

UDC 376-056.24/.36-044.337

**Pozdnyakova Elena,**

First Vice-Rector, Candidate of Pedagogical Sciences, Associate Professor, Associate Professor of the Department of Special Pedagogy and Special Psychology of the Municipal Higher Educational Institution 'Khortytsya National Training and Rehabilitation Academy' of Zaporizhzhya Regional Council

MODELING OF EDUCATIONAL SYSTEMS OF EDUCATIONAL AND REHABILITATION INSTITUTIONS AS A PEDAGOGICAL PROBLEM

The article is devoted to new approaches to the creation of unique educational systems of educational institutions, in particular educational and rehabilitation ones, where the educational process involves the creation of a special educational environment, saturated with elements of correctional content and means, methods and forms of organization of activities.

Simulation will be the leading method of creating an educational system for an educational and rehabilitation institution in the context of our research. When developing the model, we will be guided by the main methodological and conceptual provisions, taking into account the requirements of the standards of education and social order of the society.

Key words: *modeling; educational and rehabilitation institution; modern educational institution; pedagogical process; special educational needs*

Formulation of the problem. The requirement to create unique educational systems of educational institutions, in particular educational and rehabilitation, where the educational process provides for the creation of a special educational environment, saturated with elements of the remedial content of means, methods and forms of organizing activities, actualizes today.

New approaches to the organization of the educational process in a modern educational institution require a rethinking of the educational concept, updating of the contents, technologies of formation of the student's personality as a subject and designer of life, creation of a productive educational system aimed at the formation of a competent, competitive personality, who is able to creatively solve problems, aspires to change his life and the life of the whole country better.

The educational system of the educational and rehabilitation institution should become the mechanism of personal development of a student with special educational needs. In the National Strategy for the Development of Education until 2021, one of the main tasks of the practice is "the creation of an educational space that would serve not only the environment, but also the spiritual space of a student and teacher, which influences the development of personality" [20]. Unique educational systems of educational institutions are called to ensure the effective functioning of the educational space, in the process of development of which the specific conditions, peculiarities, interests and needs of all subjects of the educational process are taken into account.

One of the leading methods of creating an educational system for educational and rehabilitation institutions is modeling, which allows to predict the development of the pedagogical process, orientates all participants in the educational process to achieve the ultimate results of educational work, provides assimilation and effective use of new technologies, develops a systemic vision of problem solving, serves an effective factor in improving the quality of work of an educational institution.

The methodological basis for modeling educational, in particular educational systems, is actively developed by domestic and foreign scientists.

Analysis of recent research and publications. The problem of the content and organization of the modeling process, the conditions for the implementation of models was studied in works by such scholars as Yu. Babansky, L. Koval, V. Opachko, V. Maslov, E. Stepanov, S. Kasyarum, V. Shtoff, N. Sofronova, R. Gorokhov, V. Monakhov, A. Bezpalko, E. Yudin, N. Ostroverkhova, N. Selivanova and others.

The problems of creating a model of the educational system (for example, the division of the fields of education and enlightenment, modeling of the individual as a component of the educational system, the application of special methods in the process of modeling and implementation of model representations) and identified ways to solve them are determined in the studies of L. Novikova, I. Ermakova, V. Nechiporenko and others.

The analysis of scientific literature has shown ambiguity of some provisions of the methodology of modeling of educational systems, including educational ones. Therefore, in the framework of our research, it appears necessary to carry out a theoretical analysis of the basic concepts of "modeling", "pedagogical modeling", "model", "pedagogical model", to outline the methodological principles of the modeling process of the educational system of the educational and rehabilitation institution.

In scientific literature, the concept of "modeling" is considered as reproducing the characteristics of an object on another object (model), which is specially created for studying [13, p. 65], [14, p. 169].

L. Koval considers modeling as a method and a universal method of cognition that is used to study and transform phenomena in any field of activity. The researcher notes that in the methodology of science, the concept of "model" means a certain system of a definite fragment of natural or social reality, the creation of human culture, the conceptual and theoretical education - the original model [12, p. 498].

