



ISSN: 3060-4613



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O'zbekiston
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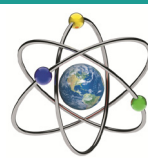


No8(2)
2026

- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

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Pedagogika, psixologiya fanlariga ixtisoslashgan ilmiy jurnal



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Elektron nashr. 312 sahifa,
12-avgust, 2026-yil.

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Pedagogika fanlari bo'yicha: OAK Kengashi tavsiyasi (26.08.2024-y., №11-05-4381/01) asosida:

- Ekspert kengashi (29.10.2024-y., №10)
- Rayosat qarori (31.10.2024-y., №363/5)

Psixologiya fanlari bo'yicha: Toshkent davlat pedagogika universiteti murojaatiga asosan OAK tavsiyasi (24.04.2025-y., №11-05-2566/01):

- Ekspert kengashi (25.05.2025-y., №10)
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26.09.2023-yildan

O'zbekiston Respublikasi Prezidenti
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reyestr raqami tartibi bo'yicha
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Litsenziya raqami: **№136361**

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A METHODOLOGY FOR USING DIGITAL EDUCATIONAL TECHNOLOGIES IN PREPARING STUDENTS TO TEACH SUBJECT-SPECIFIC DISCIPLINES IN ENGLISH IN NON-PHILOLOGICAL FIELDS OF STUDY

Mirzayeva Khilolakhon Bakhromali kizi
NUUZ, Master's degree

Abstract: The study addresses the growing use of English for teaching subject-specific disciplines in non-philological universities amid the internationalisation and digitalisation of higher education. Despite increasing interest in EMI and ESP, students and instructors are often insufficiently prepared to work with professional content in English, while digital technologies are used unsystematically. The study aims to develop and theoretically substantiate a methodology for using digital educational technologies in this context. The research employed literature analysis, comparison of ESP, EMI and CLIL approaches, pedagogical observation, and educational modelling. A six-stage model was developed, including diagnostics, language and terminological training, subject-specific content, interactive digital practice, independent professional communication, and assessment. The study also proposes criteria for evaluating the methodology's effectiveness. The model can be applied in professional-development courses for instructors and training programmes for students in non-philological fields.

Key words: digital educational technologies; English for Specific Purposes (ESP); Content and Language Integrated Learning (CLIL); English Medium Instruction (EMI); non-philological fields of study; subject-specific English-language communication; digital educational environment.

Annotatsiya: Tadqiqotda oliy ta'limning baynalmilallashuvi va raqamlashtirilishi sharoitida nofilologik oliy ta'lim muassasalarida mutaxassislik fanlarini ingliz tilida o'qitish amaliyotining kengayishi ko'rib chiqiladi. EMI va ESPga bo'lgan qiziqish ortib borayotganiga qaramay, talabalar va o'qituvchilar ko'pincha ingliz tilidagi kasbiy mazmun bilan ishlashga yetarlicha tayyor emas, raqamli texnologiyalardan foydalanish esa tizimli yo'lga qo'yilmagan. Tadqiqotning maqsadi ushbu kontekstda raqamli ta'lim texnologiyalaridan foydalanish metodikasini ishlab chiqish va uni nazariy jihatdan asoslashdan iborat.

Tadqiqotda ilmiy adabiyotlarni tahlil qilish, ESP, EMI va CLIL yondashuvlarini qiyosiy tahlil qilish, pedagogik kuzatuv hamda ta'lim jarayonini modellash tirish usullaridan foydalanildi. Diagnostika, til va terminologik tayyorgarlik, mutaxassislik mazmuni bilan ishlash, interaktiv raqamli amaliyot, mustaqil kasbiy kommunikatsiya va baholashni o'z ichiga olgan olti bosqichli model ishlab chiqildi. Shuningdek, metodika samaradorligini baholash mezonlari taklif etildi. Ishlab chiqilgan model o'qituvchilarning malakasini oshirish kurslarida hamda nofilologik yo'nalishlar talabalarini tayyorlash dasturlarida qo'llanishi mumkin.

