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Teaching technical writing in the process of higher professional education

Навчання технічного письма в процесі вищої професійної освіти

Summary. *The purpose of the article is to substantiate the need to teach technical writing skills to students of technical specialties and to highlight the main components of the technical writing course as a necessary component of professional training of students of technical specialties of higher education institutions. The approaches to teaching technical writing and its role in training students of technical higher education institutions are analyzed. The characteristic features of technical writing are considered. The methods of teaching used in the academic course of technical writing to form communication skills in the field of future professional activity of students are described. The mechanism of forming technical writing skills is revealed. Particular attention is paid to the use of the necessary vocabulary when writing written works in the process of technical writing and to taking into account the specific features of such works, in particular, the mechanics of writing, which involves a combination of a set of activities, such as writing individual paragraphs of a written work, combining them into a single whole according to a particular genre. It is noted that the structural elements of the essay, such as an introduction, description of the place of events, and description of a technological process and its results, should be combined with graphic elements if necessary. The advantages of acquiring technical writing skills are analyzed. From an academic point of view, the writing process consolidates the use of grammatical structures and allows them to learn the necessary vocabulary. The main types of essays used in technical writing are presented. It is emphasized that students need to apply the skills they have acquired from mastering academic writing. As a result, the urgency of technical writing skills for working out communicative competence in professional communication in a foreign language is emphasized.*

Key words: *technical writing course; professional training of higher education students; communication skills; writing mechanics; professional activity.*

Анотація. *Метою статті є обґрунтування необхідності навчання студентів технічних дисциплін навичок технічного письма та висвітлення основних компонентів курсу технічного письма як необхідної складової професійної підготовки студентів технічних спеціальностей вищих навчальних закладів. Проаналізовано існуючі в науковій літературі підходи до навчання технічного письма та його ролі в процесі підготовки здобувачів вищої освіти технічних вищих навчальних закладів. Розглянуто характерні особливості технічного письма. Описані методи навчання, які застосовуються в курсі технічного письма з метою формування комунікативних навичок в сфері майбутньої професійної діяльності студентів. Розкрито механізм формування навичок технічного письма. Особлива увага приділяється застосуванню необхідного вокабуляру при написанні письмових робіт у процесі технічного письма та на врахуванні специфічних особливостей таких робіт, зокрема – механіки письма, що передбачає поєднання комплексу видів діяльності, таких як написання окремих параграфів письмової роботи, поєднання їх в одне ціле відповідно до визначеного жанру. Зазначається, що структурні елементи есе, такі як вступ, опис місця подій, опис технологічного процесу, наслідки або результат цього процесу, висновки повинні за необхідності поєднуватися з графічними елементами.Розглянуті переваги набуття студентами навичок технічного письма, оскільки з академічної точки зору процес письма закріплює використання граматичних структур і надає їм можливість вивчити необхідну лексику. Наведено основні типи есе, які застосовуються в процесі технічного письма. Наголошується на необхідності застосування студентами навичок, отриманих ними в курсі засвоєння академічного письма. Як результат, зазначається важливість навичок технічного письма для розвитку комунікативних навичок в професійному спілкуванні іноземною мовою.*

Ключові слова: курс технічного письма, професійна підготовка здобувачів вищої освіти, комунікативні навички, механіка письма, професійна діяльність.

Introduction. The modern world is a world of rapidly developing science and technology. Computers and other technical devices offer a wide range of possibilities for creating all kinds of documents, e-mails, and faxes required by enterprises and organizations in various production and management processes. Thus, a person who expresses an idea in writing must be familiar with the means for preparing, organizing, and presenting ideas. From an academic point of view, the process of writing helps students learn a foreign language, reinforces the use of grammatical structures, and allows them to learn necessary vocabulary and idiomatic expressions. Moreover, the writing process activates both thinking and practical skills. If the goal of learning English is to master the language perfectly, writing should become a significant part of the curriculum.

It is considered that students will be able to communicate effectively in the professional field if they acquire knowledge of their professional terminology, learn the basics of professional communication, and develop

technical writing skills in a foreign language. English for Professional Purposes is a necessary prerequisite program whose aim is to provide students oftechnical higher education institutions with basic knowledge of their professional vocabulary and rules of the English language grammar.

