

Teaching English to Postgraduate Students in a Technical University Digital Environment

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Abstract. One of the main tasks of training postgraduate students in graduate school is to develop competences necessary to present and discuss the results of their research work in a foreign language in oral and written forms, as well as to fully understand foreign language scientific texts in their specialty.

In the last decades international scientific communication has shifted from a plural use of several languages to a clear dominance of English. The shift implies that an ever-increasing number of scientists whose mother tongue is not English have moved to English for publication and conference participation.

A literature analysis and own experience revealed such problems of postgraduate students' training in foreign languages as heterogeneity of the contingent with an unequal and often low initial level of language proficiency, a limited number of hours allocated for practical classes in English; a low level of self-directedness in language learning, a lack of elementary knowledge of the scientific discourse.

In an attempt to solve these problems, the Department of Foreign Languages staff at Kharkiv National Automobile and Highway University have developed and implemented a training course for postgraduate students in two, traditional paper and online, versions, the latter designed with the use of such a modern approach in language didactics as audiovisual translation appropriate for self-learning and flipped classroom activities. The course comprised three modules: scientific reading, academic speaking and academic writing. Besides, postgraduates with the elementary level of English were offered a grammar course covering all the basic

grammatical topics necessary to formulate correct written and oral utterances.

The effects of teaching English with the use of videos with recorded parallel bilingual vocabulary and texts placed on an online platform were compared to the results of the traditional teaching with the use of the paper copy.

The research was carried out in the 2021-2022 academic year and aimed, firstly, to compare language skills of two groups of learners: those who studied the course with the use of audiovisual technology (the experimental group) with those who studied in the traditional mode (the control group); and, secondly, to reveal how the level of self-directedness changed in the process of the course study in both groups. The study involved a mixed approach of quantitative and qualitative methods to diagnose the level of learners' language competence and self-directedness. Our results indicate that the use of audiovisual translation in teaching foreign languages improves students' language skills and increases autonomy in studies.

It can be concluded that utilizing audiovisual translation due to auditory and visual support and opportunity for learners to study at their own pace has a significant impact on postgraduate students' language proficiency though this approach requires further research and wider implementation.

Keywords: *audiovisual translation, learning English, postgraduate students, technical university.*

Print ISSN 1691-5402

Online ISSN 2256-070X

<https://doi.org/10.17770/etr2023vol2.7292>

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Published by Rezekne Academy of Technologies.

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INTRODUCTION

The main form of training to receive a Doctor of Philosophy degree is postgraduate studies, by means of which postgraduate students can acquire broad knowledge of specialty, master the deep scientific and philosophical competencies, gain universal skills of a researcher. In addition, they must acquire the language competences necessary to present and discuss the results of their scientific work in a foreign language in oral and written forms, as well as to fully understand foreign-language scientific texts in the relevant specialty, as prescribed by government documents [1].

The intensification of the research work in Ukrainian universities has caused the need to restructure the work of teaching postgraduate students a foreign language, taking into account the fact that at present practically the only really demanded language of scientific communication is English.

Hamel claims that throughout the 20th century, international communication has shifted from a plural use of several languages to a clear pre-eminence of English, especially in the field of science with more than 75 % of the articles in the social sciences and humanities and well over 90 % in the natural sciences are written in English. The shift towards English implies that an increasing number of scientists whose mother tongue is not English have already moved to English for publication [2].

Since a modern researcher should be prepared to keep pace with the progress of science and technology, their education must cultivate their ability for intellectually active perception of what others have done in their field. To work successfully, specialists are expected to have complete up-to-date information about achievements in their field and have a deep knowledge of the relevant fundamental sciences, being able to use all this in practice.

The university should teach young people to use the entire arsenal of modern scientific methods to achieve the necessary results in a specific field, while easily adapting to changing conditions. This problem can be solved only on the basis of a strong fundamental foreign language education, which will provide access to information about the latest achievements in the field of the postgraduate student's specialization.

To conduct research, a postgraduate student must use foreign scientific publications in the specialty, which are almost always presented in English. It is also important for a researcher to participate in international conferences, where most of the reports are also presented in English. Writing abstracts in English is a requirement for all specialized journals almost everywhere.

Thus, the training of postgraduate students requires due attention to the issues of foreign language education and preparation for intercultural scientific communication in English.

The purpose of the article is to analyse the problems of foreign language training of postgraduate students in technical universities and to propose some solutions using innovative digital approaches.