Kalit so'zlar: raqamli ta'lim texnologiyalari; maxsus maqsadlar uchun ingliz tili (ESP); fan va tilni integratsiyalashgan holda o'qitish (CLIL); ingliz tilida o'qitish (EMI); nofilologik ta'lim yo'nalishlari; ingliz tilida kasbiy yo'naltirilgan kommunikatsiya; raqamli ta'lim muhiti.



Аннотация: В исследовании рассматривается расширение практики преподавания профильных дисциплин на английском языке в нефилологических вузах в условиях интернационализации и цифровизации высшего образования. Несмотря на растущий интерес к EMI и ESP, студенты и преподаватели зачастую недостаточно подготовлены к работе с профессиональным содержанием на английском языке, а цифровые технологии используются несистемно. Цель исследования – разработать и теоретически обосновать методику использования цифровых образовательных технологий в данном контексте. В исследовании применялись анализ научной литературы, сравнительный анализ подходов ESP, EMI и CLIL, педагогическое наблюдение и моделирование образовательного процесса. Разработана шестиступенчатая модель, включающая диагностику, языковую и терминологическую подготовку, работу с профильным содержанием, интерактивную цифровую практику, самостоятельную профессиональную коммуникацию и оценивание. Также предложены критерии оценки эффективности методики. Разработанная модель может применяться в курсах повышения квалификации преподавателей и программах подготовки студентов нефилологических направлений.

Ключевые слова: цифровые образовательные технологии; английский язык для специальных целей (ESP); предметно-языковое интегрированное обучение (CLIL); преподавание на английском языке (EMI); нефилологические направления подготовки; профессионально ориентированная коммуникация на английском языке; цифровая образовательная среда.

INTRODUCTION

The internationalisation of higher education and the steady expansion of English-medium programmes at universities outside the linguistic profile have confronted higher education institutions with a task that traditional models of language training are ill-equipped to solve. The issue is not merely raising learners' general level of English proficiency, but developing their capacity to master, and subsequently teach, the content of subject-specific disciplines – engineering, natural science, economic, medical – by means of English. This task differs fundamentally from that of general or even professionally oriented foreign-language learning, since it requires the simultaneous command of subject content, disciplinary terminology, and the communicative genres through which that content is conveyed.

In practice, this task is addressed within three distinct, though overlapping, pedagogical approaches: teaching English for Specific Purposes (ESP), Content and Language Integrated Learning (CLIL), and English Medium Instruction (EMI). The conflation of these approaches in methodological practice leads instructors in non-philological departments either to transfer techniques designed for language courses into subject teaching or, conversely, to abandon targeted language support altogether, relying on spontaneous acquisition of terminology in the course of studying the discipline. Neither strategy provides systematic preparation of students for teaching subject-specific content in English.

The digitalisation of education offers new ways to address this problem. Electronic resources, learning platforms, corpus and lexicographic tools, automated assessment, and AI systems can individualise language and terminological training, provide repeated exposure to subject-specific content in English, and support formative assessment. However, research shows that digital technologies are still used mainly as content-delivery tools rather than as part of an integrated system connecting subject, language, and digital learning. Golonka et al. and Kukulska-Hulme and Viberg emphasise that their effectiveness depends on linking each tool to a specific pedagogical task. Similarly, Macaro et al. and Dearden note that the expansion of EMI is often not supported by systematic methodological preparation, creating a gap between internationalisation goals and participants' readiness to work in an English-medium professional environment.

The aim of the study is to develop and theoretically substantiate a methodology for using digital educational technologies that prepares students in non-philological fields to master and subsequently teach subject-specific disciplines in English. To achieve this aim, the following research questions are posed:

- 1) what is the optimal sequence of stages for preparing students in non-philological fields to work with subject-specific content in English, and what pedagogical function should digital technologies perform at each stage;
- 2) by what criteria and indicators can the effectiveness of the proposed methodology be determined;
- 3) what constraints does the specificity of non-philological fields of study impose on the choice and manner of applying digital educational technologies?

