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# THEORETICAL AND METHODOLOGICAL ASPECTS OF DESIGNING THE CONTENT OF PEDAGOGICAL EDUCATION

# ASPECTOS TEÓRICOS E METODOLÓGICOS DA DESENHO DO CONTEÚDO DA EDUCAÇÃO PEDAGÓGICA

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**Abstract:** Regularities and trends in the development of transformative systems are revealed, the nature and characteristics of human activity and relations in the technogenic environment, which are the original object in relation to the purpose and content of pedagogical education, are revealed; the nature of the interdependence of the content of pedagogical education and transformative activity, its results, consequences, development trends is established, and the ideal result of pedagogical education of students is presented in the form of principles for designing its content, a system of concepts, etc.; a model (structural matrix) of content design was developed, revealing its stages, components, connections, relationships, construction conditions, etc.; socio-cultural qualities are determined and the possibility of training a teacher of pedagogy, capable of providing training for a student as a subject of sustainable development, as a condition for the implementation of pedagogical education of students in a changing technogenic environment of a post-industrial society, is revealed.

**Keywords:** Higher education. Education system. Current stage. Pedagogical stimulation.

**Resumo:** Revelam-se regularidades e tendências no desenvolvimento de sistemas transformadores, revelam a natureza e as características da atividade e das relações humanas no ambiente tecnogênico, que são o objeto originário em relação à finalidade e ao conteúdo da educação pedagógica; a natureza da interdependência do conteúdo da educação pedagógica e da atividade transformadora, seus resultados, consequências, tendências de desenvolvimento é estabelecida e o resultado ideal da educação pedagógica dos alunos é apresentado na forma de princípios para a elaboração de seu conteúdo, um sistema de conceitos , etc.; foi desenvolvido um modelo (matriz estrutural) de design de conteúdo, revelando suas etapas, componentes, conexões, relacionamentos, condições de construção, etc.; determinam-se qualidades socioculturais e a possibilidade de formar um professor de pedagogia, capaz de formar um aluno como sujeito de

desenvolvimento sustentável, como condição para a implementação da formação pedagógica de alunos em um ambiente tecnogênico em mudança de um pós- sociedade industrial, é revelado.

**Palavras-chave:** Ensino superior. Sistema de educação. Estágio atual. Estimulação pedagógica.

## 1. Introduction

The improvement of education has always been and most likely will be an enduring concern of society. In the 20th century, and especially in the second half of it, a number of approaches and strategies for the modernization of education are being expressed and implemented. B.L. Wolfson, based on a deep analysis of the reforms of education systems, comes to the conclusion that "... the process of reforming education systems is actually going on continuously. Changes are constantly being made to the organization and structure of various parts of the system, from kindergartens to universities. But the current reform often does not solve the constantly accumulating problems leading to an aggravation of the crisis. Therefore, from time to time there is a need for deep reforms of a fundamental nature, which, as it were, sum up the previous stage of development and lay the foundations for the future. At the same time, it is emphasized that education in the world is developing against the backdrop of a deep and multifaceted crisis of modern civilization. It is indicated that the time has come to comprehend the past, the experience accumulated by mankind and the formation of a new paradigm of education and upbringing (Silva, Arruda, Zwierewicz, Stefenon, Ferreira, Klaar & Yamaguchi, 2020). This search is inherent in the world education system in general and its national structures in particular. The study of the possibilities of improving education is one of the goals of the activities of international organizations not only in relation to the United States, Japan, Western European countries, but also in relation to developing countries.

For Ukraine, the introduction of youth into the system of social relations and activities is a much more difficult task and high responsibility than for many other countries, since the solution of this problem takes place in conditions of significant socio-cultural changes, characterized by a high degree of uncertainty. Today, the need for a fundamentally new approach to education as a super-complex self-organizing system that interacts with other social systems and forms a single organism with them within the state is obvious (Iasechko S., Pereiaslavska S., Smahina O., Lupei N., Mamchur L. and Tkachova O. 2022).

