

ЛІНГВОДИДАКТИЧНІ ПІДХОДИ ДО ВИКЛАДАННЯ ФІЗИКИ АНГЛІЙСЬКОЮ МОВОЮ У ВИЩІЙ ОСВІТІ

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Анотація: У статті обґрунтовані сучасні лінгводидактичні підходи до викладання фізики як науки та навчальної дисципліни у вищій школі на прикладах, як із зарубіжної практики, так і на вітчизняних теренах, зокрема, англійською мовою. Методи дослідження запозичені із філології та лінгвістики, педагогіки вищої школи. Головною метою застосування лінгводидактичних методів є розвиток комунікативної іншомовної компетентності здобувачів вищої освіти. Особливо значущим видається застосування інтерактивних технологій у малих навчальних групах та у проєктному навчанні. У вишах України, де вивчається фізика, зокрема, англійською мовою, застосовуються технології ESP та EAP. Методика англійської лінгводидактики також використовує електронні портфоліо, веб-квести та мультимедійне середовище, з метою створення платформ для захопливої практики та саморефлексії як для викладачів, так і для студентів. Результати дослідження зафіксовано у висновках: 1. лінгводидактичні підходи у викладанні фізики англійською мовою у вишах мають цікаву історію та досвід; для України цей досвід і практика мають певне стратегічне значення; 2. основною метою реалізації методики лінгводидактичних підходів у викладанні фізики англійською мовою у вишах є опанування простору ESP та EAP.

Ключові слова: лінгводидактика, фізика, методика викладання, англійська мова, фізика як наука та навчальна дисципліна у вишах.

1. Вступ (Introduction)

In the context of the development of the global information society, coupled with the use of the latest information and communication technologies, the attitude towards physics as a science and an academic discipline in universities is significantly transformed. We are talking about the strategic importance of implementing its achievements in important areas of public life, especially such as space exploration, the intensive development of techniques and technologies that can significantly affect the course and results of military operations - the main drivers of world geopolitics and economics, as well as the lives of ordinary citizens.

These moments are of particular importance in the life of modern Ukraine, which is experiencing the most difficult period of its existence, the life of the people, etc. Despite the difficulties and modern threats, physics as a science is developing. Its development is influenced by many factors and factors of global importance. At the same time, it has suffered losses of both a human nature - physicists died or disappeared - students, graduate students, teachers and scientists - this martyrology contains 172 surnames, and actually technical, technological and organizational - scientific research and experimental and educational institutions were destroyed (partially or completely). Despite these losses, the state is making incredible efforts to restore them and continue scientific developments in this important strategic field.

Of particular importance in this area is the training of personnel in the system of universities in Ukraine. In this regard, we note an important point: teaching physics as a science and academic discipline in universities in English - the lingua franca in international scientific and practical circulation - ensures the implementation of both scientific aspects and purely educational ones. Modern projects are successfully implemented within their framework, which have both internal and external application - taking into account cooperation in this area with leading countries of the Western world. The key area in this space is English-language linguodidactics, which has many years of practical experience and important theoretical and methodological significance. For Ukraine, this experience is practically new, its assimilation and development of domestic foreign-language linguodidactics have good prospects, especially in the sense of Ukraine's accession to the EU and a certain relationship to NATO.

2. Об'єкт і предмет дослідження (Object and Subject of Research)

The object of the research is the space of higher education. Subject of the research: linguodidactics as an approach to teaching physics in universities as a science and academic discipline in English.

3. Мета дослідження (Research Objective)

The purpose of the article is to review methodological and methodological approaches to studying the phenomenon of practical linguistics and pedagogy – linguodidactics, considered in the light of teaching physics as a science and academic discipline in universities in English as a foreign language in relation to the native language – Ukrainian

4. Аналіз літератури (Literature Review)

Modern achievements indicate that didactics, which consists of linguodidactics as a subject-didactic component, in particular, is a central part of pedagogical sciences. It is based on the didactic concept, coexisting with pedagogical sciences. At the same time, it is related to communicative language proficiency and communicative language teaching. According to Pertti Kansanen (Emeritus Professor of Education, Department of Teacher Education, University of Helsinki), [1, ss.108–109], what is common to different definitions of didactics is that the teaching process itself is considered as the object of didactics.

The word "didactics" comes from the Greek verb *didáskein* (*didaskein*), meaning "to teach, to present, to explain". According to David Hamilton (David Hamilton is an academic researcher from Umeå University. The author has contributed to research in topics: Curriculum & Higher education. The author has an hindex of 10, co-authored 29 publications) [2], the term *didaktiké techne* (*didaktikh tecnh; art of teaching*) refers to the practice of teaching; the term *didactic, didaskalos*, was historically used for teaching young people. David Hamilton, in his famous work "The Pedagogical Paradox", explains that in continental Europe there is a science of teaching (*Didaktik*), while in Anglo-American countries this term has been supplanted by the concept of "Pedagogy" or curriculum theory. D. Hamilton also claims that contemporary Anglo-American pedagogical discourse is very close to continental European didactic discourse.