LITERATURE REVIEW

The use of English in teaching subject-specific disciplines in non-philological fields has been widely examined within the frameworks of English for Specific Purposes (ESP), Content and Language Integrated Learning (CLIL), and English Medium Instruction (EMI). International research indicates that these approaches

have different pedagogical purposes, although they are closely interconnected in the context of contemporary higher education. Existing studies also emphasise the growing role of digital educational technologies in integrating language learning, subject-specific content, and professional communication.

Dudley-Evans and St John consider ESP as an approach designed to develop the linguistic and communicative competencies required for specific academic and professional contexts. According to their framework, language instruction should be closely related to learners' disciplinary needs, professional terminology, communicative situations, and the genres characteristic of a particular field. Their research provides an important theoretical basis for organising English-language training for students in non-philological fields, particularly at the stage of developing subject-specific vocabulary and professional communication skills.

The integration of language and disciplinary content is further developed within the CLIL framework. Coyle, Hood, and Marsh conceptualise CLIL as an educational approach in which subject content and language learning are pursued simultaneously. Their model emphasises the interrelationship among content, communication, cognition, and culture. Of particular methodological importance is the concept of the "language triptych", which distinguishes the language of learning, language for learning, and language through learning. This framework demonstrates that successful engagement with subject-specific content in English requires not only knowledge of terminology but also the ability to use language as a tool for disciplinary thinking and communication.

A related but methodologically distinct direction is represented by EMI. Dearden defines EMI as the use of English to teach academic subjects in contexts where English is not the majority language. Unlike ESP and CLIL, EMI does not necessarily establish explicit language-learning objectives. Macaro et al. analyse the rapid international expansion of EMI and draw attention to the importance of instructors' linguistic and methodological preparedness, students' ability to engage with academic content in English, and appropriate institutional support. These studies demonstrate that the transition to English-medium subject teaching requires systematic preparation rather than a simple change in the language of instruction.

The role of technology in language education has been examined extensively by Golonka et al., who analyse the effectiveness of various technological tools used in foreign-language learning. Their findings indicate that educational effectiveness depends not merely on the availability of technology but on the correspondence between a particular digital tool and a clearly defined pedagogical objective. This principle is especially relevant to the present study because digital resources for terminology acquisition, subject-content processing, professional communication, and assessment perform different methodological functions.

Kukulska-Hulme and Viberg further examine technology-supported language learning from the perspective of mobile and collaborative learning. Their research highlights the potential of digital environments to support learner autonomy, interaction, personalised learning trajectories, and communication beyond the traditional classroom. These possibilities are particularly important for students in non-philological fields, since professional English competence requires repeated engagement with authentic subject-specific materials and opportunities to practise disciplinary communication.

Studies of ESP, CLIL, EMI, and technology-enhanced language learning therefore provide substantial theoretical foundations for the integration of language, disciplinary content, and digital technologies. At the same time, these research areas have generally developed from different methodological perspectives. ESP primarily focuses on professional and academic language needs; CLIL addresses the simultaneous acquisition of language and content; EMI concentrates on the use of English as the medium of subject instruction; and research on digital learning explores technological support for particular educational activities.

In the context of Uzbekistan, the internationalisation and digitalisation of higher education have increased the relevance of foreign-language competence, digital literacy, and the ability to work with professional information in English. Local research and educational practice increasingly address the use of digital technologies in foreign-language teaching and the development of professionally oriented communicative competence. These studies provide an important foundation for adapting international approaches to the linguistic, educational, and professional characteristics of students in non-philological fields. At the same time, further methodological integration of subject-specific English, disciplinary content, and digital educational technologies remains relevant for contemporary higher education.

The distinctive feature of the present study is that it does not consider ESP, CLIL, EMI, and digital educational technologies as isolated methodological directions. Instead, they are integrated into a sequential model for preparing students in non-philological fields first to acquire the necessary linguistic and terminological resources, then to work with subject-specific content through English, and ultimately to conduct independent professional and instructional activity in English. Digital technologies are incorporated at each stage according to their specific pedagogical function rather than being treated merely as supplementary tools for delivering educational content.



