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## MODELLING THE SYSTEM OF ACADEMIC STAFF TRAINING FOR ACADEMIC ENTREPRENEURSHIP

*This article presents the modelling of the system of academic staff training for academic entrepreneurship. In the context of the transformation of higher education and the growing role of universities as hubs of innovation, knowledge production, and social advancement, academic entrepreneurship emerges as a pivotal factor in the modernisation of the educational landscape. The aim of the article is to present the distinctive features of modelling a system for preparing academic and pedagogical staff for engagement in academic entrepreneurship. According to the author's concept, a system for training academic staff for engagement in academic entrepreneurship has been designed through modelling. This system comprises the following subsystems: target subsystem (defines the purpose and objectives of the training process); conceptual-methodological subsystem (encompasses the overarching concept, guiding principles (accessibility, continuity, and flexibility; scientific rigour and pragmatism; integration; reflexivity and consideration of prior experience and acquired knowledge), and methodological approaches (the systemic, synergetic, structural-functional, integrative, acmeological, axiological, reflexive, collegial, project-based, and the person-centred); theoretical subsystem (integrates relevant theories and conceptual frameworks (Philosophy, Economics, Sociology, Psychology, Pedagogy); outlines the structure of academic staff readiness for academic entrepreneurship); content-technological subsystem (includes the functional components of academic entrepreneurship implementation, theoretical and practical aspects of training, program content, instructional formats, teaching methods, and learning tools); diagnostic-resultative subsystem: establishes criteria and levels of academic staff readiness for academic entrepreneurship, and specifies the expected outcomes).*

**Key words:** academic staff, academic entrepreneurship, university, professional development, author's concept, system of training, target subsystem, conceptual-methodological subsystem, theoretical subsystem, content-technological subsystem, diagnostic-resultative subsystem.

**Problem statement.** In the context of the transformation of higher education and the growing role of universities as hubs of innovation, knowledge production, and social advancement, academic entrepreneurship emerges as a pivotal factor in the modernisation of the educational landscape. However, the majority of academic staff lack adequate preparation to engage effectively in entrepreneurial initiatives, thereby necessitating a systemic approach to their professional development. In order to implement the author's conceptual framework, it is essential to model a comprehensive system for training university academic staff in the domain of academic entrepreneurship.

**The analysis of recent research and publications.** First and foremost, let us turn to reference sources and scholarly works that substantiate the essence and specificity of employing the modelling method. An analysis of scientific and pedagogical literature on the research problem provides grounds for concluding that modelling is frequently utilised in academic studies addressing challenges in the field of education and professional training. In particular, modelling is applied to the study of educators' professional activities [12], [20]; their initial professional

preparation [6], [17], [18]; as well as their continuous professional development [10], [19].

Reference sources interpret modelling as "a process of creative reproduction of only the essential properties of a model as an original, where pedagogical experience and scientifically substantiated content guidelines serve as the prototype" [2, p. 52]; and as "the investigation of any phenomena, processes, or systems of objects through the construction and examination of their models; the use of models to determine or refine their characteristics and to rationalise the design of newly constructed objects; the study of objects of cognition through their models, and the construction (analysis and examination) of models of objects (systems, structures, processes, etc.)" [14, p. 110].

**The aim of the article** is to present the distinctive features of modelling a system for preparing academic and pedagogical staff for engagement in academic entrepreneurship.

**The research results.** It is worth emphasising that the concept of a model is understood as "a scheme or diagram of any object, process, or phenomenon, used as its simplified substitute; a specific construct created to acquire and/or preserve

information, which may take the form of a mental image, a symbolic description (formulas, diagrams, etc.), or a material artefact that reflects the properties, characteristics, and relationships of the original object, regardless of its nature, that are essential to the task being addressed by the subject (i.e., the individual)" [14, p. 109].

