

Foreign Language for Engineering Students (Aircraft and Helicopter Industry): Systemizing Training Content

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This paper deals with particularities of content of foreign language training provided to aircraft and helicopter engineering students. The educational information input is suggested to be systematized with regard to learning stages. The authors consider types of linguistic skills and relevant training methods aimed at effective acquisition of the input information.

Key words: foreign language training, foreign language competency in profession-oriented communication, content, input information, types of linguistic skills, training methods.

International contacts and two-level system of higher education implemented in Russia stipulated new requirements to the quality of foreign language training provided to engineering students.

Introduction of competency-based approach resulted in new standards of higher education, and today the content of foreign language training, which is provided to aircraft and helicopter engineering students, should be revised and updated. The present paper deals with training content and systematization of the input information, in particular.

Training content is the bulk of knowledge, skills, and activities ensuring effective individual performance in different spheres of life [1, p. 77].

Therefore, the content of foreign language training is *the content of the educational information input*, and this information acquired, one develops profession-oriented foreign language communicative competency (POFLCC). On the other hand, the training content is communicative abilities and skills, which, taken together, characterize the level of the competency development.

In terms of pedagogical theory, the input foreign language information is systematized and updated to meet the Federal State Educational Standards of Higher Professional Education (FSES HPE) [2]; on the basis of exemplary programme "Foreign Language for Students from Non-Technical Majors" [3]; "Foreign Language" syllabus designed for Aircraft and Helicopter Engineering Students (160100.85) [4]; "Aircraft and Helicopter Engineering (24.05.07)" curriculum [5].

The exemplary programme dated 2009 is used due to the fact that it was designed within competency-based approach and is focused on developing foreign language communicative competency. As for FSES HPE and the curriculum, they were passed in 2010 and 2011, respectively.

According to the curriculum, the discipline "Foreign Language" focuses on developing general cultural competency OK-5, which means "an ability to write and revise profession-oriented texts, an ability to use a foreign language for business communication" [5].

Developing OK-5, and its foreign language component (POFLCC), in

particular, is only possible if the training content is composed in the context of integrative and communicative approaches with traditional and particular educational principles applied (significance for and orientation to future profession, interdisciplinary connections).

The integrative approach to foreign language training conforms to the educational technique with the focus on the content, i.e. content-based language instruction (D.M. Brinton, M.A. Snow, M.B. Weshe, J.W. Oller et al.). Considering this technique, N.L. Uvarova suggests using the term "content-learning", since the meaning is "learning based on the subject content" and the term itself reflects the concept of integration. "Content-learning" means a foreign language and a particular subject being taught simultaneously, as well as the goals of teaching both subjects being integrated [6, p. 215-222].

As a result of investigations in methodology of teaching foreign language, scholars agreed that one of the strongest motivations to learning foreign language is future profession (I.V. Petrivnyaya, N.L. Uvarova, L.P. Klobukova, E.P. Komarova, Zh.V. Perepelkina, Z.I. Konnova, V.F. Aitov, O.G. Krasikova, Yu.N. Karpova, L.P. Kistanova, M.V. Daricheva, O.A. Mineeva et al.).

Thus, O.A. Mineeva, taking into consideration students' ideas and suggestions on the educational course content, came to the conclusion that "...education within supplementary training should be focused on future profession and the knowledge should be acquired to resolve professional tasks" [7, p. 99].

The communicative approach implies that the communicative function is an essential function of language, which is used as a tool for human activities.

M.V. Daricheva pointed out that foreign language training provided to design students should be based on communication, and the goal of training is development of communicative skills to ensure effective profession-oriented communication in foreign language. M.V. Daricheva noted that

the key aspect of foreign language training is communicative situation or topic, both of which should be profession-oriented. These model situations are profession-oriented and of communicative nature, therefore, they are called *profession-oriented communicative situations* [8, p. 66].

Alteration of some aspects within communicative approach, as well as syllabus analysis and testing, led to the changes in the *syllabus content*.

New syllabi "3+" contain the goals of foreign language training provided to Bachelor's degree students. However, particularities of aircraft and helicopter engineering students (the absence of Master's degree, a doubled number of academic hours – 576 hours in comparison with 288 hours of Bachelor's degree programme) necessitates considering specific aspects of foreign language training provided for Master's degree students. Let us enumerate the specific aspects formulated and detailed by E.N. Baranova when developing the foreign language syllabus for Master's degree programme. According to the author, graduates with Master's degree should know:

- linguistic units, which are most frequently used within a particular professional profile (terms and nomenclature of profession-oriented texts);
- phenomena significant for a particular professional profile and characteristic for social and cultural, scientific and industrial spheres of the countries where the learned language is official;
- standards of linguistic behavior and cultural particularities typical for native speakers in social and cultural, scientific and industrial spheres [9, p. 189].

Let us turn to the principles of selecting and systematizing input information at the first and second educational stages (I, II semesters) within Aircraft and Helicopter Engineering programme. This course is remedial and focuses on revising and acquiring profound knowledge about social,

cultural, and academic communication, as well as revising and systematizing grammar.

