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ELECTRONIC SYSTEMATIZATION AND LEXICOGRAPHIC MODELING OF ENGLISH-UZBEK PEDAGOGICAL TERMINOLOGY

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Abstract. *This article examines the linguistic and lexicographic characteristics of the electronic systematization of pedagogical terminology in the context of the digitalization of modern education. Particular attention is paid to identifying the structural, semantic, and functional features of pedagogical terms and to the ways in which they can be represented within an electronic terminological database. The study comparatively analyzes the structural and semantic characteristics of pedagogical terms in English and Uzbek and proposes a terminological entry model for their representation in an electronic system. The findings of the study may provide a theoretical and practical basis for organizing pedagogical terminology in a digital environment, identifying inter-term relationships, and developing a bilingual electronic pedagogical dictionary.*

Key words: *pedagogical terminology, electronic terminological system, electronic lexicography, terminology management, digitalization of education, linguistic characteristics, structural-semantic analysis, semantic classification, terminological database, terminological entry, bilingual electronic dictionary.*

INGLIZ-O‘ZBEK PEDAGOGIK TERMINOLOGIYASINI ELEKTRON TIZIMLASHTIRISH VA LEKSIKOGRAFIK MODELLASHTIRISH

Annotatsiya. *Mazkur maqolada zamonaviy ta’lim jarayonini raqamlashtirish sharoitida pedagogik terminlarni elektron tizimlashtirishning lingvistik va leksikografik xususiyatlari tadqiq etiladi. Pedagogika sohasiga oid terminlarning struktur, semantik va funksional xususiyatlarini aniqlash hamda ularni elektron terminologik bazada ifodalash masalalariga alohida e’tibor qaratiladi. Tadqiqotda ingliz va o‘zbek tillaridagi pedagogik terminlarning struktur-semantik xususiyatlari qiyosiy tahlil qilinib, ularni elektron tizimda tavsiflash uchun terminologik karta modeli taklif etiladi Tadqiqot natijalari pedagogik terminologiyani raqamli muhitda tartibga solish, terminlararo munosabatlarni aniqlash va ikki tilli elektron pedagogik lug‘at yaratish uchun nazariy hamda amaliy asos bo‘lib xizmat qilishi mumkin.*

Kalit so‘zlar: *pedagogik terminologiya, pedagogik terminlar, elektron terminologik tizim, elektron leksikografiya, terminologik ma’lumotlar bazasi, terminologik tizimlashtirish, ta’limni raqamlashtirish, raqamli lingvistika, lingvistik xususiyatlar, struktur-semantik tahlil, semantik tasnif, terminologik karta, terminlararo munosabatlar, ikki tilli elektron lug‘at.*

ЭЛЕКТРОННАЯ СИСТЕМАТИЗАЦИЯ И ЛЕКСИКОГРАФИЧЕСКОЕ МОДЕЛИРОВАНИЕ АНГЛО-УЗБЕКСКОЙ ПЕДАГОГИЧЕСКОЙ ТЕРМИНОЛОГИИ

Аннотация. *В статье исследуются лингвистические и лексикографические особенности создания электронной системы педагогической терминологии в условиях цифровизации современного образования. Особое внимание уделяется выявлению структурных, семантических и функциональных характеристик педагогических терминов, а также вопросам их систематизации и репрезентации в электронной терминологической базе данных. Данная модель предусматривает отражение таких параметров, как номинативная форма термина, его английский или узбекский эквивалент, дефиниция, часть речи, структурный тип, семантическая группа, синонимические варианты, сфера употребления, источник и семантические связи с другими терминами. Результаты исследования могут служить теоретической и практической основой для систематизации*

педагогической терминологии в цифровой среде, выявления межтерминологических отношений и создания двуязычного электронного педагогического словаря.