The motivation for introducing a course in technical writing is that writing instruction in higher education is limited to developing academic writing skills. The basis of this phenomenon is the disconnection of writing instruction from the field of application – students' future professional activities. Thus, this article emphasizes the necessity of teaching students efficient written communication in the field of their specialization. A technical writing course should be related to professional activity and should prepare students for their future professional activities.

Since the previous century,the issue of technical writing has been a point for discussion among researchers and professionals. Thus, B. Weber raised the question of whether technical writing skills are a result of aptitude or interest [14].

British methodologists and representatives of other world linguistic schools pay considerable attention to the development of methods for developing writing skills. C. B. Solés et al. worked out a Guide in technical writing for effective communication among participants of professional discourse [13]. K. Kaushik presented an overview of technical writing, characterized the activities of a technical writer, and the opportunities provided by technical writing [6]. B. Henze et al. presented research on specific technical communication genres [5]. J. Miština analyzed specific traits of technical writing skills for students majoring in engineering and science studies with a focus on errors in technical texts and their reasons [9]. N. K. Dubey reflected on the importance and scope of technical writing skills, such as specific registers, structure, and definite sets of vocabulary [3]. Researchers M. C. Garcia & B. C. Bondoc concentrated their studies on technical writing within the Information Technology (IT) sector. They focused on the pedagogical strategies that facilitate comprehension of complex technical topics by students specializing in IT [4]. W. Shenghua et al. presented team-based learning (TBL) instructional modules in their article [12]. D. Rus characterized the English technical discourse and highlighted the difference between 'expressive' and 'strategic' communication [10].D. Atkinson and S. Corbitt became the authors of the textbook 'Mindful Technical Writing: An Introduction to the Fundamentals' which is a complete guide for students interested in technical writing [1]. S. Last et al. contributed their manual 'Technical Writing Essentials. Introduction to Professional Communications in the Technical Fields', in which they elaborated on the specific features of technical writing and provided its basics [7].

Numerous research and textbooks in technical writing cover many aspects of its application in various situations. They are a valuable resource for practicing teachers and students. However, the methodological sources on this topic lack developments in technical writing courses aimed at developing the communication skills of future professionals. In addition, little attention is paid to the relationship between academic and technical writing, its mechanics, and its principles. These spheres require deep analysis and elaboration if the goal is to prepare professionals for various fields of human activities.

The article is intended to describe technical writing course specifics, namely those specific tools and components crucial for working out professional communication skills of students of technical specialties. So, the following objectives were set as:

– Highlighting the importance of technical writing for students of technical and engineering specialties;

– Working out prerequisites for a technical writing course;

– Determining the essential components of a technical writing course;

– Establishing a connection between academic writing and technical writing specifics.

Methodology/Methods. The methodological basis of the study is the activity paradigm, the main didactic principles of foreign language teaching, and a systematic approach to the analysis of pedagogical phenomena. To solve the research tasks, we used systemic, structural, analogies, and retrospective methods, which made it possible to identify trends and patterns in teaching technical writing. The content analysis consisted of studying the content of pedagogical documentation and performance results. It was possible to determine the effectiveness of teaching a technical writing course via pedagogical observation and testing.

Results and discussion. Learning a foreign language aims to enable one to communicate with other foreigners at the level of understanding, conversation, correspondence, and perception of written texts. Communication happens both in person and indirectly through television, computers, and other means of communication. Moreover, we can communicate with someone not directly in front of us but express our thoughts in a written text because oral and written speech are not separate systems. They constantly interact and coordinate with each other.

Writing is a productive skill that is exclusively a human activity. It is the product of the interaction of the intellect, the inner world of a person, and the technical means used to create a text. A written text originates in thoughts – the process of thinking that produces ideas put on paper or through other means, such as digital devices in electronic documents. The writing process goes through certain stages and is a creative process.

This indicates the need to combine several activities, such as writing separate paragraphs of a written word and making them a single whole by a particular genre. Thus, the writing process is a process of interaction between several activities that involve conscious effort and regular practice. While speaking and listening are developed through language learning, reading and writing are not always easy, even for native speakers. Therefore, these skills should be given special attention when learning a foreign language.

