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ORGANIZATIONAL AND PEDAGOGICAL CONDITIONS FOR MODELING THE EDUCATIONAL PROCESS OF PROFESSIONAL TRAINING OF IT SPECIALISTS IN INSTITUTIONS OF VOCATIONAL PRE-HIGHER AND HIGHER EDUCATION

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The article explores the pressing issue of quality professional training for future specialists in the field of information technology (IT) within the context of rapid societal digitalization. The aim of the study is to define, theoretically substantiate, and systematize the organizational and pedagogical conditions for the effective modeling of the educational process, focusing on the formation of value-deontological competencies of future IT professionals as a key component of their professional excellence.

The relevance of the research is determined by the growing need of the IT industry for specialists who possess not only profound technical knowledge but also a high level of professional responsibility and ethical awareness. The analysis of existing educational practices often reveals an insufficient integration of the value-deontological component, which can lead to the formation of specialists with a limited focus on the ethical and social aspects of professional activity. Ensuring the competitiveness of domestic IT professionals in the international labor market also requires the development of their value system in accordance with international standards.

The article substantiates the importance of a value-oriented approach in the training of future IT professionals. Scientific approaches to defining the essence, structure, and role of value-deontological competencies in professional development are analyzed. A set of organizational and pedagogical conditions that ensure the effective formation of these competencies is considered. Key conditions include: the integration of the value-deontological component into the content of academic disciplines and the use of interactive teaching methods; the application of innovative educational technologies, such as case studies, problem-based learning, and project activities, for modeling professional situations; the optimization of forms of control and evaluation that take into account the formation of value-deontological aspects; active cooperation with IT companies through the involvement of their representatives in the educational process and the organization of internships; and the creation of a favorable educational environment that promotes the formation of value orientations and professional culture.

The research findings can be used by scientific and pedagogical staff and developers of educational programs in the IT field to improve the quality of professional education. Further research

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may focus on the development and empirical verification of a model for the formation of value-deontological competencies of future IT professionals.

Key words: organizational and pedagogical conditions; modeling of the educational process; professional training; IT specialists; value-based and deontological competencies; teaching methodology; institutions of vocational pre-higher education; higher education institutions.

ОРГАНІЗАЦІЙНО-ПЕДАГОГІЧНІ УМОВИ МОДЕЛЮВАННЯ ОСВІТНЬОГО ПРОЦЕСУ ПРОФЕСІЙНОЇ ПІДГОТОВКИ ФАХІВЦІВ ІТ-ГАЛУЗІ В ЗАКЛАДАХ ФАХОВОЇ ПЕРЕДВИЩОЇ ОСВІТИ ТА ЗАКЛАДАХ ВИЩОЇ ОСВІТИ

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У статті досліджується актуальна проблема якісної професійної підготовки майбутніх фахівців у сфері інформаційних технологій (ІТ) в умовах стрімкої цифровізації суспільства. Метою роботи є визначення, теоретичне обґрунтування та систематизація організаційно-педагогічних умов ефективного моделювання освітнього процесу, спрямованого на формування ціннісно-деонтологічних компетентностей майбутніх ІТ-спеціалістів як ключової складової їхньої професійної майстерності.

Актуальність дослідження зумовлена зростаючою потребою ІТ-індустрії у фахівцях, які володіють не лише глибокими технічними знаннями, але й високим рівнем професійної відповідальності та етичної свідомості. Аналіз існуючих освітніх практик часто виявляє недостатню інтеграцію ціннісно-деонтологічного компонента, що може призводити до формування фахівців з обмеженою орієнтацією на етичні та соціальні аспекти професійної діяльності. Забезпечення конкурентоздатності вітчизняних ІТ-фахівців на міжнародному ринку праці також вимагає розвитку їхньої ціннісної системи відповідно до міжнародних стандартів.

У статті обґрунтовано актуальність ціннісно-орієнтованого підходу в підготовці майбутніх ІТ-фахівців. Проаналізовано наукові підходи до визначення сутності, структури та ролі ціннісно-деонтологічних компетентностей у професійному становленні. Розглянуто комплекс організаційно-педагогічних умов, що забезпечують ефективне формування зазначених компетентностей. До ключових умов належать: інтеграція ціннісно-деонтологічного компонента у зміст навчальних дисциплін та використання інтерактивних методів навчання; застосування інноваційних освітніх технологій, таких як кейс-методи, проблемне навчання та проектна діяльність, для моделювання професійних ситуацій; оптимізація форм контролю та оцінювання, що враховують сформованість ціннісно-деонтологічних аспектів; активна співпраця з ІТ-компаніями через залучення їх представників до навчального процесу та організацію практик; створення сприятливого освітнього середовища, що сприяє формуванню ціннісних орієнтацій та професійної культури.

Результати дослідження можуть бути використані науково-педагогічними працівниками та розробниками навчальних програм у сфері ІТ для підвищення якості професійної освіти. Подальші дослідження можуть бути спрямовані на розробку та емпіричну перевірку моделі формування ціннісно-деонтологічних компетентностей майбутніх ІТ-фахівців.