Ключевые слова: *педагогическая терминология, педагогические термины, электронная терминологическая система, электронная лексикография, терминологическая база данных, систематизация терминологии, цифровизация образования, цифровая лингвистика, лингвистические особенности, структурно-семантический анализ, семантическая классификация, терминологическая карточка.*

Introduction. The rapid digitalization of contemporary education necessitates the systematic organization and presentation of pedagogical knowledge not only in traditional formats but also within electronic environments. The continuous development of such areas as language teaching methodology, pedagogical technologies, assessment, competency-based education, inclusive education, and educational management has contributed to the constant expansion and diversification of pedagogical terminology. The emergence of new concepts, the incorporation of foreign-language terms into Uzbek, and the acquisition of new meanings by existing terminological units have created a growing need for the systematic linguistic investigation, classification, and digital organization of pedagogical terminology.

The study of pedagogical terminology is based on terminology theory, conceptual analysis, and lexicographic sources. J. C. Sager [2] explored the principles of terminology processing and systematization, while E. Wüster [3] established the relationship between terms and concepts and developed the theory of terminological systems. R. Temmerman [4] examined terminology from a sociocognitive perspective, emphasizing its cultural and conceptual characteristics. D. Crystal [5] and *Oxford Learner's Dictionaries* [6] serve as important sources for identifying the meanings and usage of English linguistic terms. In studying the semantic and normative features of Uzbek terminology, *The Explanatory Dictionary of the Uzbek Language* [8], A. Hojiyev's terminological dictionary [9], and A. Madvaliyev's orthographic dictionary [10] are significant sources. M. B. Nizomova [1] investigated the axiological and conceptual characteristics of pedagogical terms in English and Uzbek. These sources provide a theoretical foundation for the systematic, conceptual, and lexicographic analysis of pedagogical terminology.

Research methodology. The methodological framework of the study is based on an integrated combination of terminological, structural, semantic, comparative, lexicographic, and quantitative approaches. The application of these approaches makes it possible to examine pedagogical terminology not merely as a collection of individual lexical units, but as a systematically organized linguistic subsystem characterized by structural, semantic, functional, and inter-term relationships. Particular emphasis is placed on the interaction between linguistic analysis and electronic representation, since the development of a digital terminological system requires the systematic identification of those linguistic features that can be formally encoded as searchable and interconnected data fields. The empirical material of the study consists of pedagogical terms used in English and Uzbek. At the initial stage of the research, the collected terminological units are subjected to **descriptive analysis**, which is used to identify and systematically characterize their formal, grammatical, structural, semantic, and functional properties [3].

The **structural analysis** is employed to identify the formal models through which pedagogical terms are constructed in English and Uzbek. Particular attention is paid to one-component and multi-component terms, combinations of adjective and noun, noun and noun, participial and nominal structures, as well as other productive structural patterns. The analysis makes it possible to determine the degree of structural complexity of pedagogical terminology and to identify similarities and differences in term-formation patterns across the two languages [4].The **semantic analysis** focuses on the conceptual and meaning-based organization of pedagogical terminology. In this process, terms are grouped according to their semantic features and their relationship to specific conceptual domains within pedagogy. The **componential analysis** is applied to reveal the constituent semantic features of selected terms and to identify common and distinctive semantic components [5]. This approach is particularly useful for distinguishing closely related terms, determining semantic boundaries, and establishing hierarchical or associative relationships between terminological units. The **lexicographic analysis** is employed to determine the principles and parameters required for the electronic representation of pedagogical terms. Unlike conventional dictionary entries, which primarily provide a headword and its definition, an electronic terminological entry is designed as a multidimensional data structure in which several types of linguistic and encyclopedic information can be interconnected. An important methodological component of the research is the **modeling of the electronic terminological system [7]**. On the basis of the linguistic and lexicographic analysis, a standardized terminological entry is conceptualized as an interconnected set of parameters:

Term → Equivalent → Definition → Part of Speech → Structural Type → Semantic Group → Synonym(s) → Field of Application → Source → Related Terms.