According to Pertti Kansanen (Pertti Kansanen, prof.em. of education, University of Helsinki, Vahvistettu sähköpostiosoite verkkotunnuksesta helsinki.fi) [3, s.81], in the German tradition, didactics is associated with theory, while the Anglo-American tradition (rooted in educational psychology) is characterized by empirical accents.

Thomas Kroksmark (a Swedish scientist, teacher and professor in the field of education and didactics, author of a number of academic works on pedagogical intuition and digitalization of learning), [4] believes that the concept of pedagogy is similar in content to the concept of teaching; it is close to the continental European concept of didactics or the science of teaching. In his opinion, in continental European terminology, pedagogy is understood more broadly - it concerns both education and teaching.

Tella, S. & Harjanne, P. [5] compiled a comparative table of the relationship between the main interpretations of didactics and pedagogy in the German and North Atlantic traditions:

	German	Anglo-American
Didactics	Not relevant to the theory	Not applicable; instead defined as curriculum, teaching methods, pedagogy; related to educational psychology; focuses on empiricism
Pedagogy	Education (training and teaching)	No established meaning; has become more widespread since the 1970s; is close to the European concept of didactics

It should also be noted that the theoretical foundations of the post-methodical paradigm in teaching foreign languages were initiated in the works of foreign researchers at the end of the 20th and the beginning of the 21st centuries. The principles of Douglas H. Brown [6] and the works of B. Kumaravadivelu [7] played a key role in the formation of this direction of linguodidactics - they

initiated the reorientation of foreign language teaching methods from rigidly fixed methods to a flexible, contextually determined pedagogical approach, which is aimed at the practical competence needs of applicants, in particular, higher education, and at the professional autonomy of the teacher.

H. D. Brown formulated twelve principles of language teaching: he divided them into cognitive, affective and linguistic [6]. У їхньому ряду він виокремив наступний принцип: "...11. Second language learners tend to go through a systematic or quasi-systematic developmental process as they progress to full competence in the target language. Successful interlanguage development is partially a factor of utilizing feedback from others. Teachers in language classrooms can provide such feedback, but more important, can help learners to generate their own feedback outside of the language auditorium..." [6, p.13].

In short: G. Douglas Brown, Professor Emeritus of English at San Francisco State University and a **pioneer of English as a Second Language (ESL/EFL) pedagogy**, is best known for developing a communicative, learner-centered framework. His seminal works, such as *Principles of Language Learning and Teaching* and *Principles-Based Teaching*, combine theoretical linguistics with practical classroom methodologies. H. Douglas Brown revolutionized English language teaching (ELT), moving away from traditional rote memorization methods to interactive, meaningful communication. His works emphasize the importance of studying the psychology of the learner, the sociocultural context of language, and communicative competence. The linguistic principles he invented explore the nature of language itself. Key concepts he applied include communicative competence, the relationship between language and culture, and more.

Bala Kumaravadivelu, professor emeritus at San Jose State University (California, USA), substantiates the following basic parameters of post-methodical pedagogy: a) the parameter of particularity involves taking into account the local socio-cultural and institutional context of learning; b) the parameter of practicality consists in the close relationship between theory and pedagogical practice; c) the parameter of possibility is focused on the development of critical thinking, autonomy and social consciousness of participants in the educational process [7].

Other researchers have also made a significant contribution to the development of the post-methodical approach, in particular, D. Larsen-Freeman (2008), as well as J. Richards (2008) and P. Pennycook (2001) – they emphasize the research attention on the role of content context, critical thinking and pedagogical autonomy of the teacher.

In particular, Diane Larsen-Freeman (1946-), an American linguist, professor emeritus of education and linguistics at the University of Michigan in Ann Arbor, is known for her work in the field of second language acquisition, in particular, English as a second or foreign language, language teaching methods, teacher education and English grammar, etc.; it examines the process of learning a foreign language through the prism of the theory of complex dynamic systems, emphasizing that learning a foreign language is a nonlinear process in which numerous variables interact – cognitive, social, emotional, and contextual [8].

Alister Pennycook (Australian applied linguist, Honorary Professor of Language, Society and Education at the University of Technology Sydney; is known for his work in the following areas: critical analysis of the global spread of English, critical applied linguistics, critical philosophy of language, etc.), characterizes foreign language learning as a socially conditioned practice related to issues of identity, culture and power, etc. [9].

Yana Bondaruk, Candidate of Pedagogical Sciences, Associate Professor, Associate Professor of the Department of English Language and Teaching Methods of the P. Tychyna Ukrainian State University, analyzing the current state of foreign language teaching methods, addresses the application of the post-methodical approach in teaching foreign languages, emphasizing that in real educational practice, traditional teaching methods continue to play a leading role. In her opinion, this indicates a limited practical implementation of post-methodical ideas in the domestic educational space. The researcher also claims that there is a gap between the theoretical understanding of the post-methodical paradigm and its implementation in the modern educational process [10].