The main goal of teaching foreign languages in graduate school is the development of the following skills: 1) to freely read foreign language scientific texts in the chosen specialty; 2) to translate authentic foreign language texts on a topic related to the field of scientific interests of a postgraduate student, skilfully using knowledge of terminology, grammatical structures, methods of translation transformations; 3) to process the information received from foreign sources in the form of translation, review, annotation; 4) to communicate in a foreign language in a professional and scientific environment (reports, presentations, round table discussions, participation in conferences, etc.); 5) to be able to provide written scientific communication on the topic of dissertation research (abstracts, theses, scientific articles, academic essays); 6) to effectively master the speech etiquette of scientific communication; 7) to perform logical operations (analysis, synthesis, argumentation, generalization, commenting and conclusions). No less important in the process of foreign language training of postgraduate students is the development of creative skills that help individuals to produce original ideas, apply a creative approach to solving problems [3].

However, in our opinion, one of the most important objectives of postgraduate students' training should be the development of the skills to acquire knowledge independently, since this is the main condition for their continuous development in future as scientists who keep up with the times.

An analysis of literature [4], [5] and own experience highlight the following major problems that complicate the process of learning a foreign language in graduate school: heterogeneity of the contingent, which has an unequal and often low initial level of language proficiency and different ages; the inconsistency of the high requirements for the level of language proficiency of future researchers and the small number of academic hours allocated for practical classes; a low level of development of postgraduate students' skills required for their self-directed learning; difficulties when working with a scientific text due to the lack of sufficient knowledge about its structural, stylistic and grammatical characteristics, ignorance of genre features of written types of discourse (abstract, annotation, review, article); insufficient mastery of methods of summarizing and paraphrasing information; difficulties in writing articles, theses, presenting research results; insufficiently developed listening skills; phonetic and spelling errors.

The experience of postgraduates' training at the Department of Foreign Languages at Kharkiv National Automobile and Highway University (KhNAHU) shows that in recent years, approximately 60% of applicants to graduate school have demonstrated skills at the level of

A1-A2 (elementary and pre-threshold), approximately one-third have had skills at level B1 (threshold), and a very insignificant part have revealed levels B1+ and B2 (upper-intermediate). Such a disparity in levels puts teachers in the face of a whole set of methodological difficulties: from which level to start training, which tools to choose, which would, on the one hand, meet the main demands of modernity, but on the other hand, take into account national specifics.

In this regard, such well-known manuals as "English for Scientists" [6] or "English for Academics" [7] cannot be accepted by domestic departments of foreign languages as a model, since they are designed for students who have already reached the threshold level and, in addition, they are designed for a significantly larger number of academic hours than Ukrainian educational standards provide for technical universities.

To solve the problems of postgraduate students' foreign language training, it was necessary to create a number of conditions that would ensure the effectiveness of training, namely: the choice of effective methods and technologies of training, the creation of a favourable psychological climate that contributes to the demonstration of personal abilities, increasing creative activity; creating a foundation for the implementation of an personalized adaptive model of learning; encouraging post-graduate students to self-education for improving their qualifications, promoting practical participation in international scientific contacts.

MATERIALS AND METHODS

In order to realize the above-mentioned conditions and provide mastering the means of scientific communication in a foreign language, the KhNAHU Department of Foreign Languages have developed and implemented a training course for postgraduate students, which was designed in two versions – the traditional paper edition "The manual in the English language for technical university postgraduate students" [8] and its online version, developed with the use of such a modern approach to teaching languages as audiovisual translation (AVT).

The main problem that arose while planning the course was how to prepare learners with different levels of knowledge for intercultural scientific and business communication for 48 academic hours, that were allocated for teaching a foreign language by the university's educational and scientific programs for postgraduate students of all specialties. It was decided to divide the course into three main modules – reading general scientific texts containing vocabulary characteristic of academic discourse, academic speaking (preparation for intercultural oral scientific communication) and academic writing (training in writing abstracts, articles, grant applications, summaries, preparation of a list of references, etc.). In addition, postgraduate students with elementary and pre-threshold levels were offered a grammar course covering all the basic

grammatical topics necessary to construct correct written and oral utterances.

One of the prioritized components in foreign language training of postgraduate students is the mastery of scientific terminology related to their specialty. But, as the authors of the course claim, at the beginning of studies, authentic materials should have a popular science character, be understandable not only for postgraduate students as specialists in a certain field, but also for a foreign language teacher, who, as a rule, does not have additional technical education. And only after postgraduate students get used to easily operating general scientific vocabulary in receptive and productive activities, it is advisable that they move on to work with narrow-profile materials.