The totality of the stated approaches, ideas and grounds for the modernization of education reflects a fairly stable in society and culture polyphonic view of the ways and directions of development of man and society. This, in our opinion, is due to several factors. Firstly, pedagogical science, having accumulated a sufficiently large amount of knowledge about the real pedagogical reality and using the achievements of philosophy, methodology, cultural studies, sociology, moves to a qualitatively different level of understanding its object of study - education. Secondly, humanity, including Russian society, is entering a new, never before post-industrial stage of its development, which leads not only to significant changes in the environment, but also to the emergence of fundamentally different priorities in the activities of each individual and society as a whole. and, consequently, to fundamentally different ways of preparing young people for life and work in this changed environment. Thirdly, the "legacy" of previous eras, fixed and manifested in the consciousness and practical activities of man and human society (habits, traditions, stereotypes), poses a threat not only to sustainable development, but also to human existence. The modern action of these factors makes the questions “What to teach?” extremely relevant. and “What to educate?”. That is, the problem of designing the content of education and creating a design theory in modern conditions should objectively occupy a leading place in the methodological concepts of modernizing education.

An essential feature of various approaches to improving education is that, as a rule, they poorly reflect the contradictory nature of transformative activity, do not always link education and cultural development of a person with overcoming the problems of the technogenic environment and its attributes, which have become aggravated in the transition to a post-industrial society.

The existence and development of man and society throughout the history of their development consisted and consist in the activity of transforming the world by changing a certain set of initial resources into an intermediate or final result that satisfies the needs of people. Over a fairly long period of evolutionary development, humanity has equipped itself with a powerful tool-tool arsenal that contributed to the efficient and rapid transformation of natural objects into consumer products - clothing, food, housing, transport, communications, etc., which allowed each individual person to be independent from adverse natural phenomena and provided him with a fairly well-organized and long-term life.

However, in the twentieth century, especially in the second half of it, it became obvious that a very significant qualitative change had taken place: the means and methods of transformation, together with consumer goods and methods of their use, turned from an instrumental arsenal into a living environment.

Under these conditions, the transformative systems and activities of people bring not only comfort and convenience, but also many concomitant consequences that add up to the "global problems" of mankind. The exacerbation of the problems of existence is associated, first of all, with the extensive nature of the implementation of transformative activities, enshrined in cultural principles, norms, relationships, which became especially noticeable in the context of the exponential growth of the Earth's population and the transition of society to the post-industrial stage of development. At the same time, the education system, together with other social institutions, has made and is making its own "contribution" to the implementation of the technocratic strategy of transformative activity, since each individual (with rare exceptions) was brought up by school and became the bearer of not only knowledge, but also the cultural foundations of society. However, the transformation of education in the direction of creating conditions for a consistent balanced development of a person, the human community and their transformative activity, if it occurs, is fragmentary, episodic and does not manifest itself in a sufficiently noticeable form (Tsilmak, O., Iasechko, S., Poplavska, M., Motlyakh, O., & Kabanets, O. 2022).

The main contradiction of the pedagogical education of students, built on the objectively established principles and norms of an industrial (extensive) society, is that its content and results no longer correspond to the nature of real transformative activity, its results, consequences and trends (Grant, 2013).

The contradictory nature of transformative activity is not the subject of study in the system of technological education, which is traditionally based on the principles of its effectiveness for a person and society in the current reality or in the short term, as well as in local conditions ("here and now") without sufficient consideration of the accompanying results and consequences, including those "postponed" into the future (Bystrova, 2015).

The education system introduces students to the same paradigm of transformational activity that has led to many local and global problems (Jiang, Du, Dong, 2017). The content of technological education of students does not reflect the problems

of sustainable development, focusing on teaching the student certain techniques, procedures, means of converting materials, energy, information in the process of work, leaving the general meanings, goals, problems, contradictions and trends of technological development outside the educational process , as well as the attitude of man and society towards him.

