

MULTILINGUAL APPROACH TO POWER ENGINEERING STUDENTS LANGUAGE TEACHING

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This article addresses the role of foreign languages in the actual development of multilingualism among Russian engineers-to-be who will work in synchronously interconnected international power systems. It also brings in the discussion the measures that Higher Engineering Institutions should undertake for encouraging the development of future engineers' multilingual and intercultural competence. The article pays particular attention to the identification of the main characteristics which multilingual engineers should strive to have for working in an increasingly globalized professional society. The study is based on the extensive research made during the trilingual training of Heat Power Engineering, Electromechanical, Electro Engineering, and Physical Engineering students in the context of educational multilingualism of the Power Engineering University (Ivanovo, Russian Federation). The present study proposes to consider the experimental procedure using the first foreign language (FL1-English) as a mediator for the development of the second (FL2-German) and the third (FL3-French) foreign languages as the most significant in the European Union and the most common to study in Russian schools and universities. The results of the trilingual training prove that the process of learning a new foreign language within a single system on the basis of contrast and comparison with others, already learnt languages, is an effective tool not only for the formation of power engineering students professional competencies, but also for the sustainable evolution of multilingualism and multiculturalism.

Keywords: Educational multilingualism, multilingual communication skills, multilingual competence, multilingual engineers-to-be, language-mediator

Multilingualism and intercultural communication skills seem to be considered important for the employability of graduates all over the world. For example in New Jersey and Massachusetts (U.S. states), between 2010 and 2015 job postings have clearly demonstrated the multilingual career advantage since the demand for multilingual workers more than doubled [10]. In European countries 54% of graduates are able to hold a conversation in one additional language, 25% in two additional languages, and 10% in at least three additional languages [5]. If a graduate of linguistic or technical university wants to be attractive in the international labour market [4], knowledge of languages can potentially lead to consensus on both personal and professional matters.

In this context the implementation of multilingual education into the educational process of the Russian Power Engineering Universities is a qualitatively new stage of foreign language education, coupled with the prospect of the synchronous interconnection of the Russian and foreign energy systems and the provision of the project with qualified personnel capable of international professional communication in the electrical power engineering sector. For Russia, the interconnection has a long-term strategic importance in terms of cooperation with European countries, integration into the European electricity market. Development Association project is a combination of research synchronously interconnected systems and numerical modeling of their operating conditions, provided that countries generally main-

tain ownership and operation standards. At the same time maintaining an adequate level of reliability and sustainability of energy systems was and is the main prerequisite and the most important task to be solved by the joint efforts of engineers who need to have not only the general professional skills, but also the ability to conduct multilingual cross-cultural communication to achieve effective cooperation with the partners from the foreign countries. The increase in professional collaboration and interaction in the field of power engineering foreseen within and beyond European countries [11], begs at least one crucial question of interest today: Are Russian engineers-to-be linguistically prepared for these endeavours to a sufficient degree?

In order to answer this question let us turn to the term of multilingualism which is usually defined as a redesign of how we think about languages that takes into account 'the complex linguistic realities of millions of people in diverse socio-cultural contexts'[20]. It is also understood as 'the ability for institutions, groups and individuals to engage with more than one language in their everyday communication' [5].

Multilingual education is, at its best, (1) multilingual in that it uses and values more than two languages in teaching and learning, (2) intercultural in that it recognizes and values understanding and dialogue across different lived experiences and cultural worldviews, and (3) educational in that it draws out a special knowledge which 'students can apply in their society – locally, nationally, and globally' [12].

Thus, multilinguals are not just those who have an equal and perfect knowledge of their languages but, rather, those who use two or more languages in their everyday lives [8]. So, the social nature of the modern multilingual education is to build not just a language, but a general socio-cultural competence. For this reason, the respect for native cultural heritage and the perception of valued elements of others through the dialogue of cultures is the main way of human civilization evolution in the era of globalization. Therefore, each lesson of a foreign language is an intersection of cultures; it is the practice of intercultural communication, which results into the certain concepts about another culture, from euphoric and illusory, to reliable and adequately acceptable. To learn another language is one of the best ways to recognize the world and to see how others and otherness inhabit it. It is an education in difference as a pathway to understanding how to contribute to [...] global citizenship [18].

Since today's engineering students will form the part of the future global society and will have to interact on the global professional arena, they need languages [1]. That is why foreign language communicative competence is one of the basic, key competencies for technical students, conceived as an independent unit in the structure of general professional competence of the specialist. It allows the graduate to use a foreign language (bilingualism) or several foreign languages (multilingualism) as a means of information activities, regular replenishment of their professional knowledge, professional communication and professional culture [2]. This fact is confirmed in surveys of the Russian Moscow "Skolkovo" Management School and the Strategic Initiatives Agency, which undertook a large "Foresight Competence 2030" study [6, 15, 16]. It featured among the major professional competences of the XXI century such competence as: 'Multilingualism and multiculturalism' which includes English fluency and knowledge of a second foreign language; understanding of national and cultural context of the partner countries.