Dubaseniuk highlights that "within the theory of pedagogical design, several types of models are distinguished: a prognostic model for the optimal allocation of resources and specification of objectives; a conceptual model based on an informational database and action programmes; an instrumental model designed to prepare implementation tools and train educators in the use of pedagogical instruments; a monitoring model for establishing feedback mechanisms and methods for correcting potential deviations from planned outcomes; and a reflexive model developed to support decision-making in the event of unforeseen circumstances" [7, p. 145].

In light of the foregoing, the construction of a conceptual model and the modelling of a system for preparing academic and pedagogical staff for academic entrepreneurship in our study must be undertaken with due consideration of the specificity of the systemic approach. This approach is defined as "a comprehensive investigation of large and complex objects (systems), examining them as unified wholes with coordinated functioning of all elements and components. In accordance with this principle, each element of the system must be studied in its connection and interaction with other elements, the influence of the properties of individual components on the behaviour of the system as a whole must be identified, general properties of the system must be established, and the optimal mode of its functioning must be determined" [2, p. 81].

Researchers emphasise that the term "system" (from the Greek *systema* – a whole composed of parts) should be interpreted as "a materially and logically ordered group of components that precisely correspond to their functions, as well as the relationships among these components" [16, p. 111]. Scholars identify the following core requirements of the systemic approach: the identification of the dependence of each element on its position and function within the system, recognising that the properties of the whole cannot be reduced to the sum of its parts; the analysis of the extent to which the system's behaviour is determined both by the characteristics of its individual elements and by the properties of its structure; the investigation of the mechanisms of interdependence and interaction between the system and its environment; the examination of the hierarchical nature inherent in the system; the provision of multiple descriptions to enable a multifaceted understanding of the system; the consideration of the system's dynamism, presenting it as an evolving whole [3, p. 37].

According to the author's conceptual framework, the training of academic staff for academic entrepreneurship constitutes a system comprising subsystems, each characterised by components with clearly defined functions, specific positions within the system, and interrelations with components of other subsystems. This form of training is itself a subsystem within the broader system of professional development at the university, which should be regarded as one of the constitutive subsystems of its academic environment.

It is important to note that the development of the system for training academic staff for academic entrepreneurship is grounded in the demands of society and the knowledge economy, the needs of the university, and the interests and requirements of academic staff. Its design has taken into account the specificity of implementation across individual, institutional, regional, national, and international levels.

According to the author's conceptual framework, a crucial aspect in constructing a system for training academic staff for academic entrepreneurship is the consideration of their professional experience and competence, encompassing their knowledge, skills, and abilities, as well as their values and attitudes.

To identify the subsystems that constitute the broader system of training for academic entrepreneurship, we examined prior scholarly studies and found that researchers employing a systemic approach tend to distinguish various structural components of the subject under investigation. For instance, a comparative study entitled "Professional Development of General Education School Teachers within the Systems of Continuous Pedagogical Education in the United Kingdom, Canada, and the United States" presents two models developed by the author: a unification model, which delineates common features characteristic of teacher professional development across the three countries, and a differentiation model, which reflects the unique experiences of each national context [11]. This study is particularly valuable for our research, as it models a system of professional development that encompasses "the purpose, principles, and functions of professional development; the regulatory framework; conditions necessary for teachers' professional growth; components of professional competence; content and operational elements; assessment of professional development; and stages of career progression for general education school teachers" [11, p. 48]. Androshchuk, in her investigation of the management system for professional development of university department lecturers in management in the Republic of Poland, identifies the following components: "target-oriented, theoretical-methodological, technological, and outcome-reflective" [1, p. 203]. Zahura, conducting a comprehensive study of the theoretical and methodological foundations of professional development for physical education lecturers in multidisciplinary

higher education institutions, substantiates the relevance of distinguishing the following subsystems: "target-oriented, conceptual-methodological, theoretical-content, organisational-operational, and diagnostic-outcome" [8, pp. 310-311]. In her doctoral dissertation, Kinakh emphasises that "the cluster model of a system for developing professional-pedagogical entrepreneurship among primary school teachers within the framework of lifelong education integrates clusters as subsystems: target-oriented, conceptual-methodological, content-processual, and evaluative-outcome, which are interrelated and unified to achieve the stated objective" [9, p. 270].