The problem of pedagogical education lies in the fact that in the context of the globalization of transformative activity, its results and consequences, the design of content is limited to some local area of influence of a person or a group of people on the transformed object and, to a small extent, takes into account the emerging cooperative effect from the joint action of many transformative systems. This significantly reduces the possibility for school graduates to implement sustainable development of themselves and their environment (Liu, Liang, Onuma & Rithkerd, 2022). Moreover, at present, a certain holistic theoretical and methodological basis for designing the content of technological education of students for the conditions of the transition of society (civilization) to the post-industrial stage of development has not been developed, which constitutes a scientific problem, which, in turn, consists of many problematic issues that do not currently have time of acceptable theoretical solutions, necessary from a historical point of view.

The methodological basis of the study was: (Koris, Mato-Diaz & Hernández-Nanclares, 2021), (Keller, Kesberg, 2017), (Jiang, Du, Dong, 2017). Philosophical reflections of the essence of education, its methodological and didactic foundations (Stoicheva, 2022), (Silva, Arruda, Zwierewicz, Stefenon, Ferreira, Klaar & Yamaguchi, 2020).

The purpose of the article is to develop the theoretical and methodological foundations for designing the content of pedagogical education for students and to empirically prove the possibility of its implementation in the conditions of the current pedagogical reality.

The object of the study is the content of the pedagogical education of students in the conditions of society's transition to the post-industrial stage of development.

The subject of the study is the theoretical and methodological foundations for designing the content of teacher education for students.

The main idea of the article is the idea of pedagogical education of students as a basic component of the formation of a graduate of a general education school as a subject

of sustainable cultural and technological development of himself and the environment of life.

Research hypothesis: designing the content of pedagogical education of students, which ensures the preparation of a graduate as a subject of sustainable cultural and technological development, will be successful if: regularities and trends in the development of transformative systems are identified, the nature and characteristics of human activity and relations in the technogenic environment, which are the original object, are revealed in relation to the purpose and content of teacher education;

- the nature of the interdependence of the content of pedagogical education and transformative activity, its results, consequences, development trends is established and the ideal result of pedagogical education of students is presented in the form of principles for designing its content, a system of concepts, etc.;

- a model (structural matrix) of content design has been developed, revealing its stages, components, connections, relationships, conditions of construction, etc.;

- socio-cultural qualities are determined and the possibility of training a teacher of pedagogy, capable of providing training for a student as a subject of sustainable development, as a condition for the implementation of pedagogical education of students in a changing technogenic environment of a post-industrial society, is revealed.

## 2. Methodology

To solve the tasks set in the dissertation, the following methods were used (comparative historical, logical and terminological analysis, modeling of cultural, scientific, technological, pedagogical elements of the environment of human life; analysis, classification and synthesis, modeling and idealization, forecasting and design of technological and pedagogical systems , concepts, relationships; promotion, justification, testing of hypotheses) and empirical methods (observation, questioning and testing of pupils and students, conversations with school teachers, university professors, scientists; study of pedagogical, technological, legal, organizational and methodological documentation; generalization pedagogical experience; planning, conducting, processing and examination of empirical research data).

## 3. Results

Main results obtained:

1.The methodological concept of the study is based on the following provisions: the pedagogical education of students is both a function and an argument for the cultural and technological development of a person and society; global and local problems, together with the achieved favorable conditions for the life of a person and society, are an integral indicator of the quality of technological education; the goal of pedagogical education is to prepare the student for his own activity, which ensures the sustainable cultural and technological development of himself and his environment (Mancini, Mameli, Biolcati, 2022).

The current real state of pedagogical education, represented in general education by the educational area, is defined by us as an empirical stage of development that precedes the creation of its theory.