However, Russian graduates usually learn only one of the offered at the university foreign languages. This linguistic approach to language learning is definitely a lapse of general professional training that deprives future professionals of the opportunities to get a comprehensive multicultural development, and, therefore, reduces the degree of their relevance at labor market. So, in order to start the new educational policy of language teaching it is necessary to

harmonize a number of existing contradictions. The most important of them are:

- a contradiction between the social request for well qualified engineers with a high level of multilingual competence and insufficient development of multilingual teaching techniques, able to fulfill that social request;
- a contradiction between the need to develop students' multilingual communication skills and underdevelopment of the methods for simultaneous study of several foreign languages.

So, the objective of the following research is to address the role of English and other foreign languages for the development of multilingualism among the power engineers-to-be, to discuss the steps that Higher Technical Institutions could or should undertake for encouraging the multilingual competence development and, finally, to determine the main characteristics which multilingual engineers should strive to have for living and working in an increasingly multilingual and multicultural globalized professional society.

Materials and research methods

The experimental course of trilingual training for the future engineers of Ivanovo State Power Engineering University (ISPEU, Russian Federation) was provided by the experienced multilingual instructors of English, German and French with the aim to develop communicative, inquiring and intelligent young people who will have to create a better and more peaceful world of international professional communication through intercultural understanding, tolerance and respect. The first course students of four faculties (Heat Power Engineering, Electromechanical, Electro Engineering, and Physical Engineering) in the amount of 100 people were taught, and then tested on their ability to develop multilingual skills of 'translanguaging' [7] and cross-cultural communication.

Since in Russian educational system the first foreign target language is English and its role tends to be higher in comparison with other foreign languages, the authors of trilingual training used English as a mediation language while teaching German and French to engineering ISPEU students. A new experimental "*Multilingual Guide to the English Speaking World*" [17] served as a supporting workbook aimed at improving the multilingual skills of both Russian-speaking and foreign students in terms of educational trilingualism.

The novelty of this tutorial is seen in the introduction of the new system of simultaneous

multilingual studying of the English-speaking world realities, based on the possibility of linguistic mediation as a special kind of interactive activity, which allows students to develop a mediation competence of transferring the semantic contents of the texts from one language to the other, taking into account the cultural assumptions of the recipient.

The above-mentioned 'Guide' [17] is based on three postulates: firstly, on the principle of linguistic and cultural contrasts; secondly, on the idea of building the multilingual competence of the non-linguistic students; thirdly, on the methods of multiple languages simultaneous teaching which are built on the genetic relationship of taught languages and their comparison. So, it is based on a model of shifting to the second and third foreign languages by studying the linguistic and socio-cultural features of the language-mediator country in the context of the educational multilingualism.

Thus, during the multilingual training course the future engineers were immersed into the atmosphere of multilingualism and simultaneous learning of several foreign languages; learned the native professional culture and language in comparison with the foreign ones; used the English language as a mediator for switching to the second and third foreign languages (German and French); expanded the linguistic and country study horizons etc.

Research results and discussion

The following results were obtained at the end of the pilot multilingual training: 89.5% of students have successfully mastered the new technique, demonstrating excellent, good and satisfactory skills of language switching (45.5% of the students received excellent results, 32.7% of the pollee did well; 11.3% of the tested students achieved satisfactory results). Despite the fact that the engineering students result is not the most ideal, the positive dynamics of the sustainable multilingualism development is obvious.

The experimental results also prove that the students of technical specialties are focused on the evolution of bilingualism and formation of multilingualism and multiculturalism. However, they need a stronger motivation, new unusual forms of interaction, access to extracurricular classes, enhanced control of the assignments, and that is very important, the innovative teaching manuals aimed at the development of critical thinking, finding the language contrasts (similarities and differences), drafting the models and paradigms etc., inher-

ent in the technical mindset and perception of the world.

Furthermore, the professional features which technical students should master during the multilingual training course were determined in order to make up the multilingual learner portrait which can help individuals and groups become responsible members of local, national and global professional communities.

Following the aim to develop internationally minded engineers who recognize their common humanity, share guardianship of the world and help to create a better and more peaceful world of industrial cooperation, we worked out the Multilingual Learner Profile of Engineering Students, who should strive to be:

1. *Good communicators*: express professional interests confidently and creatively in more than one language and in many ways; master several languages and collaborate effectively, listening carefully to the perspectives of other specialists – representatives of partner countries.

2. *Multilingual mediators*: send information to the foreign-language recipient to obtain feedback in the sphere of professional communication; provide multilingual (interlingual and intercultural) communication between two or more interlocutors who are unable to speak to each other directly; serve as a tool to solve the professional conflicts or misunderstandings that are caused by differences in language and cultural representations.

3. *Multicultural thinkers*: study other cultures of the globalized society, inspired by the goal of becoming sensitive to the plurality of the ways of life, different modes of analyzing experiences and ideas.

4. *Tolerant*: appreciate native culture and history, as well as the values and traditions of other nationalities; respect the diversities of cultures.

5. *Intelligent*: develop and use conceptual understanding, exploring professional knowledge across a range of related disciplines; engage with issues and ideas that have local and global professional significance.