I. Novik understands under the modeling the method of indirect practical or theoretical operation of an object in which not the object itself is investigated, but is used an auxiliary artificial or natural system that is in a certain objective correspondence to an object that is known, is able to replace it at certain stages of knowledge and provides information about the object being modeled [22, p. 42].

Yu. Babansky's modeling determines, "as a method of studying objects of cognition on their models, as a process of constructing and studying models of existing objects and phenomena and constructed objects for the identification or improvement of their characteristics, rationalization of methods of construction, management, etc" [1, p 380-381].

Applied character is traced in the M. Opachko's definition of the concept of "modeling", which considers it as a process of layout, construction, schematization, the ideal representation of the process, phenomenon, object; as an idealization and representation of the essential features, characteristics, features of processes, phenomena, objects, which absorbs the essential features of real objects [23, p. 278]. V. Maslov argues that modeling is not only a method but also a subsystem (an independent stage) of management, which has specific functions and forms of manifestation. The main purpose of the simulation researcher determines the prediction of the purpose, content and technology of the future object modeling, as well as its reflection in a certain form – the model, the most adequate system, object, process, etc., which are subject to management [17, p. 4-6].

Along with the concept of "modeling" in pedagogical research for solving many tasks related to the management of cognitive, educational process and its improvement, the definition of "pedagogical modeling" is widely used.

In the Ukrainian pedagogical dictionary, modeling is considered as scientifically grounded design, which meets the set requirements and the planned construction of the future model of the investigated pedagogical process, taking into account the properties that are studied during the pedagogical experiment. The purpose of pedagogical modeling is to identify opportunities for

improving the educational process, finding reserves to increase its efficiency and quality on the basis of model analysis [8, p. 213].

From the point of view of the study of pedagogical phenomena, he considers modeling N. Ostapenko [24]. The author proves the idea that modeling allows to highlight the deep essence of the pedagogical process, to reveal the dynamics of the interconnection of its constituent elements, to identify the ways characterized by optimizing influence on the process of functioning of this phenomenon and to predict the final result. E. Judin considers modeling as a method of scientific cognition

The purpose of our research is to identify the possibilities for improving the pedagogical process, using pedagogical modeling and finding reserves to improve its quality and effectiveness on the basis of analysis of the proposed model.

The object of pedagogical modeling is the educational process, which is carried out in a certain socio-cultural space. The subject of pedagogical modeling, as a rule, are the specific elements of the educational process. The object and subject of simulation are more abstract categories of each researcher using the model [33, p. 46].

Considering the interpretation of the concepts of "modeling" and "pedagogical modeling" by various researchers, we can state that they are used in broad and narrow sense in accordance with the subject of research. We agree with O. Kasyanenko, who notes that traditionally

Presenting main material. The model of the educational system of the educational and rehabilitation institution must meet the following requirements:

- the model should be convenient for use;
- the content of the model must be consistent with the environment in which it functions and is part of it;
- the model should be adequate, that is, the determined goal should help to obtain the predicted result of the implementation of the indicated model;
- the model must be complete and accurate [21, p. 233-234].

The starting point for modeling the educational system of the educational and rehabilitation institution is its target and organizational specificity represented by specific features:

- ensuring the integrative activity of teachers, psychologists, correctional educators, narrow medical specialists and parents at different stages of the functioning of the educational system;
 - inclusion of rehabilitation component in educational activities;
 - implementation of complex rehabilitation of children with special educational needs;
- pedagogical modeling is used to determine the possibilities of improving the pedagogical process, finding reserves to improve its quality and effectiveness on the basis of analysis of the proposed model; is based on the results of research of system analysis, general theory of management, as well as modern psychological and pedagogical research [10, p. 125];
- development of personal potential of each student of educational and rehabilitation institution;
 - introduction of system-building activity;
 - ensuring the implementation of key educational directions;
 - individualization of the educational environment of the educational and rehabilitation institution;
 - development of cooperation system of educational institutions with representatives of other social institutions.