2. The object-original model of the content of pedagogical education of students is the features, patterns and trends in the development of the environment of life, transformative systems and the technological culture of society; 1) the technogenic environment is an irreversible and changing supertotal result of education, culture and transformative activity; 2) transformative activity based on the principles of technocracy and utalitarianism leads to the formation of global problems for humanity; 3) the smallest evolving unit of transformative systems is some idea, which is embodied in artifacts, and their entire set ("technological gene pool") develops divergently and convergently; 4) the improvement of transformative systems occurs in the direction of increasing their diversity and increasing functionality, and the participation of a person in them is reduced; 5) in the conditions of territorial and informational disunity, the transforming systems are functionally and morphologically identical; 6) the leading link (basis) of transformative activity is design as a process of producing knowledge about the future reality; 7) technological culture on the scale of the human community is becoming more and more universal (unified) and ecosystem (Liu, Che & Zhu, 2022); 8) all transformative systems are interconnected with each other, identical in composition, structure, control system and together form a living environment; 9) technosystems in their development are influenced by culture and society ("civilizational pressure"), and culture and society change under the influence of the technogenic environment ("information and technological determinism").

3. The theoretical model of the emerging graduate is identical to the subject of sustainable cultural and technological development in reality and includes the following components: 1) worldview (panoramic vision of the cultural and technological environment and its properties, contradictions and development trends) (Keller, Kesberg, 2017); 2) attitude to transformative activity, its results and consequences (technological culture); 3) understanding, knowledge and possession of ways and means of transformation (technological literacy); 4) the ability to identify problems, search for and choose solutions (creativity and design)', 5) conscious understanding and goal setting of one's own transformative activity (goal setting).

4. The concept of designing the content of teacher education includes: 1) initial foundations (basis); 2) an idealized model (matrix) of content', 3) goals, principles, rules for its content; 4) block diagram. The structural elements of the content are real pedagogically adapted technologies for the transformation of materials (substance), energy, information, biological objects in the form of separate sections (content components). Each section includes invariant parts - general technology, technological culture, design technology, information technology (Koris, Mato-Diaz & Hernández-Nanclares, 2021). The educational material is built on a single system of basic terms (concepts). General scientific, functional, culturological and ecosystem relations, dependencies, meanings are accepted as system-forming links ("through lines"). At the same time, as the student moves along the educational trajectory, the educational-transformative type of activity, based on the principles of the unity of technology and culture, innovation, anticipation in time and ecosystem, etc., becomes the leading one.

5. The main elements of the model of the content of teacher education for students (the goal, principles, system of basic terms developed by us, general technology, technological culture, technology of project activities, pedagogical technology, didactic system of teacher training, etc.) are based on a single basis ("a person as a subject activities in a technogenic environment"), and technological education as a whole, together with humanitarian and natural sciences, forms a three-component structure of general education.

6. The basis of the process of preparing a future teacher of pedagogy, which provides the possibility of practical implementation of the concept of designing the content of teacher education for students in the current pedagogical reality, is its socio-cultural qualities: 1) the purpose (mission) of the teacher; 2) values, principles, norms of pedagogical culture; 3) professional knowledge, skills and competence. These qualities, which are a necessary condition for the implementation of pedagogical education of students in the changing cultural and technological environment of the emerging post-industrial society, are implemented through curricula for full-time and part-time students, curricula for courses and disciplines, an experimental textbook and teaching aids, methodological recommendations and requirements for fulfilling term papers and preparation for the final state certification.

## 4. Discussion

Researchers associate the formation and development of man with his ability to transform natural objects into tools, implements, and commodities in the process of labor activity. However, creative labor itself is not the only condition for a rational form of life (Freudenberger,1975). The greatest "invention" of man was teaching young people how to transform the material and energy objects of the environment. At the same time, the transferred experience of labor activity formed the basis for the formation of the personal experience of a young person, and training ensured a certain development (increment) of the transferred experience. In turn, labor (labor activity) and labor training were the fundamental basis for the formation and development of attitudes towards transformative activity and its results.