Thus, unlike studies focusing primarily on language competence, subject-content instruction, EMI implementation, or individual digital tools, the present research proposes an integrated methodology that connects subject knowledge, English-language competence, professional communication, and digital educational technologies within a single pedagogical system. This approach constitutes the methodological specificity of the study and provides the basis for developing the six-stage model of preparing students in non-philological fields to teach subject-specific disciplines in English.

RESEARCH METHODOLOGY

To address the stated tasks, a set of methods was employed, including analysis of Russian and international scholarly-methodological literature on ESP, CLIL, EMI, and digital educational technologies; comparative analysis of these approaches aimed at identifying their specific pedagogical functions; pedagogical observation of instructors' and students' activity in non-philological fields while working with subject-specific content in English; and modelling of a methodological system that integrates digital educational technologies into the process of preparing students to teach subject-specific disciplines in English. For the subsequent piloting of the proposed model, the use of questionnaires for students and instructors, diagnostic testing, and a pedagogical experiment is envisaged; the experimental procedure is described below, with placeholders indicating where empirical data are to be inserted.

First, it is necessary to distinguish clearly among the concepts used, since their conflation is a common methodological error. English for Specific Purposes (ESP) is a branch of foreign-language teaching whose goal is to develop the foreign-language communicative competence required for a specific professional or academic field; ESP remains part of language training and is implemented predominantly in foreign-language classes (Dudley-Evans & St John, 1998). Content and Language Integrated Learning (CLIL) is an approach in which language and subject content have equal methodological status: a lesson pursues both linguistic and subject-related goals simultaneously, and the instructor manages the so-called "language triptych" – the language of content, the language of learning, and the language required for cognitive operations (Coyle, Hood & Marsh, 2010). English Medium Instruction (EMI), unlike ESP and CLIL, is the teaching of a subject-specific discipline in English without an explicit language goal: English serves purely as the medium for conveying subject content, and its development is treated as an incidental rather than a targeted outcome (Dearden, 2014; Macaro et al., 2018). This conceptual distinction is essential for the present study, since a methodology for preparing students in non-philological fields to teach subject-specific disciplines in English must guide them consistently through all three modes of work: from targeted language training (ESP), through the integrated acquisition of content and language (CLIL), to independent subject-specific activity in English (a mode approximating EMI).

In the proposed model, digital educational technologies are not treated as an end in themselves but as an instrument for integrating subject content, linguistic form, and professional communication. Each digital tool is introduced into the model only where a specific pedagogical task calling for it has been identified. The resulting methodological model comprises six sequential stages, summarised in Table 1.

Table 1: Methodological Model for the Use of Digital Educational Technologies

Stage	Pedagogical objective	Pedagogical function of digital technology	Examples of digital tools
1. Diagnostics	Determining the learners' baseline level of general and professional English communication, as well as their digital competence	Objective, individualised assessment; routing of the learner to an appropriate track	Electronic testing systems with automatic generation of an individual deficit profile
2. Language and terminological training	Developing command of the discipline-specific term system and typical grammatical-stylistic constructions of the academic/professional register	Controlled, repeated, personalised practice	Electronic terminological dictionaries, corpora of discipline-specific texts, adaptive testing
3. Working with discipline-specific content	Moving from isolated lexico-grammatical work to comprehension of connected discipline-specific text and video	Structuring and sequential presentation of authentic discipline-specific materials	LMS, electronic course texts, video lectures with built-in comprehension tasks
4. Interactive digital practice	Converting receptive skills into productive ones: explaining professional concepts, engaging in professional dialogue	Creating a guided interactive production environment	Virtual whiteboards, collaborative-work tools, digital simulations



Stage	Pedagogical objective	Pedagogical function of digital technology	Examples of digital tools
5. Independent professional-communicative activity	Independent use of English in a professional/subject-specific environment	Environment for independent production, exchange and preliminary feedback	Recording and publishing platforms, peer-review tools, AI systems for preliminary feedback
6. Assessment and feedback	Recording changes and adjusting the individual learning trajectory	Accumulation and visualisation of learning data	Electronic portfolios, LMS analytics modules, repeat testing