In accordance with the author's framework, the system for training academic staff for academic entrepreneurship comprises the following subsystems: target-oriented, conceptual-methodological, theoretical, content-technological, and diagnostic-outcome.

As evidenced by reflective analysis of professional experience, as well as by the arguments of both theorists and practitioners in the field of education, any form of professional training must begin with a clear articulation of its purpose and the tasks required to achieve it, alongside the expected learning outcomes. We concur with the view that "a goal is always a description of a projected normative outcome, embedded within the context of relationships in a broader system" [3, p. 45]. Scholars further assert that "the outcome must be constructive, that is, directed towards the production of a socially valuable result with improved indicators of quality or process compared to previous benchmarks" [15, p. 51].

In this context, the set of tasks should be interpreted as a programme that presents a sequential process and logic of learning, specifying the goal through the execution of clearly defined tasks, the completion of which leads to the attainment of the intended objective and, consequently, the expected outcomes.

According to the author's conceptual framework, the target-oriented subsystem articulates the purpose and objectives of training academic staff for academic entrepreneurship within the university's system of professional development: to foster the readiness of academic staff to engage in academic entrepreneurship, which entails the acquisition, deepening, and expansion of relevant knowledge; the formation, development, and refinement of skills and competencies necessary for mobilising internal and external resources and human capital. This readiness is directed towards meeting the internal needs of the university, as well as responding to the educational, scientific, technological, and innovative demands of society and the knowledge economy, various scientific domains, and the capitalisation of individual intellectual potential. The objectives are as follows: 1) to cultivate motivation and a constructive attitude towards academic entrepreneurship; 2) to acquire, deepen, and expand knowledge, and

to form, develop, and refine skills and competencies for initiating innovative ideas and projects aimed at capitalising intellectual potential; 3) to enhance the university's professional development system by expanding opportunities for personal and professional advancement; 4) to establish conditions conducive to the formation of academic staff's readiness for academic entrepreneurship, in alignment with the university's needs and the demands of society and the knowledge economy.

The conceptual-methodological subsystem, as an integral component of the system for training academic staff for academic entrepreneurship, comprises the author's conceptual framework, which is articulated through theoretical, methodological, and technological constructs. These constructs serve as "the foundation for developing the strategy and tactics of organising... the training" [7, p. 95] of academic staff for engagement in academic entrepreneurship.

The theoretical, methodological, and technological constructs, along with their substantiation, enable the articulation of the author's vision of academic staff training as a coherent system. This system is underpinned by principles and interrelations among its components, which represent not only the theoretical foundations but also the technological pathway for achieving the overarching goal, namely, the formation of readiness for academic entrepreneurship among academic staff.

The conceptual-methodological subsystem is grounded in a set of principles that guide the training process: accessibility, continuity, and flexibility; scientific rigour and pragmatism; integration; reflexivity and consideration of prior experience and acquired knowledge. These principles ensure that the training process is both theoretically sound and practically oriented, responsive to individual trajectories and institutional contexts.

We firmly believe that the effectiveness and impact of training academic staff for academic entrepreneurship can be ensured by grounding the process in a range of methodological approaches. These include: the systemic, synergetic, structural-functional, integrative, acmeological, axiological, reflexive, collegial, project-based, and the person-centred approaches.

The theoretical subsystem of the system for training academic staff for academic entrepreneurship is constructed through the synthesis of theoretical contributions from multiple disciplines. These include: Philosophy (social, cognitive, and radical constructivism; existentialism; pragmatism); Economics (institutional theory; theories of academic capitalism; the concept of the entrepreneurial university; the "triple helix" model); Sociology (theory of social capital; theory of social entrepreneurship; theory of social learning); Psychology (theory of personal development); Pedagogy (the concept

of lifelong learning; adult learning theory; transformative learning theory; experiential learning theory).

A key component of this subsystem is the structure of academic staff's readiness for academic entrepreneurship, which encompasses motivational, cognitive, operational, and personal components.