A separate section of the course deals with the preparation of future scientists for participation in international scientific conferences where English is used as the working language. Dialogues and exercises offer lexical conversational samples, the acquisition of which will help postgraduate students develop oral communication skills and overcome communication barriers with foreign colleagues. Postgraduate students learn to participate in any conversation or discussion of a scientific or academic nature, using idiomatic expressions and colloquialisms; study modern scientific literature in their specialty for the preparation of a dissertation research, which allows them to expand and deepen their professional competence.

The section "Academic writing" involves learning the Western manner of constructing an article based on the IMRAD model (Introduction – Methodology – Results – Discussion), writing abstracts, grant applications, drawing up a list of references according to various international standards.

The course offered an opportunity to master the most problematic and complex lexical-grammatical constructions. It was provided with videos for each topic, which were placed on an Internet platform [9], and listening to which allowed to practice the educational material at a time and place convenient for the postgraduate student. This enabled learners to independently master the language, which is the most modern trend in the world educational process and makes this course unique. The course also appeared useful when writing scientific articles and reports in English. Working with the course was supposed to contribute to the acquisition of integral, general and professional competences, which are necessary for the implementation of research and innovation activities.

Concerning the videos, they were developed using the audiovisual translation method. AVT as a modern trend in language teaching has a huge potential for learning a foreign language in personalized learning [10], [11]. In our approach, students were offered video and audio materials with parallel translation into the students' native language,

i.e. Ukrainian in our case; they were provided with a bilingual script, as well as recording of new words and texts in both languages for independent study. Thus, students saw the translated printed text, which provided them with the full semantic and pragmatic content of the statement in the shortest possible time. They repeated new words and phrases in pauses and then listened to the correct pronunciation. The postgraduate students were able to watch and listen to the videos as many times as they needed, at any time and in any place convenient for them.

In the classroom, the teacher used already learned material in new contexts, varying it with the help of substitutions, transformations, extensions and new combinations. For self-study, the course was provided with self-tests.

During the course implementation another modern approach – the flipped classroom technology – was used.

The idea of this technology is that the main stages of the teaching and learning process, such as classroom activities and homework, change places. It means that the theoretical material is studied by students on their own by watching videos and listening to audio lectures recorded by the teacher, or preformed materials downloaded from websites on the Internet, while in the classroom the students are involved in fulfilling practical tasks and discussion of problematic issues [12].

After careful working out the course material, the postgraduate students were prepared for independent scientific activity in a foreign language related to their specialty. They necessarily took part in a scientific conference organized by the Department of Foreign Languages with the invitation of specialists from other departments and postgraduate students from other universities and the publication of an article on the topic of their dissertation research in the annual collection of student scientific papers, “Studentship. Science. Foreign Language” which is published by KhNAHU.

Participation in the conference enabled the postgraduate students to demonstrate their skills and ability to communicate in a foreign language, to express themselves productively on professional and scientific topics, to effectively present the results of the conducted research (description of graphs, tables, diagrams, schemes; the use of appropriate terminology), to take part in discussions.

In the process of learning a foreign language of a scientific direction, special attention was paid to the peer-to-peer method. We offered postgraduate students to give a lecture or conduct a training on the topic of their research in a foreign language to Master’s students of the same specialty during a foreign language class. If postgraduate students took an internship, they could prepare a presentation in order to acquaint Master’s students with the experience of conducting similar training in other educational institutions, etc.

RESULTS AND DISCUSSION

This study aimed to investigate the effectiveness of the AVT technology when implemented for the postgraduate English learning course. The research questions were as follows: 1. What were the learners’ achievements after the study of the course with the use of AVT technology? 2. How did the level of self-directedness change in the process of the course study?

Using the method of randomization, an experimental group (EG) of 32 people and a control group (CG) of 33 people were gathered. The EG postgraduate students studied a foreign (English) language course during the 2021-2022 academic year with the use of the AVT approach while the CG postgraduate students used the traditional paper version of the course.

The students attended twenty-four 90-minute class periods during the academic year with a big emphasis on the independent out of class work. The EG postgraduate students were expected to watch and listen to the videos designed with the AVT approach. The CG postgraduate students used only the paper version of the course.

The mixed-methods design was used to explore the learners’ achievements with and without the AVT approach and their self-directedness in language learning. The independent variable was the classes which included the English postgraduate course content. The dependent variables included the learners’ achievements and their self-directedness in English learning. The first dependent variable was measured by comparing the pre-test and post-test results. The second dependent variable was measured using the questionnaire and informal group interviews.