Results and discussion. The analysis of the selected material indicates that pedagogical terminology in English and Uzbek is characterized by considerable structural diversity. This diversity is reflected in the morphological composition, number of components, and word-formation patterns of terminological units. From a structural perspective, the identified pedagogical terms can generally be classified into simple, derived, compound, multi-word terminological units, and abbreviated forms. Such classification is significant for the development of an electronic terminological system because the structural type of a term constitutes one of the essential parameters required for its linguistic description and subsequent digital organization.

Structural Characteristics of Pedagogical Terms. Simple terms represent the most basic structural category and are expressed through a single lexical unit. In Uzbek pedagogical terminology, examples include *ta'lim* (education), *tarbiya* (upbringing), *metod* (method), *dars* (lesson), *bilim* (knowledge), and *ko'nikma* (skill). Derived terms, in contrast, are formed through morphological processes and include such examples as *kompetentlik* (competence), *tarbiyalanuvchi* (learner), and *o'qituvchilik* (teaching). Compound formations, such as *ta'lim-tarbiya* (education and upbringing) and *o'quv-metodik* (educational-methodological), represent another structural pattern in which two lexical components combine to express a more specific pedagogical concept. In addition, multi-word terminological units constitute a particularly productive category, including expressions such as *pedagogik texnologiya* (pedagogical technology), *ta'lim sifati* (quality of education), *interfaol metod* (interactive method), *shakllantiruvchi baholash* (formative assessment), and *kompetensiyaviy yondashuv* (competency-based approach). The English pedagogical terminology examined in the study likewise demonstrates a high frequency of multi-component terminological combinations. Units such as *formative assessment, summative assessment, inclusive education, teacher education,* and *pedagogical technology* illustrate the productivity of multi-word structures in the nomination of pedagogical concepts. A comparison of English and Uzbek demonstrates that corresponding pedagogical terms may exhibit both structural similarity and language-specific differences. In Uzbek, many multi-component equivalents are realized through the *modifier + head* pattern, as observed in *shakllantiruvchi baholash*, *inklyuziv ta'lim*, *o'qituvchi ta'limi*, and *pedagogik texnologiya*. English equivalents such as *formative assessment*, *inclusive education*, *teacher education*, and *pedagogical technology* also display a predominantly attributive relationship between the components, although the grammatical and lexical realization of the relationship differs according to the structural characteristics of each language.

Equivalence of English and Uzbek Pedagogical Terms

Bilingualism is considered one of the key features of an electronic pedagogical terminology system. In such a system, English pedagogical terms are systematically linked with their corresponding Uzbek equivalents, ensuring semantic, structural, and functional correspondence between the two languages. This approach enables the creation of a unified terminological database that supports comparative linguistic analysis and enhances the accuracy of pedagogical communication in multilingual educational environments.

For instance, the following examples illustrate the equivalence relations between English and Uzbek pedagogical terms, taking into account their structural types:

Table 1. Examples illustrate the equivalence relations between English and Uzbek pedagogical terms

English term	*Uzbek equivalent*	*Structural type*
education	*ta'lim*	*simple term*
upbringing	*tarbiya*	*simple term*
assessment	*baholash*	*derived term*
formative assessment	*shakllantiruvchi baholash*	*terminological phrase*
summative assessment	*yakuniy baholash*	*terminological phrase*

Incorporating these units into an electronic terminological system requires more than the mere provision of translation equivalents. It is also essential to represent each term's semantic properties, structural formation, and functional usage within the pedagogical discourse. Such a multidimensional representation ensures a more accurate reflection of terminological relationships and significantly enhances the efficiency of electronic lexicographic resources in the field of education.

Electronic Terminological Entry Model

The results of the study indicate that an electronic pedagogical terminology system should represent each term through a set of interconnected linguistic and lexicographic parameters. The proposed model combines the basic information required to identify, define, classify, and relate a terminological unit to other concepts within the system.

