of individual pedagogical feedback. The system always helps in case of any difficulty. If the answers are incorrect/insufficient, a student will see a relevant message. A student can listen to the text as many times as he/she needs. If it is necessary, the student can address the menu "Help" and "Answer" (Fig. 4, 5) [4].

Fig. 2. Grammar tasks with multiple choice

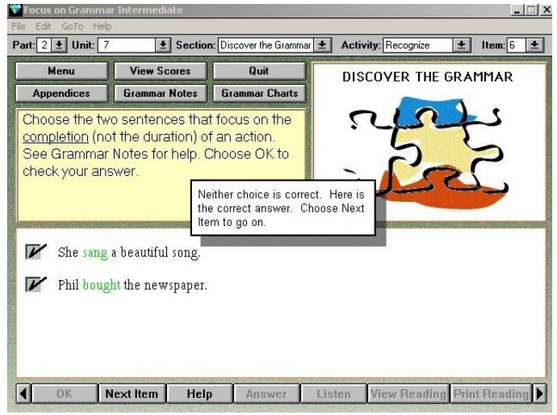
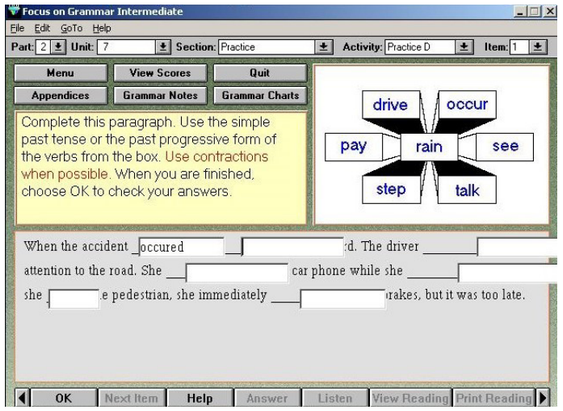


Fig. 3. Grammar open-ended tasks



E-learning provides students with independency and allows them to work at any convenient time. Such system enhances open-mildness to indirect management and students' reflection. Students become subjects of learning activity, its active initiators and controllers.

Table 2 presents the ways to use multimedia software for listening/reading training.

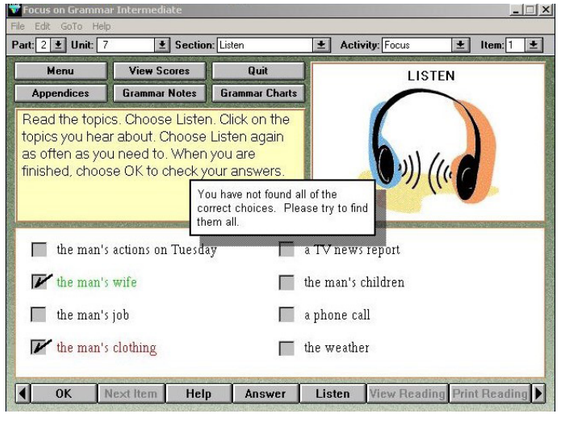
It should be noted that listening and reading of the information (text) related to a particular module can be performed not only during the module study, but also after it. In this case, the learning material is acquired and language skills are developed simultaneously with the personality development.

The assessment software program is used because it meets the goals of ESP training at a particular training stage for particular students.

Table 1. Software in grammar training

Stages of grammar practice	Teacher's activity	Students' activity
1. Introduction and practice of a grammatical form	Explains grammar form or material (tense forms). Gives tasks for primary understanding and use of the grammar form	Perceive grammar material (basic characteristics and markers). Perform the tasks aimed at primary understanding and use of the grammar form
2. Enhancement and drilling of grammar forms	Manages independent learning (IL) via software aimed at developing particular grammar skills	Perform software tasks aimed at recognition, construction and use of a particular grammar form
3. Testing and assessing grammar skills	Provides e-learning tests to assess the level of grammar acquisition	Perform tests in e-learning environment