The performance test was used to evaluate the learners’ proficiency regarding various language skills in academic speaking, reading and writing before and after studying the course.

The test consisted of one hundred test items including multiple-choice questions, true/false questions, cloze tests, “odd one out” items, matching items, transformation items, listening and speaking test items, etc. The total score for the performance test was 100 points.

Then, the number of correct answers for each student was calculated, and the level of language proficiency was determined. If the number of correct answers was more than 80%, the level was assessed as high, 60–80% – as sufficient, and less than 60% – as elementary. The dynamics of the change in the number of students with different levels of language skills is presented in Fig. 1.

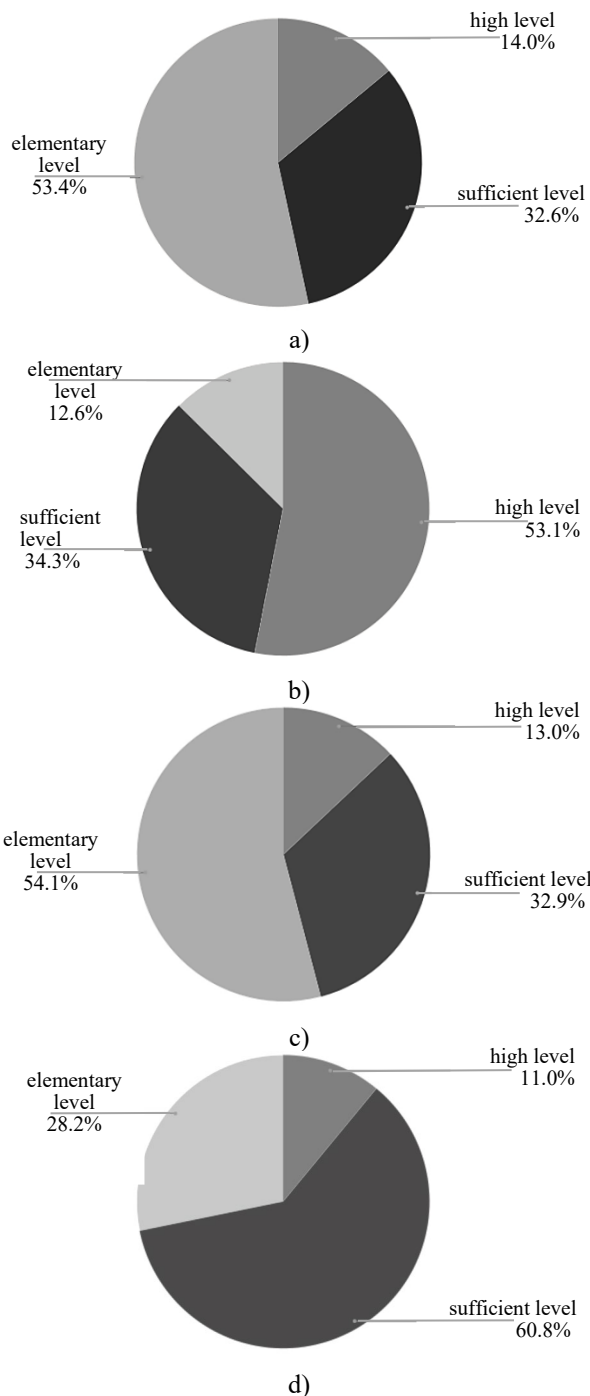


Fig. 1. Changes in the number of students with different levels of language skills: a – experimental group (ascertaining data); b – experimental group (control data); c – control group (ascertaining data); d – control group (control data)

These data confirm that the proposed approach contributed to the improvement in the postgraduate students' skills in reading, speaking, listening, and writing in the area of the academic and scientific discourse.

To receive the indicator of self-directedness the postgraduate students were asked to answer the following items of the questionnaire (Table 1) with the rank ordering

from 1 to 10 developed by [13] though adapted to our purposes:

TABLE 1 LIST OF ITEMS

No.	Item
1	I can see the benefits for my work and/or personal development from completing the course.
2	I monitor how much I have achieved in terms of learning at each stage of a course.
3	I know what I want to achieve in terms of learning from the course.
4	I am at a loss as to what I should be learning over the duration of a course.
5	I find time to study the learning materials in a course.
6	I do not know what I'm supposed to be doing whenever I sit down to study.
7	I feel that I have too much to accomplish in terms of learning towards the end of each course.
8	I do not submit my assignments on time.
9	I plan what I need to learn in a course.
10	I keep postponing my study tasks designated in a course.
11	I prefer to do other things than study the learning materials of the course.
12	I find excuses for not studying for courses.
13	I follow my study schedule.
14	I cannot focus during online presentations and practical classes.
15	I relate the content of the learning materials or resources to my work or life.
16	I do well on my assignments.
17	I love attending practical classes.
18	I am physically drained when I am studying.
19	I feel motivated whenever I am studying.
20	I am demoralised when I do not meet the expectations I set for myself in my studies.
21	I do not worry about not submitting my assignment on time.
22	I do not understand what is required of me when tackling the questions in tests.
23	I feel confident when taking tests.
24	I am very comfortable using a computer.
25	The internet provides me with a wealth of resources for my assignments.

The questionnaire was completed via an online survey tool. The online tool enabled the participants to enter their inputs directly into the system that allowed to collect and generate data swiftly.

Points scored by each student were summed up and the arithmetic mean for one student in the group was determined by the formula:

$$X = \frac{1}{n} \sum_{i=1}^n x_i \quad (1)$$

n is the number of students in the group; x_i is points of the i -th student.

Changes in the character of self-directedness were evaluated according to the Stoeffler's ratio, which can be presented as $D = X_2 - X_1$, where D is the result of the change, X_1 is the average point before the experiment; X_2 is the average point after the investigation. Thus, for the experimental group, the average point X_1 before the experiment was 33.6, and after the experiment $X_2 = 76.7$, which means that $D = 43.1$. In turn, for the control group, X_1 was 31.3, and X_2 was 44.5, and, accordingly, the value D was 13.2. The difference of values D in both groups strongly supports the effectiveness of the proposed approach.

Williamson [14] stated that those with a moderate level of self-directedness are already halfway from becoming self-directed learners. However, they need to recognize and evaluate a few areas for improvement, and some strategies might need to be adopted together with a teacher's guidance if necessary. Those with a high level of self-directedness may need to maintain their progress by finding effective and suitable methods to strengthen their self-directed learning.

Self-directed learning does not mean it is all up to you; rather it is a collaborative approach to identifying the learner's strengths and weaknesses with respect to the programs outcomes and then working constructively on building strengths and developing capacity in areas of weakness.

As to the flipped classroom approach, it can be considered pedagogically sound because it provides personalized-differentiated learning and student-centered instruction though it has both pros and cons. Among the pros the following can be pointed out: learning at one's own pace, advance student preparation, overcoming the limitations of class time, increasing the participation in the classroom. Among the cons are the possible students' lack of equipment and unlimited access to the Internet resources; there is also no way to guarantee students will adapt to the flipped model immediately while the technology completely relies on their diligent work on their own.

The approach means an extra workload on teachers who have to develop, record and upload lectures, which take time and skill, as well as carefully integrate newly developed resources into the classroom work. Although once designed, videos can be used an unlimited number of times in the future, which will provide teachers with significant convenience.

In general, the technology of blended learning which assumes the combination of e-learning and classroom activities leads to a new format of the educational course, a change in the type of communication and interaction between the teacher and the postgraduate students, and the organization of the postgraduate students' independent cognitive activities.

CONCLUSIONS

The training of postgraduate students in technical universities of Ukraine involves not only the defense of the thesis in a certain field of research, but also the further development of foreign language scientific and professional communicative competence, which has a positive effect on the development of a personality capable of continuous professional self-development. The priority is given to training in English, which has firmly taken the first position in the field of cross-cultural scientific communication.

The effectiveness of foreign language training of postgraduate students depends to a large extent on the use of the latest methods and technologies of learning and effectively organized independent work.

The main advantages of blended learning using such a modern approach to language teaching as audiovisual translation are the openness and flexibility of the educational process, greater independence of postgraduate students from the place and time of classes, an individual mode of educational activity (the ability to individually choose the pace, rhythm and volume of educational material), the possibility to get quick feedback. The use of this approach has led to a significant improvement in language skills in scientific and professional communication and the consolidation of self-directedness in a foreign language study.

There are some suggestions for future research which have not been discussed in the present study.

The rapid development of information and communication technology has a great impact on language testing and assessment. In terms of practicality and test administration, online tests appear to be more practically administered as they save time of both, teachers and test takers. So, attempts should be made to propose a design of an online achievement test specifically devised for postgraduate students as nowadays many teachers prefer the online test to the paper-based test due to its efficiency.

In general, learner-centered e-learning technologies related to the formation of an active personality capable of independently organizing their professional and educational activities for continuous professional improvement require further development.

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