The main advantages of the simulation method are that it is possible to research phenomena and systems that are too complex in the objective reality, and the simulation provides additional cognition opportunities in the absence of the ability to directly study the object being studied or the phenomenon and the growth of a role theories in certain branches of science that can not be realized without the use of abstract concepts and terms [7], [2, p. 61-63].

The conditions for the use of simulation are defined: first, when the object of knowledge existed in the past, and at the time of the study it does not exist; and secondly, when the object of

knowledge may exist in the future; Thirdly, when an object actually exists at the time of the study, it is either extremely complex or inaccessible to knowledge at all; Fourth, when the investigated process proceeds either too fast or too slowly [19, p. 80-200].

In the scientific literature there is a large number of classifications of types of modeling. Thus, in the monograph edited by N. Sofronova, the following types of modeling are distinguished: deterministic and stochastic, static and dynamic, discrete, continuous, and discrete-continuous [28, p. 50]. The researcher emphasizes that deterministic modeling reflects processes in which there is no influence of random factors. Stochastic simulation takes into account probable processes and events. Static modeling is used when describing an object at a fixed time point, and dynamic - for studying an object over a period of time, operating with continuous, discrete, and mixed models [28, p. 50-51].

It is important to determine the main functions of the modeling: descriptive (helps to distinguish in the object being studied, the most significant features); constructive (allows to use the obtained results in new conditions) and heuristic (contributes to prediction of research results) [26, p. 83].

Simulation, like any process, involves the sequential implementation of stages that are differently determined by researchers.

Thus, M. Buslova proposes to implement the modeling process in the following stages: 1) statement of the problem; 2) theoretical and experimental training; 3) creating a model; 4) model research; 5) transfer of received information to the investigated object; 6) the nomination of a scientific hypothesis based on the knowledge obtained and its verification; 7) Inclusion of the knowledge in the scientific theory [5, p. 156-157].

V. Shtoff, in his turn, considers the simulation process more generalized, distinguishing three stages:

- 1) the transition from the real object to the model - the construction of the model;
- 2) experimental research of the model;
- 3) transition from model to real object, which is carried out by transferring the results obtained in the study of this object [32, p. 98].

S. Kasyraum distinguishes six stages of modeling: the setting of tasks and determination of properties of the investigated original; the statement of complications or the impossibility of studying the original in the natural state; the choice of a model that clearly captures the essential properties of the original and is easy to research; studying the model in accordance with the task; transfer of research results to the original; checking these results [11, p. 52].

Matrosova I.G. in the process of modeling offers to be guided by other stages: the definition of the purpose and specific problems of modeling; collection, systematization and processing of information related to the formulated tasks; allocation of the main factors that have a significant impact on the object being studied or phenomenon; construction of the model in accordance with the formulated tasks; transformation of the model into concrete socio-pedagogical conditions taking into account the selected factors; selection of the best variants of the received results; development of a set of recommendations for changing the object under study [18, p. 126]. The construction of a pedagogical model is very similar to a managerial cycle and occurs through: the definition of goals, regularities, principles, definitions of content, forms, methods, control systems and the evaluation of the result.

The main stages of constructing a pedagogical model include:

- the first stage: statement of the task. This stage is considered to be the most important of all stages of constructing the model. The correct definition of the task provides a solution to the managerial problem. The task should be formulated in such a way that the problem is sufficiently diagnosed;
- the second stage: the construction of the model. It provides for the collection of necessary information that will contribute to the achievement of a specific goal, the definition of information flows, the establishment of their dependence and interaction and the process of their structuring;

-
- the third stage: verifying the model for reliability. After constructing the model, it is necessary to check the degree of conformity of the model to the real object. This occurs when analyzing all the components that affect the solution of the task. Another aspect of the test is to determine the degree of probability and ability to solve with this problem model;
 - the fourth stage: the implementation of the model, which involves determining the degree of success of the constructed model;
 - the fifth stage: updating the model. After testing the model, some of its components may require modifications.