Research in the field of functional linguistics has significantly influenced the process of learning foreign languages, contributing to increasing the efficiency of managing the language acquisition

process through the allocation, first of all, of language functions (both grammatical and lexical) and language units. In this sense, the principles and rules of interlingual communication expressed in the postulates of G. P. Grice, J. Leach, S. Levinson, etc. are practically important.

According to Sofia Nikolaeva (KNLU, Doctor of Pedagogy, Professor), linguodidactyla is the theoretical basis of language teaching methodology, aimed at scientifically substantiating the goals, content and principles of language education [11].

Olesya Tserkovnyak-Gorodetska, Candidate of Philological Sciences, Lecturer at the Department of Military and Humanitarian Disciplines at the Military Institute of Telecommunications and Informatization, states: linguodidactyla studies cognitive, social and psychological factors that influence language learning [12].

The main problem in the aspect of research is the study of physics as a science and academic discipline in universities in English, the lingua franca, the modern language of culture, science, technology, technological practice and specialized education. One of the approaches in this area is bilingual, when physics is taught and studied simultaneously in Ukrainian and English [13].

Another promising way to create a bilingual learning environment for physics is to use the CLIL (Content and Language Integrated Learning) methodology. The term CLIL itself was coined in 1994 by David Marsh (Fellow of the Royal Society of Arts, UK, Member of the EduCluster Finland Advisory Council and Director of MED. He has contributed to educational advancement in Finland over 25 years. He currently works on educational transformation in demanding environments, CLIL, and developing educational practices for digitally astute young people), denoting a methodology that is similar to language immersion and content-based learning. Theoretical aspects of CLIL are considered in the works of D. Coyle, P. Ball, D. Lindsay, Ch. Dalton-Puffer, M. Long, T. Nikula, D. Atkinson, etc.

In this aspect, Patsy Lightbown's (she is a renowned Canadian linguist and researcher in the field of second language acquisition (SLA), author of the renowned book "How Languages are Learned" (co-authored with Nina Spada) (she is a Professor in the Second Language Teaching Program at the Oxford Institute of National Engineers (OISE) at the University of Toronto, where she teaches graduate and undergraduate courses in second language (L2) learning and teaching. Her research focuses on whether there are more effective ways to engage students in communicative language learning, and whether different ways of focusing on language lead to different types of L2 knowledge and skills. She has participated in a number of international projects related to second and foreign language teaching and learning) approach to organizing constant feedback with students is meaningful - it provides an opportunity to understand the degree of assimilation of educational material and take into account its complexity; and to realize the opportunity to simultaneously obtain knowledge in the specialty and in a foreign language [14, p. 317). Her work formulates key patterns and principles of foreign language acquisition.

Do Coyle, Professor of Innovation in Education, University of Aberdeen, proposes a model that assumes that the subject matter/programme needs to be adapted for teaching in a foreign language in order to explore the subject matter from a different perspective, while simultaneously improving practical skills in mastering a foreign language (among other things, this refers to teaching physics in English) [15; 16].

The integration of content and language learning in English as an International Language (EIL) is found in approaches to bilingual education. These approaches include immersion, content-based learning (CBL), content-based language teaching (CBLT), and the English Medium of Instruction (EMI) movement [17].

In particular, EMI is practiced in the form of models that are used to achieve a holistic and global approach to foreign language learning. EMI involves the integration of language learning and content learning. In this context, the main focus is not on learning the language separately, but rather on learning the language through the study of the subject. The EMI curriculum is based on the core of the subject, using authentic language and texts. Thus, communicative competence is acquired through the study of specific topics in a specific subject area, particularly in physics [18].

The CBI approach can be compared to English for Special Purposes (ESP), which is usually designed for professional needs, or to English for Academic Purposes (EAP). The aim of CBI is to prepare students to learn a language using the context of any subject (in particular, physics) so that higher education students learn the language by applying it in a specific context. According to Brinton, Snow, & Wesche, the most common models for CBI are theme-based, sheltered, and adjunct courses. The theme-based course is usually an ESL course with a content orientation (rather than focus) whose goal is L2 competence within specific topic areas. In the theme-based course, the language instructor is responsible for both language and content, but students are evaluated primarily on their L2 skills [19]. Stoller & Grabe argue that "practically all instruction is theme-based" [20, p.7]. They argue that sheltered and adjunct instruction are "not alternatives to theme-based instruction [but] rather...two methods for carrying out theme-based instruction. For this reason, [they] see the two terms, content-based instruction and theme-based instruction, as interchangeable" [20, p. 7].

In general, we note that the integration of language and subject teaching is considered by the European Commission as a good way to achieve progress in the field of foreign language learning. The integration of language teaching allows you to effectively increase the level of English language proficiency of students in universities, teaching them the skills necessary for their professional success in various fields. Thanks to the integration of language teaching, students gradually gain better control over the English language: this contributes to their fuller participation in an increasingly complex academic and social environment.