It should be noted that the acquisition of writing skills is possible only if certain cognitive operations and physical actions interact. A study of written texts reveals the interaction between various components involved in forming writing skills. For example, working out writing skills requires the interaction of such constituents as vocabulary, writing mechanics, and the organization of texts into sentences, paragraphs, and essays. Vocabulary includes both basic vocabulary and idiomatic expressions. Writing mechanics combines spelling, punctuation, and calligraphy. Each of these components plays a role in written discourse. For example, consider the following sentence:

After I had checked in, I made my way to the departure gate.

The sentence consists of 13 words. It is formed according to grammatical rules and conveys meaning. Therefore, we consider this sentence to be correctly constructed. All words in the sentence interact with each other according to grammatical rules and sentence construction:

1. The agreement between subject and predicate that conveys the complex relationship between grammar and vocabulary.

2. Internal cohesion in a sentence based on the interaction between its organization and transition signals.

3. The content of the sentence is appropriate and adapted to a particular audience.

4. The sentence follows the rules of punctuation as required by the relationship between the vocabulary and writing mechanics.

This pattern proves that the development of writing skills is a combination of means and ways of interaction. When the appropriate combination of tools and means is used at different levels, the result of communication will be effective. More effective interaction can be achieved depending on the nature of the discourse. In a paragraph, an essay, or a story, a wider range of means and ways of interaction can be demonstrated.

The basis of writing skills is the use of the appropriate vocabulary. The vocabulary provides the basis for developing writing skills and acquiring new knowledge. Writing is not only a means of achieving some goal. It is also the activity that combines the purposeful process of writing a text

with cognitive activities aimed at developing other skills or mastering content. For example, a written response to a problematic article combines writing and reading. Contrasting purely academic writing, technical writing is more specific, as it conveys technical information, has a special purpose, and takes place in a specific professional situation. Technical writing also uses the most effective means of communication [8]. Moreover, it is aimed at a particular audience. The purpose of such writing, used in a specific context is to present technical information in written form exclusively but also in graphs, animation, video, and audio materials. Technical writing can also be called professional or business writing because it occurs in a professional or business context. It is aimed at achieving professional goals. Besides, it is addressed to a wide range of readers. Some of its readers may have different perspectives. Technical writing requires additional work with papers and e-mail. It should be understood that it may be read by an audience unknown to the author. Technical writing requires legal responsibility for the author and the organization he represents.

Researchers identify such sufficient features of technical writing as:

– "It arrives by the date it is due.

– It is well designed. It makes a good impression when it is picked up, handled, and flipped through or read online.

– It has the necessary preliminary or front matter to characterize the report and disclose its purpose and scope.

– It has a body that provides essential information and that is written clearly, without jargon or padding.

– When appropriate, it uses tables and graphs to present and clarify its content.

– It has, when needed, a summary or set of conclusions to reveal the results obtained.

– It has been so designed that it can be read selectively – for instance, by some users, only the summary. by other users, only the introduction and conclusions. by still other users, the entire report.

– It has a rational and readily discernible plan, such as may be revealed by the table of contents and a series of headings throughout the report.

– It reads coherently and cumulatively from beginning to end.

– It answers readers' questions as these questions arise in their minds;

– It conveys an overall impression of authority, thoroughness, soundness, and honest work" [11, p. 20].

Technical writing is a complex of activities, systems, processes, and methods. The basics of technical writing consist of components such as:

– writing a descriptive essay;

– a process essay;

– compare and contrast essay;

– causes and effect essay;

– definition essay;

– an essay that presents persuasion and argumentation.

A technical writing course can be incorporated into the curriculum for a Bachelor's degree as an optional component or become a part of the English for Professional Purposes program. In either case, students are supposed to achieve better results in their professional activities after the course completion. The main goal of the course is to provide students with basic knowledge of technical writing, namely professional vocabulary, mechanics of writing, and proficiency in written communication in the sphere of their specialization. As a result of completing a course in technical writing, they are to become fluent in professional communication and obtain a solid basis for future success in their professional activities.

Although the fundamentals of academic writing are the same as those of technical writing, the outcomes students get from completing an academic writing course are quite different from those of a technical writing course. Successful compiling a technical writing report often depends on the professional setting. Thus, a description can be used equally in academic and technical writing courses. However, in a technical writing course, description allows students to create a report from the place of professional activity, a business trip report, etc. It can be a report on a research study.