The process of creating a pedagogical model should be based on the principles:

- the principle of multifaceted description of the objects of the educational system;
- principle of consistency in determining the structure of the object of modeling;
- the principle of purposefulness and openness;
- principle of causality and unity of the essence of the object of modeling;
- the principle of the structural division of the object into its constituent elements;
- the principle of the continuity of the development of the modeling object;
- the principle of predictability;
- the principle of the reliability of the description of the object being modeled;
- the principle of variability;
- the principle of specificity of reflection;
- the principle of the reality of the conditions of implementation [3], [19].

Summarizing the basic provisions of modeling theory, we can state that the concept of "pedagogical modeling", in contrast to "modeling", is narrower and more specific, and is used in the process of designing improvements in the educational system. Despite some discrepancy in the interpretation and scale of the application of the phenomena studied, the result of both processes is the model. Consider this concept in more detail. In the dictionary of foreign language words, the concept of "model" is considered as a multi-valued concept: a sample of any product for serial production; a scheme for explaining an object, a phenomenon or a process in nature and society [4, p. 213].

In the great explanatory dictionary of modern Ukrainian, the concept of "model" is considered as an imaginary or conditional image (image, description, schema) of an object, process, or phenomenon used as a reflection of it [6, p. 535].

N. Serdyuk defines a model as a description of an object, object, process or phenomenon, composed to study its properties. A model may be another material or imaginary object, instead of the original object, provided that it corresponds to the properties of the model of the original object. In this case, the model will act as a peculiar tool of knowledge, which the researcher puts between himself and the object, studying with it the object being investigated. The model only reflects the main aspects of the system and, accordingly, has fewer elements than the object under study [27, p. 149].

The researcher notes that in pedagogy, the concept of "model" is used as a certain conceptual instrument, an analog of a fragment of reality used to preserve and expand knowledge about the features, the structure of simulated processes, and primarily focused on their management [27, p. 150].

At the same time, V. Krajewski emphasizes that any perfect model can not fully reflect the specifics of the laws of conscious, socially determined practical human activity, because it acts only as a result of an abstract generalization of personal experience, rather than a direct result of the experiment [14, p. 268].

Considering the modeling process from the point of view of the method of scientific research B. Glinsky, B. Gryaznov and others note that the model of the investigated object reproduces its dynamic or functional characteristics and makes it possible to investigate the changes of these characteristics under the influence of the predicted active actions. The options of these actions form the basis for developing the ways of the planned impact on the object. The results of

the simulation process make it possible to make a preliminary correction of the project's objectives. In the context of reproduction of the model of dynamic and functional characteristics of the object under study, researchers determine the functions of the model that are implemented in the process of organizing research activities:

- an illustrative function that allows to visualize the phenomenon, its internal structure, properties, etc.;
- explanatory function, which helps to understand the object more deeply, to form more clear representations about it;
- heuristic function, aimed at discovering new dimensions of being a certain fragment of social reality;
- the criterion function acts as a specific model for comparative analysis and evaluation of the entire object or its individual properties;
- prognostic function associated with obtaining information, forecasting the further functioning and development of the phenomenon being investigated;
- a transforming function that promotes the selection of optimal ways and ways of transforming social objects [7, p. 26].

A characteristic feature of models, according to N. Ostapenko, is their structure, which provides an opportunity to study the real world or to change it, realizing certain goals. The pedagogical sense of the model lies in the fact that it provides an opportunity to outline the actual and prospective tasks of the educational process, to discover, study and scientifically substantiate the conditions for possible convergence between probable, expected and desired results [24, p. 180]. In pedagogical researches different types of models are used in accordance with the set research tasks: structural, functional, theoretical, empirical, normative, models of similarity, etc.

G. Fesenko in his study distinguishes and differentiates the structural, functional and structural-functional model. The researcher notes that the structural model of complex objects reflects their structure and relationships between components, and the functional model is considered from the point of view of organization, planning, adjustment, dynamism, flexibility, and efficiency of ensuring the implementation of functions performed by the object. In pedagogical studies, the structural-functional model, which combines features of structural and functional models, is most frequently used [31, p. 98].