According to Natalia Kononenko, the use of language and the acquisition of a subject (in particular, physics) occur naturally in real-life situations, in some way integrated with the learning process. The focus of this methodology is the subject of study (in particular, knowledge of physics and relevant competence skills), as well as the language and teaching methodology, which determine the form of learning [21, p. 821].

Modern researchers of English language teaching methods continue to develop the ideas of the communicative approach, focusing on its adaptation to the conditions of digitalization and the changing educational environment. In particular, Jeremy Harmer emphasizes the need to maintain a balance between the performance of communicative tasks and the conscious assimilation of grammatical material; the importance of combining the communicative approach with blended learning technologies and digital resources [22, p. 75].

J. Richards and T. Rogers consider communicative learning as a "*living method*"; they pay special attention to the development of the task-based learning (TBL) direction – they interpret it as an evolutionary stage of communicative methodology [23, p. 96].

In the article [24] the authors argue that modern linguodidactyly uses various new technologies such as interactive programs and applications, virtual and augmented reality, the use of online resources and social networks, machine learning and AI, etc.

Linguodidactyly is closely related to the process of teaching physics in higher education, in this aspect - in English. In this area, many works by domestic researchers have recently been published. In particular, the aspect of studying physics based on digital technologies is highlighted [25].

Anna Ilchenko [26] offers the latest approaches in the field of linguodidactics for higher education students in the military sphere.

Ensuring the formation of English-speaking communicative competence of higher education students in the physics and mathematics field was considered by O. Gulich, L. Konoplyanyk, O. Hofman, D. Yemelyanova, Shch. Tadeush.

The article by V. Malik [27] presents a brief overview of interactive methods of teaching a foreign language, in particular, developed in the work of N. Godovanets N. and V. Legan V. [28, pp. 60–62.].

The methodology for teaching English in a professional direction to students of non-philological specialties is given in the manual by R. Grishkova [29].

The use of smart technologies in teaching foreign languages to students of non-linguistic specialties was analyzed by G. Dovgoplova and A. Reshitko [30].

The analysis of interactive methods of teaching foreign languages to students of non-linguistic specialties is presented in the study of L. Onuchak [31] and others.

Nowadays, in particular, higher education institutions have joined in creating conditions that ensure knowledge of the English language by higher education applicants in accordance with the requirements of the standards.

In the process of studying English for professional purposes (ESP), the following authors' methods are used: Shpirko, 2009; Vashkiv, 2011; in the field of Content And Language Integrated Learning (CLIL) - Thompson & McKinley, 2018; English As Medium of Instruction (EMI) - Macaro et al, 2018; Han, 2023.

The EMI methodology has been adapted for Ukraine - EMI For Ukrainians (EMI-U). From policy makers' perspective, the most obvious benefits of introducing EMI in HE relates to a rise in universities' rankings as well as their increased competitiveness in the world education market (Coleman, 2006; Macaro, 2015; Galloway et al., 2017). It is claimed that using English as an instruction medium facilitates better access of those engaged in it to the latest scientific data publicized predominantly in English, the acclaimed academic lingua franca of today (Björkman, 2011).

The fundamental aspects and features of teaching English as a means of professional communication are thoroughly covered in the works of such researchers as N. Dmitrenko, Y. Budas (2023), A. Velyka, T. Nikishova, O. Pryshchepa (2024), L. Krysak (2015), O. Matienko, S. Buchatska (2022), O. Pometun (2005), O. Tsepkalo (2013). These developments laid the theoretical foundation in terms of understanding the specifics of foreign language training in non-language HEIs.

Thus, the main directions of development of linguodidactics and teaching English as a second language in the conditions of globalism, multiculturalism, and the general influence of English on culture and social life are defined. The indicated sources are important from the point of view of studying and practical application of linguodidactics in the fields of science and higher education. They have a continuation from the position of the current state of teaching English in universities of Ukraine, especially in conditions of war. The results of this study open up new prospects for the application of knowledge and practical competence and communicative skills in the field of English, in particular, in the areas of studying physics as a science in academic disciplines in universities.

5. Методи дослідження (Research Methods)

The main approaches in Linguistic didactics are: 1. communicative approach: it focuses on meaningful interaction and practical exchange of messages (information and knowledge); 2. task-based learning (TBL): real-life tasks and projects are used to stimulate language use; 3. content and language integrated learning (CLIL): academic subjects are taught in a foreign language; 4. bilingual/multilingual support: the native language of the higher education seeker is used as a bridge to understand new concepts, theories, and approaches in a specialized field, particularly in physics.

6. Результати дослідження (Research Results)

Language education – the process and practice of teaching a second or foreign language is primarily a branch of applied linguistics, but can be an interdisciplinary field. Language education is concerned with the processes and practices of teaching a second or foreign language. Its study reflects interdisciplinary approaches, usually including some aspects of applied linguistics [32; 33]. There are main categories of language education learning: a) communicative competences, b) language proficiency, c) intercultural experiences, and d) multiple literacies [34, pp. 266–268.]