To substantiate the content-technological subsystem within the system for training academic staff for academic entrepreneurship, a set of core functions has been identified. These functions are essential for the implementation of academic entrepreneurship and include: motivational-stimulatory, analytical-exploratory, diagnostic-design, organisational-managerial, and reflexive-creative. Their delineation has informed the determination of the substantive content of academic staff training, as well as the selection of appropriate instructional formats and teaching methods, aligned with the capacities of the university's professional development system.

The content of academic staff training for academic entrepreneurship should encompass knowledge in the following areas: the concept and nature of academic entrepreneurship, the interaction between science, education, and the economy, the university as a hub of innovation and intellectual advancement, historical and contemporary trends in the development of academic entrepreneurship, the institutionalisation of academic entrepreneurship, strategies for the sustainable development of academic entrepreneurship, approaches to entrepreneurial motivation, the linear model of research and educational service commercialisation, mechanisms of technology transfer, the university's innovation ecosystem, grants and innovation support programmes, crowdfunding, venture capital, academic start-ups, and investor engagement, mentorship programmes for start-up support, intellectual property protection, start-ups and financial risk management, etc.

Within the context of our scholarly inquiry, particular emphasis is placed on the cultivation of entrepreneurial thinking and the development of a systemic, holistic understanding of academic entrepreneurship as a phenomenon intrinsic to the contemporary higher education landscape. This includes the capacity to identify opportunities for its implementation, the ability to set purposeful goals, and the possession of knowledge regarding the means, tools, and strategies necessary for their attainment.

We concur with Sagach's assertion that "the dynamics of a teacher's continuous professional growth, in addition to transformations in the structure of activity (motivational, goal-oriented, and operational components), also comprise internal transitions within the activity itself, through which its development occurs. These transitions include mechanisms such as the "shift from motive to goal", as well as empathy and emotional resonance. They are generated by the subject of professional development,

yet their form is determined by object-related relations independent of the subject. The essence of the "shift from motive to goal" mechanism lies in the fact that the educator's emotional state, specifically, the functional need for emotional enrichment, becomes a factor that determines the development of their personality and professional activity" [13, p. 324].

Contemporary researchers advocate for the use of diverse instructional formats within the framework of professional development for educators. With the aim of fostering the "professional and creative development of the educator-researcher within the context of a scientific-pedagogical school", Biruk recommends the implementation of various forms and methods of learning, including: "participation in the activities of scientific-pedagogical schools, research laboratories, academic centres, study groups and problem-based teams; presentations at conferences of various levels, seminars, round tables, webinars, summer schools; and engagement with distance learning platforms, among others" [4, p. 167].

In the process of modelling the development of entrepreneurial competence among heads of general secondary education institutions within the framework of lifelong learning, Bondar identifies a technological module and notes: "the technological module of the model reflects a purposefully designed process for the active development of entrepreneurial competence through didactic support for knowledge acquisition and the formation of practical skills; it includes pedagogically structured stages and conditions for implementing the development process, ensuring the achievement of the intended outcomes in entrepreneurial competence among school leaders within lifelong education" [5, p. 173]. According to the researcher, the principal forms of instructional organisation include "lectures with entrepreneurial content; practical workshops; problem-based seminars; and training sessions," while the recommended methods encompass "innovative methods and educational technologies (interactive techniques, business simulations, project-based learning, presentations, training sessions, mind mapping, round tables); as well as traditional methods" [5, p. 175].

Zahura substantiates the relevance of categorising the forms, models, and methods of professional development for physical education lecturers working in multidisciplinary higher education institutions into two distinct categories: institutional forms and models (internships, professional development programmes, advanced training courses, inter-institutional collaboration, interdepartmental cooperation within multidisciplinary higher education institutions, and collaboration between the department of physical education and other structural units of the institution), and individual forms and methods (mentoring, consulting, lecture-discussions, paired practical sessions, case method, business games, role-playing,

training workshops, masterclasses, seminars, webinars, discussions, modelling, delegation of functions, rotation, teamwork, cascade method, creative tasks, project method, portfolio development, and the narrative method" [8, pp. 249-250].