Core parameters of the electronic terminological entry:

- Term: the nominative form of the pedagogical concept
- English equivalent: the corresponding English term
- Uzbek equivalent: the corresponding Uzbek term
- Definition: a concise scientific explanation of the concept
- Part of speech: grammatical classification of the term
- Structural type: simple, derived, compound, or multi-word term
- Semantic group: the conceptual category to which the term belongs
- Synonyms: synonymous or terminological alternatives
- Variants: lexical or formal variants of the term
- Field of application: the area of pedagogical use
- Source: the dictionary, textbook, scholarly work, or other source
- Related terms: semantically or conceptually connected units
- Terminological relations: hyperonymic, hyponymic, synonymous, or associative relations

▪ **Example of an electronic entry**

Term: Formative assessment Uzbek equivalent: Shakllantiruvchi baholash Part of speech: Multi-word terminological unit Semantic group: Assessment terminology Definition: A type of assessment used during the learning process to identify learners' current progress and provide information for improving subsequent learning. Related terms: Summative assessment, diagnostic assessment, assessment criteria Terminological relations: Hyperonymic and associative relations

The proposed model presents a pedagogical term not as an isolated lexical item but as a multidimensional and interconnected unit of terminological information. Such organization makes it possible to combine definition, bilingual equivalence, structural and semantic classification, and inter-term relations within a single electronic entry. Consequently, the model provides a practical linguistic basis for developing a bilingual electronic pedagogical dictionary and a searchable terminological database.

Discussion. The findings indicate that the electronic systematization of pedagogical terminology differs from traditional lexicographic practice in both structure and functionality. While a conventional dictionary primarily focuses on presenting a term and its definition, an electronic terminological system can additionally represent the structural, semantic, and conceptual relationships between terms. This makes the electronic format more suitable for describing pedagogical terminology as an interconnected and developing system. At the same time, several methodological challenges should be considered. Some pedagogical terms may have multiple equivalents, while English-derived terms can occur in different translation or adaptation forms. The parallel use of synonymous variants and the absence of established equivalents for newly emerging concepts may also create inconsistencies within the database. These issues demonstrate the need for clear criteria governing term selection, normalization, definition, equivalence, classification, and source verification. Therefore, the development of an electronic pedagogical terminological system should be based on consistent linguistic and lexicographic principles. In particular, attention should be given to maintaining terminological accuracy, distinguishing established terms from variant forms, documenting the sources of equivalents, and regularly updating the database. Such an approach would ensure that the electronic system remains not only a convenient reference resource but also a reliable platform for the systematic study and further development of English–Uzbek pedagogical terminology.

Conclusion. The findings of the study demonstrate that the electronic systematization of pedagogical terminology represents a promising direction in contemporary Uzbek terminology and lexicography. The digital representation of pedagogical terms requires consideration not only of their nominative forms but also of their structural, semantic, functional, and lexicographic characteristics. Such an approach allows pedagogical terminology to be represented as an organized and interconnected system rather than as a simple collection of individual lexical units. The comparative analysis of pedagogical terms in English and Uzbek provides an important basis for identifying their common and language-specific features, determining patterns of terminological equivalence, and establishing principles for the development of a bilingual electronic pedagogical dictionary. The proposed approach also demonstrates the importance of considering structural and semantic correspondence alongside direct lexical equivalence when representing pedagogical

concepts in two languages. The terminological entry model proposed in the study makes it possible to integrate essential information about a term within a single electronic structure, including its nominative form, equivalent, definition, structural type, semantic group, synonymous variants, field of application, source, and related terms. This model can facilitate systematic classification, retrieval, comparison, and cross-referencing of pedagogical terminology in a digital environment. As a further stage of the research, the proposed model can serve as a basis for developing an English–Uzbek electronic pedagogical terminological database containing approximately 200–250 terms. Future development may also include the creation of a semantic network linking related pedagogical concepts and the formation of a national electronic corpus of pedagogical terminology. Such resources could contribute to the standardization of pedagogical terminology, support bilingual lexicographic practice, and provide a reliable digital foundation for further linguistic and pedagogical research.

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