

## THE STRUCTURE OF THE TUTORIAL "PHILOSOPHY AND METHODOLOGY OF SCIENCE" FROM THE SYSTEM APPROACH PERSPECTIVE

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The article explores from the system approach perspective the basic structure and content principles of the tutorial on the "Philosophy and Methodology of Science" for master students studying in English. It is outlined different views about functions that the tutorial should perform, including the author's opinion. The article then determines the system-forming factors for the tutorial and its main aims. It goes on to the author analyses the substrate and procedural teaching elements in the tutorial. The article then examines the tutorial's spatial, genetic, functional, horizontal, and vertical structure. The conclusion proposes the variant of structure for the tutorial "Philosophy and Methodology of Science".

***Keywords: textbook theory, system approach, tutorial's structure, philosophy and methodology of science, tutorial for students studying in English***

The modern educational process is characterised by a wide access of students to information. Therefore, the educational literature should be adapted to the new communicative situation and reflect the specifics of teaching students in English.

The research aim is to identify from the system approach perspective the basic structure and content principles of the tutorial on the "Philosophy and Methodology of Science" for master students studying in English.

In the systematic approach, the system is understood as a limited set of interacting elements that are in stable relationships with each other. Such unity has the characteristic of integrity. The system as a whole is thought to contain qualities that neither its elements, taken separately, nor a simple "arithmetic sum" of elements possess. It can be assumed that such an emergent property in the tutorial "Philosophy and Methodology of Science" is its ability to provide content for making up students' own minds about scientific claims in the wider philosophical contexts as well as their own values and beliefs. The curriculum for the above-mentioned discipline is structured in such a way that students can get to know various philosophical key ideas and value judgments. The student's task is to assemble their own world picture from these "puzzles".

The important system research stage is the determination of the system's functions in relation to other systems.

There is a large range of opinions about the main functions of the tutorials in the pedagogical literature. Their priority for authors depends on the discipline being studied, the target audience, the education level and other features. The following functions are most often distinguished:

- informational, the essence of which is that tutorials should convey the content of the studied science;
- teaching. This function means that tutorial is a way of organising the cognitive students' activity, the process of the education content's assimilation.
- didactic. "In general, the didactic function of a textbook is understood as its purposefully formed properties (qualities) as a carrier of the education content and the main book learning tool that most fully meets the intended purpose of the textbook in the process of implementing the content of education in the conditions of developing personality training" [3, p. 167]. In other words, the textbook should answer the questions "what to teach?" and "how to teach?"

– self-education. It is about learning how to acquire knowledge independently and how to work with a tutorial with the help of the tutorial itself [2, p. 31].

More additional functions are often mentioned such as:

- systematisation, consolidation and control;
- motivation;
- creative (development of creative thinking);
- developing personality (formation of a worldview);
- integration, etc.

D. D. Zuev and D. V. Chernilevsky add to them a transforming, coordinating, stimulating functions as well as the function of directing the teacher's activities [2, p.31; 3, p. 169, 174].

In our opinion, the didactic function includes many of the listed functions.

V. P. Bespalko insists on the leading role of teaching textbook's function [1, p. 107] as the textbook is no longer the main source of knowledge after the Internet emergence. "The purpose of the textbook is changing. It becomes not a carrier of information, but first of all a tool for organising teachers' and students' educational activities with an emphasis on independent activity" [5, p.13].

R. P. Kaisheva considers that the dialogue function is very important as it allows us to inspire student's reflective thinking process, teaches to raise questions and to answer them, encourages the search for the solution of problems [3, p. 171].

T. S. Nazarova believes self-educating, teaching, motivating and creative functions to be the main ones for the new generation textbooks [Quote by: 2, p. 32].

To our mind, the tutorial "Philosophy and Methodology of Science" for master students studying in English should perform not only teaching, didactic and informing functions, but also developing personality, motivating, creative and self-educating ones. After all, to form a worldview and to develop reflexive and critical thinking are the main aims for this discipline.

As the tutorial "Philosophy and Methodology of Science" is part of teaching system used in the learning process, the author should take into account interdisciplinary connections and general aims of the master education training. The difficulty is that this discipline is taught at all Belarusian universities. Hence, the specificity of each specialty is almost impossible to be considered in one tutorial. The solution may be in focusing the textbook's content on peculiarities of specialties groups (engineering, natural sciences, humanities, etc.). Since this tutorial is being developed for master students studying in English, it would be possible to concentrate on specialties with the largest number of students, studying in English in Belarus. However, unfortunately, there is no any data about master students, studying in English at Belarusian universities. For this reason, we will proceed from the fact that the target audience of the discipline "Philosophy and Methodology of Science" are future scientists and teachers. From this perspective, the tutorial "Philosophy and Methodology of Science" should concentrate on thinking about science as a social institution and research activity, as well as on philosophical issues of the scientific research methodology. A discussion on worldview issues also should be included in the tutorial, as some master students will become teachers.

We should note that the determination of internal and external system-forming factors is among the main system method requirement. Such factors are generated by separate elements and groups of elements combined into a system. We concluded that the main system-forming tutorial's factor is its aim. This involves the claim that the system elements are combined and function for a specific purpose. At the same time, we should keep in mind that the tutorial is an artificially created system. This peculiarity means that such system constructing methods are set from the outside in accordance with specific goals, and the elements have a sufficiently high certainty. For this kind of system, the external system-forming factors are highly important. As for tutorials, one such external system-forming factor is the peculiarities of Belarusian education system functioning.