6. *Critical thinkers*: use critical and creative thinking to analyze and take responsible action on complex professional problems; exercise initiative in making substantive, reasoned decisions.

7. *Enlightened*: analyze a range of points of view and grow from the intercultural professional experience.

8. *Curious*: develop skills of professional inquiry and research; learn with enthusiasm independently and with others throughout life.

9. *Venturous*: approach professional uncertainty with forethought; work cooperatively to explore new ideas and innovative strategies of the development; be resourceful in the face of professional challenges.

10. *Multitaskers*: perform simultaneously multiple mental and manual tasks in the sphere of professional cooperation.

In the context of the XXI century, the elaborated Multilingual Learner Profile reflects a number of essential characteristics for engineering students to achieve in order to become the full members of the globalized professional society. For the purpose of creating the favorable grounds for the balanced growth and foreign language development of the engineers-to-be, multilingual teaching should become a necessary component of the modern engineering education.

The successful results of ISPEU students trilingual training proves that multilingual teaching can take place on the basis of comparison of the languages studied, allowing to determine the subjective difficulty of the linguistic phenomena of the second and third foreign languages through a dialogue with the native (for each student) language and culture. The results of this research also demonstrate that the second foreign language is learned more quickly and easily if the first foreign language appears to it as a support (a mediator). However, the level of the first foreign language should be high enough.

To show and prove to the students how surprisingly much they already know in a new, unfamiliar language, it is necessary to activate the existing but not yet relevant students' knowledge. The search and discovery of 'the familiar in the strange' [19] is grounded on two linguistic bases: the relation of the languages and the internationalisms (lexical units widely used in various areas of modern life). This language relationship plays a major role, as it allows the students to discover the familiar units at the linguistic and cultural levels.

Besides, multilingual teaching of the future power engineers can be connected with the dynamic model of multilingualism, which ensures the development of the related languages (such as English, German and French) on the basis of the main (first) foreign language. The first foreign language affects the ability to adapt to the system of each new foreign language [14]. It usually serves as the material for cross-language and socio-cultural comparisons, so despite the customary approach, language teaching should not be limited by learning vocabulary, grammar and translation

techniques. The program also needs to include classes on history, culture and traditions of the target language countries. This creates a positive students' attitude to the subject, as well as enhances their motivation to learn the new languages.

It is also noteworthy that multilingual teaching is a process of forming not only sustainable multilingual communicative competence, but also critical thinking, social, cultural and mediation competence of power engineering students. In modern multicultural world mediation skills seem an educational field of professionals' training as well as an important component on the individual's generic competences list [13]. By the way, for many scientists (Garzone, Rudvin, 2003; Valero-Garcés, 2004; Zarate, Gohard-Radenkovic, Lussier, 2004, etc.) the problems of language mediation is an important part of linguodidactics and it is studied in the light of professionally-oriented activities of the specialists in a multicultural context.

During the process of multilingual training of power engineering students a special environment is formed, in which three factors have mutual influence: the mother tongue, the first (FL1) and the second (FL2) foreign languages. Moreover, a fascinating atmosphere of multilingual thinking appears and helps to form a multilingual individual able to navigate in the diverse translingual context.

Conclusions

The analysis of the situation in the area of power engineering education reveals that the responsibility of higher education institutions is to develop the professionals of the future – the ones who will have to ensure the sustainable development of the country. These young people – the engineers-to-be – must be multilingual, even if they do not have a sufficient level when they leave secondary education, the tertiary system must take over.

It is worth emphasizing that about eight years after the Russian language policy of mother tongue plus two foreign languages was introduced, there is still a long way to go before that goal has been reached for the majority of technical students. Academic and professional mobility has resulted in a much more complex linguistic landscape where English has obtained a special role of the generally accepted *lingua franca* almost in all spheres of life [3]. This fact has led many people to believe that English is enough for international communication, especially in the professional field, and there is no need to learn more foreign languages. Consequently, there is a dramatic fall in the

learning of foreign languages and the range of languages offered to and taken by the power engineering students is extremely limited.

It's evident that more research is needed to make clear how promote languages among non-linguistic students and develop their linguistic competence since engineers-to-be have a crucial role to play in the growth of their native country. It is the responsibility of the university leaders to ensure that their graduates are properly prepared to be part of the development – not only in physics, math, chemistry, electrical, civil, industrial, mechanical and etc engineering, but also when it comes to languages and intercultural communication skills.

Thus, for the formation of multilingual competence in the power engineering university it is necessary to create such a method of teaching that: would meet the principles of communicative, cognitive and activity approaches; would be an integral part of a program for teaching foreign languages; would be built on non-traditional approaches to training in line with the new educational technologies; would be consistent with the requirements of the XXI century and linguistic needs of university youth; would take into account the peculiarities of technical mentality and engineering students specifics.

In this article attempt made to prove that the process of learning a new foreign language within a single system on the basis of contrast and comparison with others, already learnt languages, is an effective tool not only for the formation of power engineering students professional competencies, but also for the sustainable evolution of multilingualism and multiculturalism. The development of functional multilingualism and students' multicultural thinking should be performed in line with the language mediation as a form of communication activity.

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