To general classification of models G. Fesenko adds a prognostic model, aimed at optimal allocation of resources and the specification of goals; conceptual model based on the information database and program of actions; an instrumental model by which one can determine the content, methods, to pick up forms and prepare means of carrying out the planned types of work and to teach teachers to work with pedagogical instruments; a monitoring model for creating feedback mechanisms and ways to correct possible deviations from planned results; a reflexive model that can be corrected in the event of unexpected and unforeseen situations [31, p. 99].

Conclusions and perspectives of further research. The peculiarity of the model of the educational system of the educational and rehabilitation institution is the clearly reflected systemic interconnection of its structural components. It is worth noting that in the process of developing a model of the educational system the priority role belongs to the system approach, the use of which in pedagogical activities involves the use of special concepts and methods, adherence to special principles, norms and rules.

The system approach allows to consider the simulated pedagogical object as a certain integrity, which acts as a complex and multifaceted pedagogical system. Modeling not only transmits and concludes a research cycle, it permeates it, because the theory, as a final, final model researcher comes through the refinement of the system of their initial representations. And the final model is only for this time period, because any replenishment of knowledge about the object requires from the researcher to clarify the model he created.

Consequently, the foregoing allows us to draw the following conclusions. Simulation, as one of the main categories of the theory of knowledge uses specially constructed models that are studied to determine or refine the characteristics and rationalization of methods of constructing objects. Before the simulation is applied when it is necessary to design the investigated object, to make corresponding corrections after approbation.

In the process of creating the educational system of the educational and rehabilitation institution, simulation is one of the most optimal methods that allows to highlight the actual and perspective tasks of the educational process, to discover, study and scientifically substantiate the conditions for possible convergence between the probable, expected and desired changes of the subject being studied. .

The constituent parts of the simulation, as a procedural system, are: object and subject of modeling; the process of formation and implementation of model representations; model and results. The components of the model of the educational system of the educational and rehabilitation institution are: the purpose, tasks, components and interconnections between them, the connection of the system with the external environment, the types and forms of activity, the criteria and indicators of the functioning of the system.

References

1. Babansky`j, Yu. K. (1988) *Pedagogy`ka*. Moscow : Prosveshheny`e. 479.
2. Bezpal`ko, O. V. (2015) *Kompetentnisny`j spektr majbutn`ogo social`nogo pedagoga yak osnova profesionalizmu*. *Problemy` osvity` : zbirny`k naukovy`x prac`* (p.p. 60–64). *Zhy`tomyr` – Ky`yiv*. 84.
3. Bespal`ko, O. P. (1989) *Sy`stemno-metody`cheskoe obespecheny`e uchebno-vospytatel`nogo processa podgotovky` specy`aly`sta : uchebno-metody`cheskoe posoby`e*. Moscow. 144.
4. By`by`k, S. P., Syuta, G. M. (2005) *Sloyny`k inshomovny`x sliv. Tlumachennya, slovotvorennya ta slovovzhy`vannya : bly`z`ko 35000 sliv i slovospoluchen` / za red. S. Ya. Yermolenko*. Xarkiv : Folio. 623.
5. Buslova, M. K. (1975) *Modely`rovany`e v processe poznany`ya (na matery`alax xy`my`y`)*. My`nsk : Nauka y` texny`ka. 160.
6. Vely`ky`j tlumachny`j sloyny`k suchasnoyi ukrayins`koyi movy` / ukklad. i golov. red. V. T. Busel. Ky`yiv ; Irpin`, 2005. 1728.
7. Gly`nsky`j, B. A., Gryaznov, B. S., Dыny`n, B. S., Ny`ky`ty`n, E. P. (1965). *Modely`rovany`e kak metod nauchnogo y`sledovany`ya (gnoseology`chesky`j analy`z)*. My`nsk : My`GU. 248.
8. Goncharenko, S. U. (2011) *Ukrayins`ky`j pedagogichny`j ency`klopedy`chny`j sloyny`k. Vy`dannya druge dopovnene i vy`pravlene*. Rivne : Voly`ns`ki oberegy`. 552.
9. Gordyeyeva, A. V. (2001) *Koncepciya pedagogichnoyi reabilitaciyi v umovax zagal`noosvitn`oyi shkoly`*. *Naukovo-metody`chny`j posibny`k*. Moscow : Akademiya. 34.
10. Gordyeyeva, A. V. (2001) *Reabilitacijna pedagogika: vid teorii do prakty`ky`*. Moscow : Akademiya. 212.
11. Ivashhenko, K. V. *Vy`znachennya sutnosti ponyattya “pedagogichna sy`stema”* [Electronic resource]. Access mode : <http://dspace.udpu.org.ua:8080/jspui/handle/6789/3628>.
12. Kas`yanenko, O. M. (2018) *Formuvannya gotovnosti majbutnix vy`xovateliv do roboty` z dit`my` doshkil`nogo viku v umovax inklyuziyi : dy`s. ... kand. ped. nauk : 13.00.04*. Mukachevo. 240.
13. Kasyarum, S. O. (2008) *Modelyuvannya zmistu navchal`nogo materialu*. *Pedagogichny`j al`manax : zb. nauk. prac`*. Xerson : RIPO. #3. p.p. 49–54.
14. Koshman, S. N. (2003) *Organizacijno-pedagogichni umovy` efekty`vnogo funkcionuvannya sy`stemy` reabilitaciyi social`ny`x sy`rit (regional`no-municy`pal`ny`j aspekt): Avtoref. dy`skand. ped. nauk. – Moscow*. 25.