Based on the above, the main aims of the tutorial "Philosophy and Methodology of Science" should be 1) the formation of knowledge, skills, and abilities for pedagogical and scientific research work; 2) the dependence of the young scientists' worldview training.

Another issue about tutorial "Philosophy and Methodology of Science" subsystems is worth considering further. These subsystems, i.e. the main structural parts are the introduction, sections (chapters), the list of references, various appendices (for example, glossary, some parts of philosophical texts, etc.). In turn, the sections (chapters) consist of smaller subsystems such as the introduction, key terms, topics' content, and questions for self-examination.

The smallest tutorial's part (the system element) is the teaching element. Lavrentiev G.V., Lavrentieva N.B., Neudakhina N.A. define it as "a logically complete piece of information has to be assimilated" [4, p.155]. The widely held view that there are substrate and procedural elements in the systems. Substrate elements carry certain properties of system objects, affecting the processes occurring in the system. Procedural elements are groups of

specific interactions inherent in a given system that ensure its integrity and functioning [7, p. 231-235]. In our opinion, the substrate elements in the tutorial are notions (their definitions), principles, laws, regularities, facts, phenomena, processes, qualities of the studied objects, etc. Procedural elements are all those mental operations that set up interconnections between the substrate teaching elements to ensure their understanding and assimilation by students, as well as ways to represent the substrate elements. The procedural tutorial elements include methods on constructing judgments and conclusions, types of argumentations, diagrams, graphs, mental maps, photos, pictures, etc.

The main factors, uniting elements in systems are similarity, complementarity and completion of growing. In our view, in the tutorial "Philosophy and Methodology of Science", the elements should be combined primarily on the complementarity principle, which ensures the connection of both homogeneous and heterogeneous system elements.

The important system method requirement is to determine the system's structure. Structure is a philosophical category denoting a set of stable connections between elements that ensure the system's integrity and the preservation of its basic characteristics during external and internal changes. Structural connections include spatial, genetic, functional types of connections [7, p. 230].

The tutorial's structure, according to the previous definition should represent interconnected teaching elements and subsystems.

The tutorial's spatial structure is related to the order of the sections, topics, teaching elements, as well as to the connections of the procedural elements.

Genetic links reflect the principles of continuity, causal dependence between teaching elements. For example, it is worth using such connections to present the history of philosophy. The main philosophical issues analysis also can be based on genetic linkage when we study different views on the issue in the history of philosophy. Almost everywhere, if causal dependence takes place, we are talking about the genetic type of relationships.

Functional links in the tutorial express the role that teaching elements and subsystems perform in relation to other teaching elements and to the entire text as a whole.

When analyzing the system, its horizontal and vertical structures should be identified. Horizontal structures reflect single-order components and vertical structures demonstrate hierarchically organized multi-level elements. In the textbook, the horizontal structure includes interconnected notions from different sections, which have the same scope and play the role of teaching elements. For instance, the key concept from anthropology is a man and the interconnected term from the social philosophy of the same scope is society. An example of a vertical structure is the concepts' hierarchy in the ontology section based on the concept's scope criterion. The most general category is being. Then goes matter and spirit as concepts that describe two subsystems of being. These categories have less scope than being. Further concretization on the category "matter" leads to the appearance of such concepts as nature and society. Nature can be divided into natural environment and technology. The natural environment consists of living nature and inanimate nature.

The tutorial's structure usually contains an introduction, sections (chapters, paragraphs), conclusion, list of references, glossary.

The introduction (preface) to the tutorial assumes a description of the pedagogical system's aims, which will be recreated with the help of a tutorial. These aims should be measurable and evaluated [1, p. 41]. Before each chapter, these parameters are detailed in accordance with the specific chapter aims [1, pp. 74-75]. In addition, the preface should justify the system and sequence in presenting the material. Before each chapter, the logical structure of its content can be indicated. For international students it is very useful to give a small glossary on the most important concepts for this chapter [1, p. 104]. Diagnostic of educational material is provided by control questions and tests placed at the chapter's end. Test answers are located at the end of the tutorial.

The textbook's structure can repeat the structure of the science, which basics it expounds. However, this is optional. The tutorial's "Philosophy and Methodology of Science" structure largely reproduces the main philosophy sections. Besides, its structure is largely determined by the Standard Program-minimum on candidate exams, approved by the Ministry of Education of the Republic of Belarus on 13.08.2012 [6]. The program contains an element of variability, associated with the presence of two modules in it. The author can focus on natural and technical science module or he may consider in more detail a socio-humanitarian module. It depends on the tutorial's target audience. In any case, the section "Philosophy of Science" is considered in detail. The epistemology section is not presented, because the epistemological problems are expanded and deepened in the section "Philosophy of Science". Among the other sections, most of the attention is paid to the social philosophy. As for the history of philosophy, philosophical trends of the 19th-21st centuries are mainly analyzed here. At the same time, it should be borne in mind that some of the students who graduated from universities outside Belarus did not study philosophy there. Master students from China and Muslim countries are not familiar with the Western cultural and philosophical traditions. Therefore, in the tutorial "Philosophy and Methodology of Science" for students studying in English, the

text should include a brief excursion into classical European philosophy and a comparative analysis of Eastern and Western philosophy.

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