Methodologically, our research program is based on the general (generally accepted) structure of scientific theories, including the derivation of initial foundations, the construction of idealized objects (models), the choice and application of inference rules and methods of proof, as well as a set of conclusions and statements. The program provides for: the study of properties, phenomena, facts, events, relationships of reality (living environment, man-made environment, transformative system, a person in a transformative system, a person as a carrier of culture and as its creator), which is accepted as an object - the original in relation to content of technological education; building appropriate models; choice of rules for deriving conclusions and statements of the theoretical basis for

designing the content of technological education for students; determination of the components of this theoretical and methodological framework, which are: the goal of technological education, the principles of designing the content, the structure of the content, the rules and conditions for filling it with educational material, as well as the socio-cultural and professional-pedagogical qualities of the teacher as a condition for the implementation of the content of pedagogical education.

The goal of pedagogical education of students, the principles of designing content, the main personal qualities of a person as a subject of sustainable cultural and technological development, as well as a system of concepts that reflect (containing) the general contours and essence of pedagogical education, formed as a result of the study, were the basis for constructing a structural model of content, in which at least three lines of content growth can be distinguished: 1) explicit, subject content, reflecting phenomena and facts of objective reality (didactic line); 2) hidden from students, and often from teachers (latent, contextual), but which is planned and included in the content in an implicit form - worldview, thinking style, abilities, attitudes, etc. (educational line); 3) indefinite for students and educators, which is an unpredictable cumulative result of the joint action of a multitude, including external factors - interdisciplinary interaction, phenomena and facts of reality, interpersonal contacts, sociocultural situations, etc. (synergetic line).

## 5. Conclusion

1. The concept of designing the content of teacher education for students has been developed, including: the initial basis - a set of empirical and theoretical facts and phenomena inherent in the transformed reality and teacher education; theoretical idealized model of a school graduate as a subject of sustainable cultural and technological development; an idealized structural scheme (matrix) of the content; rules and principles of filling (addition) of the idealized model; a system of theory conclusions in the form of its elements (goal, design principles, content components, structural links). The purpose of pedagogical education is defined as the preparation of the subject of sustainable cultural and technological development of himself and the environment of life. Content design principles: unity of culture and technology, innovativeness, conceptual, timing, ecosystem, uncertainty and dynamism of development, focus on overcoming problems, etc. The structure of the content of teacher education: real pedagogically adapted

transformation technologies as components; invariant composition and structure of components; reflecting patterns, contradictions, problems and trends in the technological development of society and culture; system-forming connections ("cross-cutting" lines) - general scientific (fundamental), functional (pragmatic), cultural (including moral), ecosystem;

2. The nature of the dependence of the pedagogical education of students, represented in different periods in the form of a labor school, manual labor, labor training, etc., on the real state and degree of development of transformative systems has been revealed;

3. The main (general) parameters and indicators of transformative systems are determined: a) properties (morphological identity, raising the level of complexity and self-organization, interdependence, extraterritoriality, supranationality, etc.), b) composition (initial resources, methods, means, results, consequences , supersystem, control system), c) structure (connections: direct and reverse, internal and external, functional, managing, ecosystem, etc.), d) hierarchical levels (transition - operation - process - complex - technogenic environment), e) patterns of existence and development (divergent-convergent nature, civilizational pressure, drift and mutation of ideas, displacement of natural nature, independence from man, autonomization, dynamism, heterogeneity, etc.), f) stages of implementation (emergence of an image, design, implementation, utilization) ;

4. The technology of project activity has been improved as an invariant backbone component of the content, taking into account, on the one hand, the needs and universal values, and on the other hand, the consequences of the action of transformative systems. It includes the following steps: identification and analysis of the problem; drawing up a list of requirements for the future object; identification of shortcomings and search for solutions to the problem; choosing the best option, its visualization and materialization; making a decision on the possibility of implementation;

5. The socio-cultural qualities of a teacher of pedagogy (purpose, five-component structure of competence, pedagogical culture) have been established), the composition and structure of the main educational program have been developed, and the possibility of its preparation as a subject of the educational process and as a bearer of the meaning and content of technological education of students in the conditions of the current pedagogical reality.

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