Ключові слова: організаційно-педагогічні умови; моделювання освітнього процесу; професійна підготовка; ІТ-фахівці; ціннісні та деонтологічні компетентності; методика навчання; заклади фахової передвищої освіти; заклади вищої освіти.

Introduction of the issue. Special attention to the value-deontological component in the system of professional requirements for modern IT specialists aligns with the prevailing view of higher education as a specific process of forming professional competencies. These competencies comprehensively and systematically ensure the performance of labor functions and contribute to the

development of the specialist's personality. The formation of such competencies reflects a high level of axiological culture and the presence of a deontological type of thinking [1].

Within the broader framework of our research project – "Theoretical and Methodological Principles for the Formation of Value-Deontological Competencies of IT Specialists" – we

designed the structure of value-deontological competencies of contemporary IT professionals. As a result, authorial definitions of axiological and deontological competencies were formulated:

1. **Axiological competence:** understanding the content of axiological knowledge, awareness of its significance for professional activities in the IT sector, mastery of skills and abilities for applying axiological knowledge, comprehension of the value dimension of the IT field, and recognition of professionally significant values;

2. **Deontological competence:** understanding the content of deontological knowledge in a socio-historical perspective, mastery of the conceptual and categorical apparatus of deontology, awareness of the significance of deontology for professional IT activities, and understanding the deontological dimension of the IT sphere [2].

The next logical stage of the research involves modeling the educational process for the formation of value-deontological competencies among future IT professionals [3; 4], based on the analysis of the conceptual and methodological foundations of the modern educational process, as well as the description of pedagogical technologies and innovations supporting this formation. Therefore, special attention must be paid to the **organizational and pedagogical conditions** (hereinafter referred to as pedagogical conditions) for modeling the educational process for developing value-deontological competencies of future IT professionals.

This necessity arises because the substantiation and conceptualization of such conditions are a crucial prerequisite for organizing the educational process aimed at forming professionally important competencies (both general and specific, including value-deontological ones), which represent the program learning outcomes and attest to the achievement of a certain qualification level (in our case, the first (bachelor's) level of higher education in the field of Information Technologies).

Current state of the issue. In the context of conceptualizing the term "pedagogical conditions," several fundamental considerations must be noted. Primarily, the notion of "pedagogical conditions" is one of the most widely used concepts in pedagogical practice, which can be explained by its significant role in the organization of the educational process. Almost no study dedicated to the organization (or modeling) of the educational process for the formation of professional competencies (general or specialized) bypasses the topic of pedagogical conditions. As a result, a large number of definitions of the concept have been developed.

These definitions can be categorized depending on the approach taken toward understanding pedagogical conditions:

1. **Systemic approach** – pedagogical conditions are seen as a system of forms, methods, and material prerequisites necessary for achieving specific educational goals [5: 118; 6: 230];

2. **Complex approach** – pedagogical conditions are understood as a special combination of factors (both external and internal) influencing the educational process and its outcomes [7: 51; 8: 243];

3. **Organizational-educational approach** – pedagogical conditions are viewed as a combination of educational activities aimed at the formation of certain competencies [9: 314; 10: 84];

4. **Motivational approach** – pedagogical conditions are considered as means of stimulating learners toward personal development, self-improvement, and self-education [11: 115; 12: 7-8].

Each of these approaches offers useful insights and emphasizes different aspects of pedagogical conditions. The diversity of interpretations enriches the theoretical understanding of the phenomenon but leaves space for its specification and reinterpretation within the context of particular pedagogical research and practice.

In our study, we particularly consider the related concepts of "pedagogical conditions" and "organizational-pedagogical conditions." Some

researchers distinguish between them, defining "pedagogical conditions" as the framework for implementing pedagogical technologies and models, whereas "organizational-pedagogical conditions" are understood as a broader set of educational activities encompassing institutional and administrative aspects [13: 94].

However, we argue that this distinction is not sufficiently justified, as the realization of pedagogical technologies or models is inherently linked to organizational educational activities. According to the Law of Ukraine "On Education" [14], educational activities are defined as activities aimed at organizing, ensuring, and implementing the educational process. Thus, "pedagogical conditions" and "organizational-pedagogical conditions" should be considered synonymous.

For the purposes of this study, we define "organizational-pedagogical conditions" (or simply "pedagogical conditions") as a phenomenon of pedagogical practice, existing as a functionally complex system of educational-methodological and pedagogical activities that structure the content and processes of the educational environment to achieve specific learning outcomes, particularly the formation of professionally important (general and specific) competencies.

Aim of the research is to substantiate and provide a meaningful description of the organizational and pedagogical conditions for modeling the educational process focused on the formation of value-based and deontological competencies among future IT specialists.

