Educational Elements and Logical Structures of Information Modeling Education in the Context of Creating Digital Educational Resources

Siradjev Saloxiddin Negmatovich

Researcher of Karshi Engineering Economics Institute;
Tel: +998 91 213 99 29; goldsagf@gmail.com

ABSTRACT

This article presents educational elements and logical structures of Information Modeling education in the context of creating digital educational resources. In addition, factors are presented that ensure the internal structure of the content of education in its integrity and relative independence.

Keywords: Digital education, information modeling, educational elements of Education, logical structures.

Introduction. In didactics, it is accepted to distinguish the concepts of "content of education" and "content of educational subject", therefore, for example, the sequence of choosing the content of educational subject has two aspects: the content of education is an element of the methodical education system is to choose as and turn it into the content of the academic subject or, in other words, into the content of teaching a specific educational subject, which in turn is a specific implementation of the methodical system.

In our scientific research, we present the educational content (according to V. I Genetsinsky [1992]) in a concise form in order to master all the components of the content of professional education at the appropriate level and field in the educational programs, and the teaching activities of pedagogues and We understand it as scientific information about studying the pedagogically based, logically arranged and textual materials that determine the cognitive activity of students in the educational programs.

At the same time, the uniqueness of the didactic form of presenting a certain element of knowledge in the content of education is that this form allows the object of pedagogical influence to appropriately manifest (reproduce, reflect) this element in his mind, contributes to the development of consciousness, guides it with values (worldview), programs its cognitive activity in a certain way, allows to assess (diagnosis) the level of mastery achieved. The most important thing here is that the creation (construction) of the didactic form of presentation can be done only on the basis of sufficient consideration of the content of the relevant knowledge element.

In addition, according to V.S. Lednyov [1991, p.45], the content of education should be characterized as a system of didactically processed knowledge in the subject area, which takes into account the following from the point of view of the systemic-structural approach: determining the place in the metasystem; determine the optimal set and characteristics of components that ensure the effective operation of the system and its development; establishing connections between components.

Thus, according to the concepts presented above, we need to reveal the internal structure of the educational content (informational part and logical order), as well as

the factors that ensure its integrity and relative independence (V. P Bespalko [1989]):

— educational elements of theoretical (basic) material, which are a set of basic concepts in a specific field of science and the connections between them (they are, in addition to the basic or basic concepts of a specific subject area, various fundamental ideas for learning specific concepts and there may be different approaches);

— task materials determined in accordance with the theoretical material and designed for the development of specific skills and abilities of the students for the relevant field of knowledge;

— inter-subject and intra-subject relations between educational elements.

Next, we rely on the point of view of the content model of learning a specific educational subject consisting of two blocks (according to the scientific work of [Laptev, Rijova, Shvetsky, 2003]). The main part of the educational content includes:

1) subject part - description of the studied object within the scope of the subject, including "knowing" it by defining concepts (epistemology), studying statements and theorems that reveal the construction and characteristics of the studied object;

2) part of activity — algorithms, technologies, methods and their application on a computer. An auxiliary block of educational content is questions on the history of the studied scientific subject, as well as auxiliary sections in other (for example, mathematics, computer science and pedagogy, etc.) fields of science. It is known that the auxiliary block contains information related to other subject areas (concepts, assertions, theorems, algorithms, tasks). In some cases, this auxiliary block can be transferred to the main block of educational content.

Taking into account the main components of the educational content, it is impossible not to take into account the point of view of T. Sergeeva [1991], because according to him, the following four components should be distinguished in the teaching content of a specific educational subject: 1) system of knowledge; 2) reproductive (both subject-specific and general education) skills that the student should acquire during the educational process; 3) creative skills that the teacher subjectively acquires new knowledge through independent search; 4) personal component.

It should be noted that in our research we do not pay attention to the personal component of the educational content, because our research does not focus on the individualization and humanization of education in the field of information modeling, but on education through the traditional approach in this field for the pedagogical education system. lim is focused on selecting content and structuring it.

As for other components, according to our concept, the first component is reflected in the theoretical block of the educational content, and the second and third parts are reflected in the task material.

The concept of information modeling educational content in the context of creating the RTR that we compiled (see: § 1.5) has a bright technological direction, and readiness for information-analytical activities requires theoretical knowledge, methods, algorithms and technologies suitable for the types and stages of professional activities of the specialist. , as it is formed on the basis of the ability to use it to solve professional tasks based on selection, the content and structure of education, in our opinion, has the following two components:

1) theoretical knowledge defined by a set of basic concepts, laws, principles, modeling theory, technology and practical considerations and reflected in the theoretical block of educational content;

2) practical-technological skills determined by a set of practical skills and skills based on the acquired theoretical knowledge in the field of modeling, corresponding to the stages of the computing experiment or the stages of the design and development of digital educational resources using information modeling in graphs (educational content, including technologies - should be based on practical-technological block of task materials).

We describe the structure of the educational content in the form of a scheme (see Figure 3), and it shows both the main

components of the educational content and the main sections that should be allocated when teaching information modeling to future informatics teachers. let's see. In Figure 3, the following symbols are used: 1) elements of the same class are separated in the same way; 2) semantics of connections between elements (indicators): < - > • — means "connected"; I — "includes"; f — "composed of"; 3) the "thick" frame covers the main components of the educational content.

The main block of the theoretical material consists of two parts: the subject part includes the theoretical foundations, technological and practical aspects of information modeling in graphs in the field of science, and among them there are 8 educational elements - the main sections: (a) concepts of system theory; (b) basic concepts of general modeling theory (or fundamentals of modeling theory); (v) basic concepts of information modeling theory; (g) basic concepts of the theory of finite systems (sign, marked systems); (d) mathematical foundations of information modeling in graphs; (ye) issues of theory and technology of information modeling in graphs and trees; (j) issues of theory and technology of information modeling of abstract data types; (z) issues of theory and technology of information modeling in pedagogical design (development and creation of digital educational resources).

The activity part includes algorithms and their implementation, more precisely, the technology of implementation of practical tasks of information modeling in graphs with the help of various, including computer tools (information systems of various forms). Algorithms in our research work are represented by a wide category of algorithms on graphs, which mainly include algorithms of the polynomial (R) category of temporal complexity, as well as separate algorithms of the categories of exponential (B) and nondeterministic polynomial (No) complexity. In the implementation of algorithms, different sign systems are used (natural language to describe the idea of the algorithm, formalized description of the mathematical model, formalization in pseudo code, programming language).

Auxiliary block: (a) modeled history issues; (b) issues of didactics, pedagogical design, mathematics, informatics and other scientific fields not included in the main block; (v) should include issues of propaedeutic content, which should be relied on in the main block.

The task materials are directly related to the theoretical materials, and the theoretical materials are rationalized according to the functions of the educational tasks, which are manifested as educational tools and educational goals according to the existing facet classification of the tasks during their use in the educational process. - determined after objective analysis (see: [Laptev, Rijova, Shvetsky, 2003, p.264]).

Conclusion / Recommendations. Thus, the structure of the proposed educational content reflects the technological direction of the educational concept (see § 2.1), the theoretical basis of modeling future informatics teachers in graphs and the methods of information-analytical activities of the informatics teacher. defines the components of application training and helps to develop certain knowledge and skills in the field of information modeling and pedagogical design of RTR in this category of students.

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