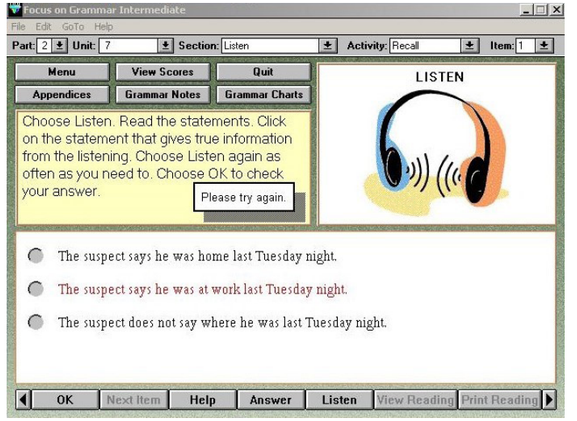
Fig. 4. Tasks to identify general content



It is applied to assess learning outcomes of the students in the frame of particular sphere of professional communication. As V.V. Rubtzov notes, "a computer does not dictate training methods and content, but it can be properly and efficiently included in training programmes to ensure adequate management of learning activities" [10, p. 10].

The second year of language training (ESP stage, 2nd year of study) is aimed at learning terminology and developing the ability to work with the information related to professional activity (in this case – "aircraft engineering"). The choice and arrangement of the incoming information (vocabulary) are carried out with account of interdisciplinary relations of the foreign language and the disciplines related to the future professional activity ("Airplane (helicopter) design", "Machinery systems", "Flight dynamics",

Fig. 5. Identification and choice of more detailed information



Aircraft armament" etc.). The programme also involves "Business English" training.

To arrange the assessment of ESP learning outcomes, it is reasonable to apply the training software for reading and vocabulary oriented tasks. The formative assessment in the form of automated tests relieves teachers from routine activities.

We must admit that development of an efficient assessment software program is labour consuming and requires cooperative work of teaching staff and computer experts. However, one software program can operate several different data selections, and the teaching staff can independently change and update the varied information to meet particular training goals.

A complex of automated tasks aimed at assessment of reading comprehension ensures indirect management of language activities related to comprehension of specific professional information.

The assessment software program identifies the input answers, counts scores and assesses the learning outcomes related to reading comprehension of specific technical texts. It allows assessing learning outcomes of each student efficiently and in an objective way.

The assessment tasks for reading comprehension, as well as tasks for self-control, should be arranged from simple to the most difficult ones.

Generally, the tasks imply identification, choice and reconstruction of the most general, key and detailed information of the text. For example:

- choice of the objects described in the text;
- choice of the statements related to the content (True/false statements) (key information analysis);
- matching of the sentence parts (cross choice);
- reconstruction of the text with the help of the word list (analysis of the detailed information) (Fig. 6).

To assess the terminology acquisition by means of the assessment software program, it is reasonable to offer tasks with multiple choice and open-ended tasks. For example:

- to choose the terms that do not relate to the topic;
- to choose the English terminology equivalents to the Russian ones (possibly in context, or cross choice) (Fig. 7);
- to translate terms from English into Russian.

It should be noted that the automated tasks can be used both for assessment and training activities with self-control. The only difference is in the particularity of the

Table 2. Multimedia software for listening/reading activities in module study

Stages of module study	Aim of learning activity	Teacher's activity	Students' activity
1. Introduction and drilling of new vocabulary.	Language competence development.	Organizes introduction and drilling of active vocabulary of the module.	Practice tasks and exercises for automatic use of the vocabulary.
2. "Immersion" in communicative situation in the frame of the module.	Development of language, communicative and discourse competences.	Ensures practice with basic speech samples and primary drilling of vocabulary in the corresponding context.	Practice basic speech samples, do the tasks involving different kinds of reading (comprehension of social and cultural texts) in written and oral forms.
3. Practice activity.	Further development of language, communicative and discourse competences.	Ensures and manages independent learning via software – simulators aimed at developing listening and reading skills in communicative environment.	Do automated listening/reading tasks in the mode of "human-computer dialogue".
4. Testing and assessment activities.	Further development of all key communicative competences in the frame of ESP.	Provides and manages tasks in speaking, writing and reading via problem-oriented, project and creative training methods as well as forms of control.	Do the tasks in the frame of traditional, problem-oriented, project and creative activities : - report (written or orally); - presentation; - participation in communication, role playing/business game etc.