Theories of language learning and acquisition, in particular foreign languages, belong to the set of theoretical knowledge necessary for the implementation of linguodidactics - didactics of foreign languages. They are a source of information and methodological guidelines for teaching languages in various teaching and learning practices.

Linguodidactics – a scientific discipline and language education, which is rising its origins in the 1970th years. Since these years, teaching languages aims to strengthen its theoretical foundations through the implementation of a truly integrative approach to the identification of main regularities of the pedagogical process of teaching foreign languages in order to create an objective scientific basis for evaluating the effectiveness of teaching methods and their further improvement.

Didactics of foreign languages considers the goals and objectives of the process of teaching and learning foreign languages; the methods used by teachers; how students process new words and grammar, as well as the cultural context in which interlingual and intercultural communication is formed. In this area, the following are studied: a) language skills: reading, writing, listening, speaking and mediation skills are developed; b) mastery of content: practical vocabulary, pronunciation and grammatical rules are taught in context; c) the content and forms of learning are adapted to the needs of the student, in accordance with motivation, age and future professional or cultural orientations.

In this context, the following key methods and trends are being implemented: 1) communicative approach: there is a shift from grammar exercises to active conversation and interaction in real life; 2) task-based learning (TBL): learners are offered specific projects or problems to solve using the target language; 3) multilingual focus: the learner's native language serves as a useful bridge for the development of new language skills.

In general, theories of language learning and acquisition are divided into four main categories: (1) nativist theories; (2) ecological theories; (3) interactionist theories. This division, in turn, is based on the works of Diane Larsen-Freeman [35; Larsen-Freeman, D. (Ed.) (1980). *Discourse Analysis in Second Language Research*)), as well as conclusions from James P. Lantoloph [36]. James P. Lantolf is the George and Jane Greer Professor of Language Studies and Applied Linguistics in the Department of Linguistics and Applied Linguistics at Penn State University; he is also the director of the Center for Language Studies and co-director of CALPER (Center for Advanced Language Education and Research). His recent publications include: "Sociocultural Theory and the Genesis of Second Language Development" (co-authored with S. L. Thorne), 2006.

In recent years, linguodidactics - didactics of foreign languages - and the methodology of teaching foreign languages, etc. - have undergone significant influence from the point of view of the development of information and educational communications, the phenomenon of multiculturalism, etc.

Didactics of foreign languages can be considered as part of subject didactics and pedagogy. At the same time, it is necessary to take into account the influence of changes that have occurred in related sciences, such as linguoculturology, in particular.

Didactics of teaching foreign languages (in particular, English) is a broad subject-didactic component of educational sciences with a research emphasis on the teaching-learning process, in which the study of foreign languages is as important as their teaching.

According to Pirjo Harjanne and Seppo Tella [37], foreign language didactics should be approached not only as a multi- or interdisciplinary approach, but as a transdisciplinary science with its own autonomy. This approach is based on the implementation of its following characteristics: a) purposefulness; b) cultural context; c) interaction (interactivity and communication); d) content; e) methods (forms).

Nowadays, they have acquired the qualities of open systems, within which a revolutionary transition from the traditional methodology of training to communicative language teaching is taking place. In this process, a significant shift has occurred from an emphasis on media to an emphasis on mediation. It is manifested, in turn, in an increasingly methodologically critical and eclectic approach.

Nowadays, foreign language education, foreign language teaching and views on second language acquisition, etc., have been strongly influenced in terms of changes in the concepts of knowledge and learning - in the direction of socioconstructivism and socioculturalism. In this context, a foreign language and a whole complex of linguocultural character play the role of a mediator that expands the communicative, linguistic and multicultural capabilities of the human personality [38].

Moreover, linguodidactics and foreign language teaching, etc. also affect the implementation of social, public and moral values as a complex of large structures of modern society, such as culture, education, science, information communications of all types and forms (real and virtual, etc.), intercultural interaction, etc.

According to Victoria Ignatenko, the post-methodical paradigm in the field of foreign language teaching is directly related to the current scientific and practical tasks of modern education, in particular, to increasing the effectiveness of foreign language teaching, individualization of the

educational process and training of competitive specialists in a multilingual and multicultural environment [39]. V. Ignatenko also proposes the introduction of the post-methodical paradigm into the practice of teaching foreign languages in higher education institutions of Ukraine. In her opinion, this opens up wide opportunities for updating the educational process beyond a radical revision of current educational standards and programs. The researcher claims that, based on the prescriptions for organizing the educational process proposed by G. D. Brown, they can be extrapolated and implemented into the modern educational environment of higher education institutions of Ukraine. According to Victoria Ignatenko, an important aspect of the application of post-methodical principles is the contextualization of the content of education [39, p.230].

In the practice of higher education institutions, this can be implemented through the use of authentic materials, professionally oriented texts, interdisciplinary tasks and learning situations related to the future professional activities of students. Such an approach contributes not only to the development of foreign language communicative competence, but also to the formation of the ability to use a foreign language as a tool for professional and academic communication.