Piloting of the model is envisaged in the form of a pedagogical experiment involving [number of participants] students of the non-philological field of study [specify field of study] at [name of university]; the duration of the experiment is [specify duration, e.g. one semester]. The experimental group comprises students undergoing training according to the described six-stage model; the control group comprises students mastering subject-specific content in English through a traditional methodology without the targeted use of digital educational technologies. Assessment is conducted through pre- and post-experiment diagnostic testing, questionnaires, and analysis of learning-activity products.

ANALYSIS AND RESULTS

The effectiveness of the methodology is to be evaluated using seven groups of indicators: command of professional English-language terminology (size of active terminological repertoire, accuracy of term use in context); comprehension of subject-specific texts and video materials in English; ability to explain professional concepts in English (coherence, terminological accuracy, and communicative adequacy of the explanation); participation in professionally oriented communication; independent work with English-language sources; digital competence required to work with subject-specific content in English; and readiness to use English in a professional/subject-specific environment.

For each indicator, data obtained prior to piloting the methodology (baseline diagnostics) are to be compared with data obtained after its completion (final diagnostics) in both the experimental and control groups. The form for reporting results, to be completed by the author on the basis of empirical data, is presented in Table 2.

Table 2: Form for Presenting Diagnostic Results (EG – Experimental Group, CG – Control Group)

Indicator	EG, pre	EG, post	CG, pre	CG, post	Significance of difference
Command of professional terminology	[value]	[value]	[value]	[value]	[p-value/test]
Comprehension of discipline-specific texts and video materials	[value]	[value]	[value]	[value]	[p-value/test]
Ability to explain professional concepts	[value]	[value]	[value]	[value]	[p-value/test]
Participation in professionally oriented communication	[value]	[value]	[value]	[value]	[p-value /test]
Independent work with English-language sources	[value]	[value]	[value]	[value]	[p-value/test]
Digital competence	[value]	[value]	[value]	[value]	[p-value/test]
Readiness to use English in a professional/subject-specific environment	[value]	[value]	[value]	[value]	[p-value/test]

A qualitative analysis of students' learning-activity products – fragments they prepare explaining professional concepts in English – is additionally envisaged, based on criteria of terminological accuracy, coherence of presentation, and conformity to the genre of an instructional explanation. The results of such analysis are recorded in the form of expert assessments and must be completed by the author on the basis of collected data: [present examples and results of expert assessment].

The hypothetical nature of the changes to be tested is as follows: application of the six-stage model is expected to produce a more pronounced gain in the indicators of ability to explain concepts, participation in communication, and readiness to teach, compared with the traditional methodology, since these indicators are directly linked to the stages of interactive digital practice and independent professional-communicative activity, which are absent from the traditional approach. Verification of this assumption is possible only on the basis of actual empirical data obtained during the experiment.



It is appropriate to structure the discussion of the obtained (expected) results not through a simple comparison of pre- and post-intervention indicators, but through an analysis of the pedagogical mechanisms linking the stages of the model to the anticipated changes. The greatest contribution to developing students' readiness to teach subject-specific disciplines in English is likely to come from the stages of interactive digital practice and independent professional-communicative activity, since it is at these stages that receptively acquired terminology and content are converted into productive professional-communicative skills. This is consistent with Macaro and colleagues' finding that the positive effect of English-medium instruction on language competence manifests itself above all where learners are required to produce utterances on subject matter independently, rather than merely receive it. Similarly, Golonka and colleagues show that the effectiveness of digital technologies in language learning is determined not by the type of technology as such, but by whether it provides substantive feedback and repeated practice – both conditions being built into the proposed model at the stages of interactive practice and assessment.