Fig. 6. Task on text reconstruction

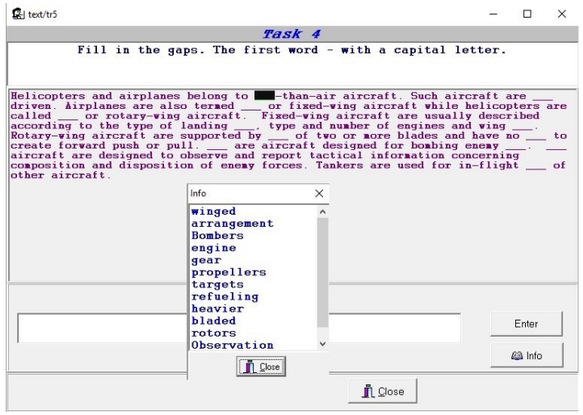
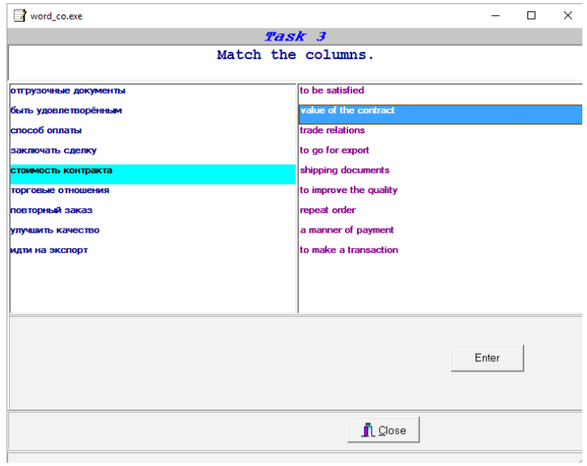


Fig. 7. Tasks to assess knowledge of professional terminology



feedback. The training program implies immediate feedback (simple or detailed), while the assessment mode implies delayed response obtained after a student finishes the whole test.

It is possible to develop such assessment tasks in E-learning environment. However, in this case the tasks have a number of specific features:

- they can be applied in distant (not class room) training;
- they have some disadvantages if compared to the assessment software programs in terms of screen presentation of the material;
- they have limited feedback modes (only delayed).

Table 3 presents the ways to apply the assessment software programs at the stage of ESP training.

The use of software programs for ESP training undoubtedly contributes to students' motivation for ESP learning. Didactical properties of a training software program ensure comfortable conditions for independent language learning activities, which has a positive impact on language skills development.

Conclusion

The theoretical and practical value of the article is justification and examination of training software application in ESP training, which can be useful for foreign language training at any technical higher school.

Table 3. The application of assessment software programs in ESP training

Stages of module study	Aim of learning activity	Teacher's activity	Students' activity
1. Introduction and drilling of new terminology.	Development of language competences.	Ensures drilling of terminology in the context of the module.	Do the tasks and exercises aimed at primary introduction of vocabulary and eliminating language difficulty while reading ESP text.
2. Uptake of content related to ESP module.	Further development of language, communicative and discourse competences.	Provides languages activities aimed at conceiving, drilling of terminology and language pattern in the frame of particular topic in various forms of speech.	Work with the information, do the reading and listening tasks aimed at analyzing and selecting required information in written and oral forms.
3. Testing and assessment activities.	Further development of all key communicative competences in the frame of ESP.	Assesses students' learning outcomes in the frame of the studied module via assessment software programs, writing tasks, and communication in professional environment.	Do the tasks in the frame of traditional and computer testing: - Computer tests aimed at assessing students' comprehension of information and terminology related to the studied topic; Communication and business game; Writing tasks.

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