Taking into account the contributions of domestic scholars, this study proposes the use of appropriate instructional formats for acquiring knowledge about academic entrepreneurship and preparing for its implementation. These formats are aligned with the concept of lifelong learning and the theory of adult education. Specifically, the proposed professional development programme incorporates lectures, practical sessions, seminars, and training workshops. Additional modalities include consulting, mentoring, intra-university collaboration, and inter-university cooperation.

Among the teaching methods identified as most effective there are: the case method, game-based learning, discussion method, brainstorming, modelling, project-based learning, collegial collaboration, creative learning strategies, narrative method, and reflexive method.

To support the training of academic staff for engagement in academic entrepreneurship, a dedicated pedagogical toolkit has been developed. This toolkit includes: an electronic educational-methodological complex for academic staff, a training manual, scholarly-methodological guidelines, instructional materials, and educational information and communication technologies etc.

The diagnostic-resultative subsystem presents the criteria (motivational-value, cognitive-informational, activity-operational, personal-reflexive) and levels (low (basic), medium (reproductive), high (productive) of academic staff readiness for academic entrepreneurship, and specifies the expected outcomes.

**Conclusions.** According to the author's concept, a system for training academic staff for engagement in academic entrepreneurship has been designed through modelling. This system comprises the following subsystems: target subsystem (defines the purpose and objectives of the training process); conceptual-methodological subsystem (encompasses the overarching concept, guiding principles, and methodological approaches); theoretical subsystem: (integrates relevant theories and conceptual frameworks; outlines the structure of academic staff readiness for academic entrepreneurship); content-technological subsystem (includes the functional components of academic entrepreneurship implementation, theoretical and practical aspects of training, program content, instructional formats, teaching methods, and learning tools); diagnostic-resultative subsystem: establishes criteria and levels of academic staff readiness for academic entrepreneurship, and specifies the expected outcomes).

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#### **Гельжинська Т. Моделювання системи підготовки науково-педагогічних працівників до академічного підприємництва**

У статті представлено моделювання системи підготовки науково-педагогічних працівників до академічного підприємництва. В умовах трансформації вищої освіти та зростаючої ролі університетів як центрів інновацій, виробництва знань і суспільного прогресу академічне підприємництво постає як ключовий чинник модернізації освітнього простору. Метою статті є представлення особливостей моделювання системи підготовки науково-педагогічних працівників до участі в академічному підприємництві. Відповідно до авторської концепції, шляхом моделювання спроектовано систему підготовки науково-педагогічних працівників до академічного підприємництва. Ця система охоплює такі підсистеми: цільова підсистема (визначає мету та завдання процесу підготовки); концептуально-методологічна підсистема (охоплює загальну концепцію, провідні принципи (доступності, неперервності і гнучкості; науковості і прагматизму, інтеграції; рефлексивності і врахування попереднього досвіду та набутих знань), а також методологічні підходи (системний, синергетичний, структурно-функціональний, інтегративний, акмеологічний, аксіологічний, рефлексивний, колегіальний, проектний, особистісно-орієнтований); теоретична підсистема (інтегрує відповідні теорії та концептуальні засади (філософія, економіка, соціологія, психологія, педагогіка); окреслює структуру готовності науково-педагогічних працівників до академічного підприємництва); змістово-технологічна підсистема (включає функціональні компоненти реалізації академічного підприємництва, теоретичні та практичні аспекти підготовки, зміст програми, форми організації навчання, методи навчання та засоби навчання); діагностико-результативна підсистема (визначає критерії та рівні сформованості готовності науково-педагогічних працівників до академічного підприємництва, а також окреслює очікувані результатами).

**Ключові слова:** науково-педагогічні працівники, академічне підприємництво, університет, професійний розвиток, авторська концепція, система підготовки, цільова підсистема, концептуально-методологічна підсистема, теоретична підсистема, змістово-технologічна підсистема, діагностико-результативна підсистема.

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