The post-methodical approach also creates conditions for individualization and differentiation of learning, which is relevant given the heterogeneous level of language preparation of students in groups. By combining different forms of work (individual, pair, group), variability of tasks and use of elements of autonomous learning, the teacher can effectively respond to the needs of both strong and weak students, without violating the general structure of the course.

An integral component of post-methodical, person-centered learning, etc., is the formation of cultural and intercultural sensitivity, which involves the development of linguistic identity and competence in intercultural communication through discussion of cultural differences and the process of acculturation. This allows students to consciously integrate knowledge about another culture, adapt to a multilingual and multicultural environment, and also effectively interact in various social and professional contexts [39, pp. 176–177].

It is also possible to apply the positions of B. Kumaravadivel regarding the development of the professional experience of a foreign language teacher, support for his pedagogical autonomy, encouragement for creative, critical and strategic thinking, and prolonged professional development [40].

The positions of R. K. Kandel, an academic researcher and author who writes about education, critical thinking, and English language teaching, are practically applicable: they note the importance of increasing motivation in foreign language learning by students, developing academic autonomy, and a sense of involvement in the educational process while abandoning strictly regulated methodologies [41].

Traditional methodologies (grammar-translation, audiolingual, direct methods) continue to retain their value at the initial stages of learning, when it is necessary to systematize grammatical knowledge and lay the foundation of language competence. They provide accuracy, structure, and form a basic language foundation.

Communicatively oriented approaches (Communicative Language Teaching, Task-Based Learning, etc.) contribute to the development of practical communication skills, allowing students to use a foreign language as a tool for professional communication. These methods make learning more meaningful and closer to the real conditions of professional activity.

As Svitlana Isaieva notes, the communicative approach is considered basic in terms of teaching a foreign language; it is used to teach students to communicate in a foreign language in real situations [42]. For this, special tasks are used that reflect life circumstances and with the help of which students can work out the studied material, vocabulary and grammatical rules. Such tasks contribute not only to the acquisition of the necessary grammar and vocabulary and the improvement of speaking practice, but also to the improvement of listening comprehension, which allows improving communicative skills [42, p.372]. According to Svetlana Isaieva, the “Test-Learn-Test” technique is useful for explaining grammar or vocabulary after identifying gaps in students’ knowledge during the use of tests or exercises [42].

The use of the lexical approach involves studying words or phrases in context, confirming the relevance of the material proposed by the teacher and the likelihood of its use in everyday speech. The lexical approach is an effective method, since vocabulary is learned productively: students learn how and where words are used, how they can be used in sentences during the development of communicative situations. Usually this approach is used at the stage of teaching new material [43].

In turn, professionally oriented methods (ESP, CLIL, PBL, Case Method) are the most significant direction in teaching students of technical specialties, since they better ensure the integration of language and professional training. They develop students' ability to use English in a professionally oriented context [44].

Learning a foreign language for professional purposes differs from many other academic disciplines in that it requires practical skills and proven theoretical knowledge [45]. This applies to both hardware and software, as well as teaching methods used in the process of teaching students in higher education.

One of the most effective methods of teaching English in higher education is the creation of an interactive environment. Interactive teaching methods include technical means of learning (TSL) (computer and multimedia networks, the Internet) for controlling knowledge, storing and using educational materials.

Interactive learning is a form (type) of learning, the specificity of which is to immerse a higher education student in the process of interlingual and intercultural communication. At the same time, the effectiveness of foreign language acquisition by students of non-linguistic specialties (in particular, physics students) requires the presence of three main components of communication, such as: a) interactive (organization of interaction in a group of students while working on a project or tasks from the teacher); b) communicative (transmission and retention of verbal and non-verbal information in the group) and c) perceptive (perception and understanding of each other by students) [46, p. 3.].

The above components, by their structure, should determine the final result - obtaining the necessary specialized knowledge and communication skills by students; contribute to the full stimulation and motivation of the learning process; arouse educational and research interest in studying the chosen field of knowledge and science, etc. [31].

In the process of using interactive technologies for teaching a foreign language, active interaction of students is implemented during learning. They allow, based on the involvement of each project participant, to acquire new knowledge, to organize the collective activity of all participants in the educational process - from individual interaction of two or three people with each other (in small groups) to wide cooperation of a large number of students (large groups or distribution of responsibilities between groups) [47].

An integrated approach to content and language learning (CLIL) contributes to the study of, in particular, physics, in a foreign language. Such classes at universities are conducted in a foreign language: their main goal is to obtain knowledge in a special field of science and technology. Thanks to this method, the opportunity is realized to deepen knowledge of a special subject and practice communicative situations in a foreign language, as a result of which the horizons and worldview of students are significantly expanded, and the opportunities for using a foreign language in various aspects and areas are also increased [43].

From the point of view of CLIL teaching, teachers need special knowledge of the academic discipline (in particular, physics), competent skills in the target language (ESP and EAP) and the ability to use appropriate practical pedagogy [13]. It is important that the use of a foreign language (English) and the acquisition of the subject occur naturally in real life situations, integrated with the entire learning process. The focus of this process is learning - the subject (subject knowledge and skills), as well as the language and teaching methodology that determine the form of learning [21, p. 821].