15. Nacional`na strategiya rozvy`tku osvity` v Ukraini na period do 2021 roku [Electronic resource]. Access mode : <https://zakon3.rada.gov.ua /laws/show/344/2013>.
16. Ostapenko, N. M. Misce modelyuvannya yak metodu navchannya v pedagogichnomu proektuvanni (na materialy lingvometody`ky` vy`shhoyi shkoly`) [Electronic resource]. Access mode : <http://journalib.univ.kiev.ua/index.php?Act=article&article=1046>.
17. Ry`zhakova, L. A. Social`na pidtry`mka ditej, yaki potrapy`ly` u vazhku zhy`ttyevu sy`tuaciyu [Electronic resource]. Access mode : <https://nsportal.ru/shkola/sotsialnayapedagogika/library/2013/07/05/sotsialnayapodderzhkadeteypopavshikhvtrudnyu>. – 21.09.2018.
18. Yaky`mans`ka, I. S. (2014) Tekhnologiya osoby`stisno-oriyentovanogo navchannya v suchasnij shkoli. Moscow. 176.

Позднякова О. К. Моделирование освітніх систем освітньо-реабілітаційних закладів як педагогічна проблема

Стаття присвячена новим підходам до створення унікальних освітніх систем навчальних закладів, зокрема освітньо-реабілітаційних, у яких навчання передбачає створення спеціального освітнього середовища, насиченого елементами корекційного наповнення та засобами, методами і формами організації діяльності.

У контексті нашого дослідження моделювання трактуємо як провідний метод створення освітньої системи освітньо-реабілітаційного закладу. У розробленні моделі керувалися основними методологічними та концептуальними положеннями, ураховуючи вимоги стандартів освіти й соціальне замовлення суспільства.

Ключові слова: моделювання, освітньо-реабілітаційний заклад, сучасний заклад освіти, освітній процес, особливі освітні потреби.

Позднякова Е. Л. Моделирование образовательных систем образовательно-реабилитационных учреждений как педагогическая проблема

Статья посвящена новым подходам к созданию уникальных воспитательных систем учебных заведений, в частности образовательно-реабилитационных, где образовательный процесс предусматривает создание специальной образовательной среды, насыщенной элементами коррекционного наполнения, а также средствами, методами и формами организации деятельности.

В контексте нашего исследования моделирование рассматриваем как ведущий метод создания воспитательной системы образовательно-реабилитационного учреждения. В разработке модели руководствовались основными методологическими и концептуальными положениями, учитывая требования стандартов образования и социальный заказ общества.

Ключевые слова: моделирование, образовательно-реабилитационное учреждение, современное заведение образования, образовательный процесс, особые образовательные потребности.