The role of the digital educational environment in the proposed methodology lies not in replacing traditional forms of instruction, but in ensuring a stable connection among the three components of preparation – subject content, linguistic form, and professional communication – which, under a traditional approach, often exist in the educational process in isolation from one another: language is acquired in foreign-language classes, content in subject-specific classes, and professional communication remains outside the educational process until students enter practical training. In the described model, digital tools function as connecting links: terminological corpora and electronic dictionaries link language to content at the lexical level; interactive and simulation environments link content to communication at the level of speech practice; and LMS analytics modules link all three components at the level of assessment and feedback. It is precisely in this, rather than in the mere fact of using digital technology, that its pedagogical potential lies: technology serves not as the goal of instruction but as an instrument for integrating the ESP, CLIL, and EMI components of preparation into a unified methodological system.

Compared with the traditional study of professional English, in which language and subject content are typically acquired sequentially rather than in parallel, the proposed methodology narrows the gap between the moment terminology is acquired and the moment it is used functionally in professional-subject communication. This is consistent with the general logic of the CLIL approach (Coyle, Hood & Marsh, 2010), according to which linguistic and subject-related content should develop simultaneously rather than through sequential transfer. At the same time, the limitations of the present study must be noted. First, the model has been developed and substantiated theoretically; its empirical verification requires piloting on a sample of students from a specific field of study and cannot automatically be extended to all non-philological fields without regard to their subject-specific characteristics – disciplines with a high proportion of visual-symbolic means of representing knowledge (mathematics, engineering graphics), for instance, impose different disciplinary-literacy requirements than disciplines with predominantly verbal content (Airey, 2011). Second, the effectiveness of the model depends substantially on the digital competence of the subject-discipline instructor, which calls for a separate programme of methodological support for teaching staff (Robert, 2010; Polat & Bukharkina, 2007). Third, applying digital educational technologies within the described model presupposes a developed digital educational infrastructure at the university, which limits its applicability under conditions of insufficient technical provision.

Directions for further research include the empirical piloting of the model across different non-philological fields of study, followed by a comparative analysis of its effectiveness depending on the subject-specific characteristics of the discipline, as well as the study of the methodology's long-term effects – the persistence of the developed readiness to teach in English under conditions of graduates' actual professional activity.

CONCLUSIONS AND RECOMMENDATIONS

The study conducted permits several conclusions to be drawn. Preparing students in non-philological fields to master and teach subject-specific disciplines in English constitutes an independent methodological task that cannot be reduced either to the traditional study of professional English or to the unsystematic introduction of English into subject teaching. Solving this task requires the consistent differentiation and coordinated application of the ESP, CLIL, and EMI approaches, each of which performs its own function at a particular stage of preparation. The six-stage methodological model developed – diagnostics, language and terminological training, work with subject-specific content, interactive digital practice, independent professional-communicative activity, and assessment and feedback – makes it possible to systematically link these approaches by means of digital educational technologies, each of which is introduced into the model in relation to a specific pedagogical function rather than as an end in itself. This provides an answer to the stated aim of the study: a methodology has been proposed and theoretically substantiated that integrates digital educational technologies into the process of preparing students in non-philological fields to work with subject-specific content in English.



The scholarly-methodological significance of the proposed model lies in clarifying the distinctions among the concepts of ESP, CLIL, EMI, and digital educational technologies as applied to the task of teaching subject-specific disciplines in English in a non-philological setting, and in developing a set of criteria for evaluating the effectiveness of such preparation. The practical value of the study lies in the possibility of using the model in designing professional-development programmes for instructors in non-philological departments and elective courses for students oriented toward subsequent participation in English-medium educational and professional programmes.

Prospects for further research relate to the empirical piloting of the model across different fields of study and to examining the durability of the developed readiness for professional communication in English under conditions of actual professional activity.

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- 13.00.00 Pedagogika fanlari
 - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
 - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
 - 13.00.03 Maxsus pedagogika
 - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
 - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
 - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
 - 13.00.07 Ta'limda menejment
 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



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2026. №8(2)

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Litsenziya raqami: № 136361.

Manzilimiz: Toshkent shahar, Yunusobod tumani
19-mavze, 17-uy.