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**SYSTEMATIC THINKING AS A MEANS OF IMPROVING THE QUALITY OF TEACHING DATABASE DESIGN IN ACADEMIC LYCEUM STUDENTS**

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**Abstract.** The article presents a general description of systemic thinking as a means of improving the quality of teaching database design to students of academic lyceums and substantiates scientific views based on sources in the field.

**Keywords:** Systemic thinking, database, parametric description, objective functions, metaphysical method of thinking, style of thinking.

We previously noted that database design is a complex, multifaceted creative process. It is based on the reflection of information about real-world objects as a holistic data model with attributive, functional, and communication properties. At the same time, the database creator must have the ability to synthetically perceive objects of the real world and consciously understand the diversity of information inherent in the holistic picture of the world, which determines the systematic thinking of the designer. In this approach to system design, information about the object (data) is considered as a specific attribute (parametric description), functional (target functions), and communicative properties (connections and relationships in the system).

This means that it is necessary to develop systemic thinking (STM) in future specialists in the learning process, as it determines new features of acquired knowledge and skills, a new level of development of intellectual abilities, as well as skills and abilities for quickly and effectively solving complex tasks, including quantitative and qualitative elements.

To solve the problem of improving the quality of database design based on the formation of systemic thinking, we need to clarify and expand the definition of "systemic thinking." For this purpose, we will provide a brief overview of the development of human thought in general.

Thinking is defined as a person's cognition of objects and phenomena of objective reality through mediation and generalization in their basic properties, connections, and relationships. Human thought has a socio-historical nature. It is inextricably linked with practical activity. Each specific historical period was characterized by its own way of thinking. Its features reflect the realities of the historical stage in all spheres of human life, which are consolidated in various forms of social consciousness (philosophy, ideology, science, art, law, morality, etc.) and influence the general style of thinking.

Each historically significant stage in the development of scientific knowledge is characterized by the uniqueness of scientific thinking, possessing common "stylistic" features.



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The next stage - the metaphysical method of thinking - is characterized by the predominance of analysis: "The division of nature into separate parts, the division of various processes and objects of nature into different classes, the study of the internal structure of organic bodies (bodies) according to their various anatomical forms - all this was the main condition for the enormous successes achieved in the field of natural science over the past four hundred years. But this method itself left us the habit of considering things and processes outside their great connection, in isolation and therefore - not in motion, but in a stationary state, mainly not changing, but eternally unchanging, not alive, but dead."

A new, higher level of systemic cognition is represented by the dialectical method of thinking. Representatives of classical German philosophy - I. Kant, I. Fichte, and F. Schelling - contributed to the development of dialectics. Kant gives direct reflections on the systemic nature of thought and its development:

"Unity achieved by reason is the unity of the system." But Kant considered the system only ideal: "By system I mean the unity of diverse knowledge, united by one idea."

The study of the processes of cognitive development, the relationship between cognition and reality, led Hegel to the final formation of dialectics. The interconnectedness of all concepts without exception, the transition of all concepts from one to another, the relativity of contradictions between concepts, and the similarity of contradictions between concepts are of particular importance. Moreover, each concept has a certain relationship, a certain connection with other concepts.

At the present stage of the development of science, the systemic approach is becoming the leading methodological direction. The systematic direction of scientific research, as a stable, general form of the cognitive process, acquires the character of a "method of thinking," which includes the historical norms of the theoretical thinking of the scientific and technological revolution. The systematic style of modern science, which replaced the analytical style of classical science and the synthetic style of non-classical science, is not simply a combination of analysis and synthesis; it represents a new stage in the development of scientific thought, encompassing previous styles in a modified form. The orientation of thinking towards a systematic approach in the activity of cognition and transformation constitutes a "stylistic" feature of modern scientific thinking.

A study of the literature on the research topic showed that currently there is no unambiguous interpretation of the definition of "systemic thinking." Depending on the purposes of this concept under consideration, different authors give different definitions. For example, systemic thinking (STM) is defined as the highest form of human cognition. In this case, the processes of representation, analysis, and study of objective reality from the point of view of achieving the set goals are based on the ability to form a holistic image of the object of research from various material objects, situations, phenomena, and processes distributed in the space-time environment, the ability to construct and solve the problem of its systematic study based on the systematic use of the possibilities of



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mathematical and methodological tools under conditions of conceptual uncertainty, as well as the researcher's knowledge, experience, intelligence, intuition, and foresight.

The definition of systemic thinking is approached from the point of view of information. Systemic thinking should be understood as the ability to synthetically perceive the objects of reality and consciously understand the diversity of information inherent in a holistic picture of the world. In particular, information about the object should be considered both as attribute properties (parametric description), as functional properties (target functions), and as communication properties (connections and relationships within the system).

Systemic thinking is defined as the process of solving problems based on the principles of a systemic approach using methods of system analysis.

Using the computer metaphor, "we can say that in our brain there are many fragments of separate programs combined to solve a particular problem in a particular situation." Systemic thinking is the ability to adapt a set of one's abilities to the conditions of a certain situation, which are always different.

Systemic thinking is considered a qualitatively new state of consciousness, while others define it as the choice of a certain position, point of view, or worldview.

Systemic thinking is a method that allows you to identify certain patterns and meanings in a number of events and phenomena in order to better prepare for the future and have the ability to influence it.

In general, systemic thinking has an interdisciplinary nature. It serves as a general scientific methodology based not on the laws of a particular science, but on the general theoretical basis of materialistic dialectics.

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