Therefore, in terms of pedagogy, in the first semester, it is essential for the syllabus to include information on student's communication and lifestyle, university education, native town, life in megapolis, and environmental issues.

In the second semester, students are supposed to get acquainted with the information about the country where the language is naturally spoken, with a particular emphasis on the education system.

However, we suppose that the *emphasis* on the education system is more suitable for the syllabus designed within programmes in Pedagogy.

Taking into account the FSES HPE and the goals of Aircraft and Helicopter Engineering programme, we suggest adding social and cultural topics. For instance, the engineer, when on a business trip, can face different everyday life situations, so, studying such topics as "In the Airport", "Hotel", "In a Cafe" will allow the engineer to quickly adapt in an overseas environment and successfully perform his/her professional activities. It is noteworthy that developing communicative skills in the context of the above-mentioned situations is based on **the principle of using professionally significant information**.

Another particularity of educational information input is introducing topics on future profession and modern trends in technological development based on **the principle of using profession-oriented and understandable information**.

It is clear that social, cultural and everyday life information content focusses on immediate and non-formal communication. While learning, communicative skills are developed in the forms of monologues, dialogues, and short reports, which can be performed within creative and interactive tasks (roleplay, mini-presentation, discussion).

Oral speech, which is naturally used in the social and cultural context of everyday life, as a language skill is developed on

the basis of receptive skills and relevant activities – reading and writing based on a model text. Therefore, speaking can be regarded as an outcome since it indicates the acquisition of information within the scope of a particular social and cultural topic. However, elements of speaking are certainly trained when dealing with texts, for instance, doing question-answer tasks and discussions based on the social and cultural topic reflected in the text.

Reading and writing based on a model text, as receptive language skills, are in the focus of foreign language training since the more a student reads and writes, the better he/she speaks.

Reading is both method and tool in foreign language training. Different ways of reading (skimming, scanning, intensive), which serve different purposes: for instance, to get acquainted or to drill various language phenomena (foreign thesaurus, grammar forms, etc.), estimate the level of students' acquisition.

Writing based on a model is quite helpful for reading and preparing monologues. Such writing can be based on one or several texts and implies substituting some text paragraphs by particular information, for instance, that connected with student's lifestyle. Preparing short reports in area studies (for example, a topic on Great Britain) implies identifying key information in the relevant text and compiling it in the form of a summary.

Reading and "model" writing tasks are used to ensure acquiring foreign thesaurus, monitor understanding and information processing within the scope of a particular topic.

Writing as a productive language skill is connected with such tasks as filling in templates (CV, template letter "My University"), writing personal e-mail letters, preparing project tasks (mini-presentation about the city or the country whether the foreign language is spoken).

Table 1 shows particularities of information input at the early stages of university education.

Table 1. Systematization of input information at 1-2 stages of foreign language training

Stage	Communication sphere	Topics (situations)	number of hours
semester 1	Social and Cultural	1. Student and Student's Lifestyle	36
		2. City, Megapolis, Environment	
	Academic	Higher Education in the RF, NNSTU n.a. R.E. Alekseev	36
Grammar	Prepositions. Auxiliary verbs, present tenses		
semester 2	Social and Cultural	1. Country Where the Language Is Spoken: Industry, Political System, Traditions and Culture	20
		2. Business Trip: in the airport, in the airport, in a cafe	18
	Professional	Profession of Engineer. Current Trends in Technology Development	12
	Grammar	Tenses, Modal Verbs	18

Let us systemize the input information at the third and fourth stages (semesters 3 and 4), when foreign language training is profession-oriented.

In accordance with the exemplary programme "Foreign Language for Students for Students from Non-Technical Majors", the content should comprise information on future profession, famous scientists and outstanding personalities in aircraft and aviation [3]. However, this programme is exemplary and only provides recommendations on how to structure the educational content for Bachelor's degree students. This means that there can be some amendments proposed by the teachers involved in foreign language training.

In terms of profession-oriented foreign language training, it is reasonable to use the integrative approach with an emphasis on acquisition of *professionally significant knowledge of foreign language*, in particular,

learning terminology and developing skills of information search, interpretation, and processing within the scope of a certain professional profile.

It seems to be well-grounded to provide information on famous scientists and outstanding personalities in aircraft and aviation through reading for gist (skimming).

The key **principle** to select and systemize information at the current stage is using *interdisciplinary connections* between foreign language and professional disciplines ("Aircraft (Helicopter) Construction", "Mechanical Equipment Systems", "Aircraft Flight Dynamics", "Aircraft Armament Systems", etc.).

It is worth noting that the suggested model of content-learning can be correlated with a type of "topic-based teaching" [10]. This model works for any non-linguistic programme since the topics can be selected to meet the interests and needs of students of any professional profile.

The content of profession-oriented foreign language training does not revise, but deepens and updates the content of the relevant professional discipline, broadens the mind and professional worldview of future aircraft engineers.