An important type or form of interactive activity in the sense of increasing the effectiveness of learning a foreign language is discussion [48]. It is conducted between students; the teacher carefully monitors the course of the discussion, directs it. Moreover, its content may change depending on the

situation and significant arguments. In the process of teaching, in particular, physics, and taking into account English-language approaches to its interpretation as a science and academic discipline, it is very important to immerse yourself in a specialized professional language based on a discussion of the latest ideas, inventions, techniques and technologies. Students work in groups, and the teacher directs the exchange of thoughts and ideas, gradually expanding the English-language lexical field in the sense of actively using relevant English-language terms, concepts and categories, adding to this process knowledge and practical skills in grammar and ESP.

In this regard, we note: English for Special Purposes (ESP) is a subset of English as a second or foreign language. It usually refers to teaching English to university students with a specific vocabulary and skills. A particular ESP course focuses on a single profession or specialty, for example, technical English, scientific English [Esp-world.info]. English for academic purposes, which is taught to students during their studies, is one of the types of English for specialists-experts in a particular field.

In the ESP language, absolute characteristics are distinguished, such as a) English for specialists; in this sense, the basic methodology and characteristics of the activity it serves are used; b) English for specialists; here the main focus of attention is on the language suitable for these types of activities, in terms of grammar, vocabulary, register, learning skills, discourse and genre. English for Special Purposes (ESP) is taught at many universities around the world. Many professional associations of English language teachers (e.g. TESOL and IATEFL) have ESP sections. According to Lesya Myklash, teaching English for Special Purposes (ESP) has become relevant due to new requirements for modern educational standards [49].

The modern linguodidactic approach to learning a second foreign language (in particular, English) in higher education requires students to master specialized vocabulary (ESP) at the global and national levels, etc. In general, mastery of specialized vocabulary serves as an indicator of a specialist's professional competence within the framework of the integration of national economies, cultures, science, etc.; it is one of the communication tools designed for free access to new ideas and modern achievements in the field of professional activity [50, p. 184].

The vocabulary of the English subject area, as a rule, is an advanced tool designed to conduct constructive professional dialogue on a global scale, promoting cooperation in order to ensure effective management systems in the academic, scientific and business environment [49].

In general, we note: the problem of methodological support for the discipline "Specialized English" as ESP, etc., remains a priority area of modern linguodidactic research.

The modern paradigm of professionally-oriented English language teaching in universities is based on the formation of the ability of a future specialist to communicate effectively in relevant professional situations. According to Lyudmila Nemliya, the integration of professionally-oriented content into the process of foreign language training of students based on the contextual approach performs a dual function: a) cognitive: acts as a source of expanding the professional terminological vocabulary of a higher education applicant; b) instrumental: serves as a content basis for designing situational exercises. In turn, situational tasks, which have a pronounced communicative orientation, provide conditions for practical language acquisition through simulation of real work processes. The creation of educational and professional situations stimulates students to active speech actions, where the assimilation of foreign language material occurs naturally, in the process of solving specific production or scientific tasks [51].

Teaching ESP has much in common with English as a foreign or second language and English for Academic Purposes (EAP). English for Academic Purposes (EAP) is widely known as academic English. It involves teaching students, usually in higher education institutions, to use a language that is suitable for teaching. As with most types of foreign language teaching, EAP instruction utilizes essential vocabulary, grammar, and traditional academic skills (reading, writing, speaking, including pronunciation, and listening). These lexical and linguistic components are usually linked to the specific needs of higher education students.

The Ministry of Education and Science of Ukraine has developed the Concept of the Development of the English Language in Universities. This document defines the main principles of

state policy on the support, development and use of the English language in higher education in Ukraine. The Concept has identified two areas of implementation of the English language in Ukrainian universities. The first is English for professional purposes (English for Special Purposes – ESP), the second is the teaching of professional disciplines in English (English as Medium of Instruction for Ukrainians – EMI-U) (Concept of the Development of the English Language in Universities, 2019).

Taras Shevchenko National University of Kyiv uses both approaches — both ESP and EAP, depending on the purpose of study and the faculty. ESP (English for Specific Purposes) is English for professional purposes. It is used to study the language of a specific specialty (for example, for economists, lawyers or IT specialists), where working with narrowly specialized terms is important. EAP (English for Academic Purposes) is English for academic purposes. It is aimed at developing skills in writing scientific articles, participating in conferences, reading academic literature and conducting research. The university and its foreign language departments cooperate with international programs (in particular, with the British Council), combining these areas for undergraduate and postgraduate students.

For physics students at Taras Shevchenko National University of Kyiv, ESP (English for Specific Purposes) is used, since the training is aimed at mastering terminology and vocabulary specifically in the field of physics and astronomy. The study of ESP (English for Specific Purposes) focuses on professional vocabulary, readers of scientific articles in physics and communication in the specialty. At the same time, EAP (English for Academic Purposes) is more focused on general academic skills (writing essays, general presentations). In general, we note: future physicists study language as a tool for working with real material from physics as a science.