A process essay can be a step-by-step description of technological processes and product specifications. These are typical projects in professional activities. All these types of essays are intended to help students create a wide range of reports to convey technical information.

Working out writing skills in general and technical writing in particular aims to increase the effectiveness of communication or students' communicative competence. Communicative competence explained by C. Brumfit "involves knowledge of the rules of language and the generally accepted rules of communication and interaction" [2, p. 112]. Learning the rules of the language does not guarantee the development of communicative skills. This requires an adequate interaction between the knowledge of lexical items and the actualization of this knowledge in actual communication. According to H. Widowson, "communicative competence refers to the knowledge of the grammatical system of the language as well as to the practical use of the language" [15, p. 59]. It refers to the language as a whole and considers language learning a creative process. Communicative competence is the interaction between language knowledge and its use between the speaker and the listener. It is

the relationship between the process of communication and the product of communication, as well as between the message and the mediator.

A technical writing course must have all the necessary components for applying a sufficient amount of reflection and practical activity, which is why the study of this course contributes to the improvement of students' communicative competence. As a result of studying the technical writing course, students will master the skills of writing reports from the place of professional activity, describing technological processes, providing instructions for the operation of devices, writing research reports, providing recommendations and expert opinions, forming extended definitions, writing letters of inquiry and letters of complaint. These types of technical writing can be presented in the form of business correspondence, including electronic correspondence, formal reports, oral reports, including informal Internet documents.

Important points to consider in a technical writing course are the analysis of the task (writing technical documentation) and the target audience, writing in a team (group of students), sentence organization and style, grammar, stylistic responsibility of vocabulary and punctuation, transition signals, discourse mechanics, abbreviations and symbols. Particular attention should be paid to such elements of technical documents as headings, lists, footnotes, tables and diagrams, and illustrative graphs.

The methods used for teaching technical writing are to familiarize students with the necessary vocabulary, in particular, transition signals, which help to convey the content of certain types of professional activities and to organize the structure of the text correctly.

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For this purpose, educational materials selected by the teacher are used. The analysis of these materials is accompanied by a selection of vocabulary necessary for students and their independent search for authentic information from English-language sources (newspapers, magazines, electronic publications).

As a result of this work, students get a task to write an essay. This activity is preceded by students' suggestions of ideas for writing it. This technique is known as brainstorming. All students in the group suggest ideas and work out strategies for writing an essay. The actual writing of the essay is an individual activity. A mandatory step is for the teacher to check students' essays and then give feedback on their work. Working in pairs is an effective teaching method in a technical writing course. Students can demonstrate their skills and knowledge to create one joint essay out of two

already written individually after receiving feedback from the teacher. This collaborative work is also subject to revision and should receive feedback from the teacher. A useful technique for working on mistakes is when the teacher offers an example of a sentence that should be corrected. Students discuss these sentences and offer corrected versions. Finally, the teacher gives his or her version of the correct sentence.

The final step in the process of work on the technical writing course is that students write an individual control task – an essay with the addition of graphic components, if necessary. The essay should have certain structural elements, such as an introduction, a description of the scene, a description of the technological process, the consequences or result of this process, and conclusions. The topic for the essay is chosen from the students' professional field activities.

Students work on the control task independently. The final draft of the essay is checked and marked by the teacher. It is the teacher who evaluates the correspondence of the essay to the standards of technical writing.

Conclusion. The article highlights the main features of a technical writing course as a necessary component of professional training for students of technical specialties in higher education institutions. The methods of teaching used in the course of technical writing to form communication skills in the field of future professional activity of students are described.

The prerequisites for a technical writing course are a good command of grammar, knowledge of professional terms, awareness of the processes in the field of activity, understanding of the mechanics of writing the above-mentioned types of essays, and principles of their coherence.

The essential components of a technical writing course are working out the principles of its organization, the choice of textbooks and manuals, outlining the procedure of the course, namely the elements of instruction, collaborative work in teams and pairs, stages of work on the course, and methods of assessment.

The technical writing course allows students to put into practice all the skills they have developed in the academic writing course. At the same time, the technical writing course will help students develop their communication skills in English and make their professional communication more effective.

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