Profession-oriented foreign language texts are difficult enough to comprehend, contain a lot of complex syntactic constructions, terms, and professionalisms. The main goals of working with such texts are exploratory reading and writing, in particular, identifying and presenting the key information (summary, abstract, plan, key words). Such work is particularly fruitful when preparing mini-presentation and reports. It is clear that oral speech is challengeable for students; therefore, to ensure professional communication in classroom, it is better to select the most significant information, which can be reproduced in the talk and built up without text.

The topics of the professional section are given in table 2.

The requirements that specialist's degree graduates should meet imply introduction of "business section".

In accordance with the FSES HPE, the graduate should be able to apply foreign language knowledge in correspondence, negotiations, preparing business documents, as well as possess well-developed communicative skills to discuss professional issues in foreign language [2, p. 14-15].

According to the exemplary "Foreign language" programme, business section, which comprises several modules ("Company Presentation", "Business Trip to Foreign Country", "Business Correspondence"), is introduced in the third semester. However, to ensure profession-oriented learning and efficient monitoring, it is more reasonable to distribute the topics of the business section over the two semesters (3 and 4), with 72 and 68 hours, respectively.

Thus, in the third semester the teacher should provide relevant information on the topic "Company", which includes such aspects as company structure, world-know companies and the history of their development, the leading aircraft company in the city.

In the forth semester students should practice business communication,

simulating negotiations on new equipment and including such points as price, discount, terms and conditions of delivery and payment. It is worth noting that this content is understandable and useful not only for future engineers, but for Bachelors of any professional profile.

Table 2 shows the topics within the business section.

Business communication skills are developed through all four types of activities: reading, writing, listening, and speaking. Business communication is simulated by means of short reports, roleplays, and business games. For instance, the business game "Post-Appointment" implies the analysis of CVs, which can be used as templates for student's CV.

Writing based on a model text is connected with identifying key information (company structure), playing out particular

situations, and participation in a roleplay. Productive writing implies writing personal CV, cover letter, and business letter containing information on the leading local aircraft company (the topic "Company").

To sum up, the content of foreign language training is selected and systematized relying on the principles as follows: *consistency, succession, continuity, orientation to future profession, ease of understanding, interdisciplinary connections, and cross-subject links.*

Theoretical and practical value of the present paper comes from updating and systematizing the input information used for foreign language training in the context of traditional and specific principles; the case-study materials can be used for teaching Aircraft and Helicopter Engineering students in any higher technical school.

Table 2. Systematization of content at 3-4 stages of foreign language training

Stage	Communication sphere	Topics (situations)	number of hours
semester 3	Professional	Profession-oriented information (classification of aircrafts); aircraft construction; helicopter; famous scientists and outstanding personalities in aircraft and aviation	42
	Professional and Business	Company: company structure, world-know companies and the history of their development, the leading local aircraft company (letter to a potential business partner)	12
	Systematizing Grammar	Complex grammatical structures, sequence of tenses	18
semester 4	Professional	Profession-oriented information: flight velocity and altitude, aircraft flight dynamics (jet aircraft); aircraft flight control systems	56
	Professional and Business	Negotiations on buying new equipment	12

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Quality Management Competency as an Essential Component of Professional Qualification of Engineering Graduates

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The authors focus on developing quality management competencies conducting the case study of education programme "Materials Science and Technology of Materials". The authors consider the skills of quality management to be crucial for today's engineering graduates and suggest enhancing Bachelor and Master of Engineering curricula with practice-oriented disciplines, modules, and practices, with relevant examples given.

Key words: quality of education, engineering education, quality management, competency development, curriculum design, engineering education programmes.

In the past decades the issues of engineering education have been actively discussed. Among these issues methods and tools of its quality enhancement as well as ways of their implementation into university functioning are particularly debated. It is commonly agreed not only in Russia, but also in the world that development of only special professional competencies does not meet employers' requirements for engineering graduates. In our opinion, one of the competencies necessary for a graduate engineer is a competence of quality management. This article considers the question of this competence development using the example of students of "Material Science and Technology of Materials" profile.

In 2011, when universities started students' training including engineering ones, in accordance with the State Federal Educational Standards of Higher Education, the universities and departments gained large discretion in designing both curricula and syllabi of the subjects. In doing so, it was necessary to ensure students' cultural and professional competencies. This trend is supported by the educational standards of the latest generation FSES 3+. As a rule, the design of curricula (i.e. inclusion of subjects

in curriculum, their content and volume, a set of competences produced by each definite subject) is performed by graduate departments of university. Leaving some subjects beyond the curriculum and transfer to the competence-oriented education, on the one hand, facilitated the work of graduate department, on the other hand – complicated. Historically, the graduate departments are mainly focused on inclusion of mostly field-specific subjects in the curriculum when developing engineering curricula, as they are responsible for training students for their main professional activity (application of knowledge about materials, research methods, testing and diagnostics of materials, products, processes of their production, skills of engineering process modeling, etc.). In addition, some professional competencies are acquired in reduced and generalized form, as a part of more significant, in the graduate department's opinion, subjects. This approach leads to very superficial knowledge of "non-major" subjects and results in problems of engineers' adaptation in the workplace. Therefore, the graduate departments face the daunting task: despite the established tradition, to design curricula and syllabi to acquire the entire set of competences registered in the standard.



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