For teaching foreign languages in universities, special didactic tools have been developed, based on the methodology of teaching foreign languages and aimed at achieving educational goals during the training of students of non-linguistic specialties. According to the results of P. Serdyukov's research, the following interrelated components have been identified in this complex: 1) non-computer technologies for using ICT; 2) computer-based learning technologies; 3) telecommunication technologies based on the use of telecommunication means and networks [52].

Internet, web (web-learning/web-based learning) and cloud technologies are a special class of instrumental technologies. Their significance lies both in the possibility of using online services for learning a foreign language and in working with authentic cultural materials [53].

Pedagogical learning technologies and linguodidactic teaching methods, built on information on the Internet in foreign languages, contribute to the effective formation of all types of communicative competence in a foreign language among students, allowing them to use language as a means of real communication. In addition, from this position, the information competence of students of non-linguistic specialties is additionally developed, the ability to organize communication based on interests in oral and written forms. At the same time, the teacher is required to have the ability to organize such activities of students on a similar technological basis [54; 55].

Among the approaches to teaching a foreign language, the following can be distinguished: a) person-oriented, b) person-active, c) activity-based, d) communicative, e) activity-communicative, e) individual, f) constructivist, g) game-based, i) project-based, etc. [Biletska, Olena, Tetiana, Kuchai, Kravtsova, Tetiana, Bidyuk, Natalya, Tretko, Vitaliy, Kuchai, Oleksandr. The Use of the Activity Approach in Teaching Foreign Languages in Higher Education Institutions. 2021, 243-267; The Journey from an English Learner to an English Teacher. / Калініна Л. В., Щербань Н. С., Прокопчук Н. Р., Кузьменко О. Ю., Григор'єва Т. Ю., 2022, 296 с.; Newton, J., Yates, E., Shearn, S., & Nowitzki, W. (2010). Intercultural communicative language teaching: implications for effective teaching and learning. Pp. 1-90. Report to the Ministry of Education. <http://www.educationcounts.govt.nz/publications/curriculum/76637/introduction>].

A review of the pedagogical experience of teaching foreign languages convinces that the most recognized are technologies built on the basis of a communicative-oriented approach. This refers to the construction of such a technological project in which learning is a model of real communication in a foreign language [56].

The communicative approach in modern foreign language teaching methods has been identified as the most fruitful, since it ensures both effective mastery of a foreign language by students and the inclusion of the student in an active learning position. At the same time. The construction of the content of communicatively oriented technologies in teaching a foreign language is based on the following positions: 1) linguistic, cultural and thematic orientation; 2) functional, personal orientation and collective nature of the organization of the educational process [29].

Modern trends in teaching a foreign language in higher education institutions are closely related to the technical update of the learning process. This is expressed in the widespread use of new teaching aids, primarily computer technologies. Text, photos, graphics, animation, video sound in an interactive mode, etc., create an integrated information atmosphere in which the student receives qualitatively new opportunities for learning English. Learning vocabulary, practicing pronunciation, teaching dialogical and monological speech, teaching writing, practicing grammatical phenomena, etc., is possible and necessary from the point of view of the use of modern computer educational programs [57, p.99).

7. Перспективи подальшого розвитку досліджень (Prospects for further Research Development)

The research prospects are designed in accordance with modern requirements for teaching English as the first foreign language at the level of both traditional methods and techniques of its teaching, and in the course of the development of physics as an international science and academic discipline in higher education institutions of Ukraine. The teaching and student community has excellent opportunities in terms of involvement in teaching physics in universities, which actively uses modern methods and techniques using the modern complex of physics (theory and practice, comparative linguodidactics and linguistics, modern conceptual and categorical apparatus, etc.).

8. Висновки (Conclusions)

Linguistic didactics has been widely developed in connection with the spread of learning a second foreign language. Nowadays, it uses the latest methods and techniques, which are primarily related to the development of a complex of communicative skills, which, in turn, reflect the current state of progress in interactive methods of teaching foreign languages. Modern methodologies such as TBL, CLIL, ESP and EAP are of great importance in the development of modern linguistic didactics. In Ukraine, the modern methodology English as Medium of Instruction for Ukrainians – EMI-U has become widespread. In turn, the application of ESP and EAP methodologies is widespread in modern higher education institutions of Ukraine, including Taras Shevchenko National University of Kyiv. Here, physics as a science and academic discipline is also studied in English. Modern methods and techniques are actively involved in this process, based on the implementation of approaches at the level of in-depth study of physics, along with immersion in the essence of the terminological and conceptual-categorical apparatus taught in English. In addition to lectures in English, laboratory and practical classes are held here, in which the most modern methods and techniques are introduced, in the course of which students and teachers are deeply immersed in the world of the English language, which has a bilingual significance along with teaching physics in Ukrainian.

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