To achieve this aim, the following tasks are pursued:

1. Conceptualization of the notion "organizational-pedagogical conditions" within the context of the presented research;

2. Generalization of the experience of conceptualizing pedagogical conditions for the formation of professional competencies, particularly of future IT specialists;

3. Substantiation of the organizational-pedagogical conditions for modeling the educational process for the formation of value-based and deontological competencies among future IT specialists;

4. Systematization of educational and methodological activities ensuring the pedagogical conditions necessary for the development of such competencies.

Results and discussion. In the context of defining pedagogical conditions, several methodological approaches are particularly relevant. These approaches are reflected in Ukrainian pedagogical research and provide a methodological basis for the formulation of pedagogical conditions aimed at forming professional competencies.

For instance, Ukrainian researcher Valentyn Rohoza, while studying the formation of ecological values among future natural science teachers, identified the following priorities:

- Creating an individual educational trajectory toward the awareness and acceptance of ecological values;
- Designing educational situations that foster personal experiences of values (such as nature, responsibility, ecological norms);
- Forming the ability to assimilate and retransmit these values in professional activities.

Based on these priorities, Rohoza formulated the pedagogical conditions for forming ecological values:

1. Formation of an eco-centric understanding of nature;
2. Awareness and internalization of ecological values;
3. Ability to implement and transmit ecological values in educational and professional activities [10: 88].

Similarly, Nataliya Shetelia emphasized the importance of axiological aspects in professional training within the field of culture and arts. She identified the axiological competence as the combination of personal, professional, and socio-cultural values defining the value-semantic sphere of the individual, and highlighted the following pedagogical conditions:

1. Formation of the intellectual-cognitive basis for value motivation in professional activities;

2. Activation of value motivation for developing a well-formed value-semantic sphere and axiological culture;

3. Activation of life and professional practices based on values and axiological knowledge;

4. Encouragement of personal value-based self-development through active participation in creating value-semantic constructs [6: 235-237].

Another significant example is the work of Tetiana Honcharenko, who focused on the professional training of future software engineers. She formulated pedagogical conditions based on the structure of professional readiness, including motivational, cognitive, operational, and personal components. The pedagogical conditions she identified include:

- Integration of content from mathematical, foreign language, socio-humanitarian, and professional training;
- Activation of students in acquiring knowledge, skills, and personal qualities essential for software development;
- Application of a dual education approach by combining university training with professional IT company experience [15].

Overall, analysis of the practical application of the concept of pedagogical conditions shows the following trends:

- Emphasis on systemic organization of the educational process with clearly defined learning outcomes;
- Focus on the personality of the learner, particularly on their spiritual and value-semantic development;
- Alignment with the content and specifics of the future professional activity;
- Consideration of educational developmental environments;
- Use of innovative pedagogical technologies to stimulate self-development and self-education.

These tendencies are closely aligned with leading educational concepts such as learner-centered education, developmental educational environments,

and practice-oriented learning. Therefore, they must be considered when formulating organizational-pedagogical conditions for the formation of value-based and deontological competencies among future IT specialists.

Moreover, to ensure the objectivity of our research, an expert survey was conducted among ten university lecturers specializing in the training of IT specialists from six institutions of higher education in Ukraine.

Based on the theoretical analysis and expert evaluation, the following organizational and pedagogical conditions were identified as potentially effective for forming value-deontological competencies:

- Encouragement of value-deontological self-development through participation in social activities;
- Development of programmatic and methodological foundations for value-deontological competencies;
- Formation of the intellectual-cognitive (knowledge) component of value-deontological competencies;
- Motivation for mastering axiological and deontological knowledge through ICT tools;
- Activation of skills and abilities as elements of the intellectual-cognitive component;
- Activation of value motivation and development of a well-formed value-semantic sphere;
- Stimulation of values and personal qualities related to value-deontological competencies;
- Creation of an educational environment incorporating value and deontological practices;
- Stimulation of the development and application of values and qualities as elements of value-deontological competencies;
- Stimulation of self-development of value-deontological components of future professional activities.

According to the results of expert assessments, the most significant and promising conditions include:

1. Formation of the intellectual-cognitive component;

2. Activation of skills and abilities as elements of the intellectual-cognitive component;

3. Activation of values and personal qualities;

4. Stimulation of the development and application of values and qualities associated with value-deontological competencies.

Conclusions and research perspectives. Summarizing the process of substantiating and describing the organizational and pedagogical conditions for modeling the educational process aimed at the formation of value-deontological competencies of future IT specialists, we conclude the following:

Through theoretical analysis and empirical research (particularly expert surveys), key pedagogical conditions were identified, namely:

- Formation of the intellectual-cognitive (knowledge) component of value-deontological competencies;

- Activation of skills and abilities related to value-based and deontological knowledge;

- Stimulation and development of professional values and personal qualities linked to value-deontological competencies.

In future research, these identified pedagogical conditions will serve as the methodological basis for the practical activation of:

- Axiological and deontological knowledge,

- Associated skills and abilities,

- Professional values and personal qualities.

The successful formation of these competencies will signify the presence of a high level of axiological culture and a deontological type of thinking among future IT specialists.

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