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GENERAL SCIENTIFIC ALGORITHM OF COGNITION AND FORMS OF SCIENTIFIC RESEARCH

D. Kostadinovich[1], Ya. V. Bondareva[2]
[1] University of Niš
Univerzitetskitrg 2, Niš 18106, The Republic of Serbia
[2] Moscow Region State University
ul Veri Voloshinoy 24, Mytischi 141014, Moscow Region, Russian Federation

Abstract
Aim. At the epistemological level, fixing the results of scientific research, to identify the forms of the process of searching for truth, which are categories, laws, principles, concepts and scientific theories.
Methodology. The work was carried out on the basis of a systematic approach, taking into account the interdisciplinary significance of the subject under study.
Results. It is revealed that epistemological forms acquire scientific status only if they reflect the essence of certain fragments of being, have their own specific ontological basis. Concepts (categories) reflect the essence of the elements of the subject area of a particular science; laws are the essence of their connections; principles – the essence of the ways (sequences) of links between elements of a particular subject field; concepts – the essence of the impact of classes of environmental phenomena on the phenomena studied by a particular science; theories – the essence of the influences of the environment on them as a kind of holistic formation.
Research implications. The results of the study can be used to improve methodological competencies at the stage of modernization of the education system.

***Keywords*:** cognition algorithm, concept, law, methodology, principle, theory

ОБЩЕНАУЧНЫЙ АЛГОРИТМ ПОЗНАНИЯ И ФОРМЫ НАУЧНЫХ ИССЛЕДОВАНИЙ

Костадинович Д.[1], Бондарева Я. В.[2]
[1]Университет в Нише
18106, г. Ниш, Университетская площадь, д. 2, Республика Сербия
[2]Московский государственный областной университет
141014, Московская обл., г. Мытищи, ул. Веры Волошиной, д. 24, Российская Федерация

Аннотация
Цель. На эпистемологическом уровне, фиксирующем результаты научных исследований, выявить формы процесса поиска истины, каковыми являются категории, законы, принципы, концепции и научные теории.
Процедура и методы. Работа выполнена на основе системного подхода с учётом междисциплинарной значимости изучаемого предмета.
Результаты. Выявлено, что эпистемологические формы обретают научный статус только в том случае, если отражают сущность определённых фрагментов бытия, имеют своё специфическое онтологическое основание. Понятия (категории) отражают суть элементов предметной области конкретной науки; законы – сущности их связей; принципы – сущности способов (последовательностей) связей элементов конкретного предметного поля; концепции – сущности воздействий классов явлений среды на феномены, изучаемые конкретной наукой; теории – сущности воздействий на них среды как некого целостного образования.

Теоретическая и/или практическая значимость. Результаты исследования могут быть использованы в совершенствовании методологических компетенций на этапе модернизации системы образования.

Ключевые слова: алгоритм познания, концепция, концепция, закон, методология, принцип, теория

Introduction

The general scientific research algorithm sets a certain logic of scientific research. The latter can be divided into two parts: the process of scientific search for truth (let's call this part epistemological) and the process of fixing the results of scientific research (let's call this part epistemological). Very often epistemology is identified with epistemology. This is acceptable within certain limits. At the same time, one can and should see differences between epistemology and epistemology. Their main difference is that the process of searching for truth has its own forms. They are well known: facts → problems → scientific hypotheses → evidence → scientific concepts [3].

Once again, we note that these are forms of the epistemological level. The epistemological level, which fixes the results of scientific research, has its own forms. They are: categories, laws, principles, concepts and scientific theories. Epistemological forms acquire a scientific status only if they reflect the essence of certain fragments of being, have their own specific ontological basis. We emphasize once again: concepts (categories) reflect the essence of the elements of the subject area of a particular science; laws are the essence of their connections; principles – the essence of the ways (sequences) of links between elements of a particular subject field; concepts – the essence of the impact of classes of environmental phenomena on the phenomena studied by a particular science; theories – the essence of the influence of the environment on them as a kind of holistic formation. As you can see, these forms of science are the means that serve the scientific algorithms of cognition [8].

Concepts (categories) as forms of science

First, we will conduct an analytical digression into scientific literature and try to understand the essence of concepts, laws, principles, concepts and scientific theories as strictly and objectively as possible. In the context of the integration of knowledge and the search for truth, it will probably not be a mistake to bring the idea that concepts are results in which the data of experience are generalized. Today, the definition of the concept as a form of science is popular, the features of which are presented in a fairly wide range on the pages of scientific literature.

The concept is quite often interpreted as a representation of something, a way of understanding something, intelligence, a judgment about an object, which includes a number of interrelated features. If we summarize all such approaches, we can state: a) concepts are forms of people's thinking; b) they are also forms of scientific knowledge, along with laws, principles, concepts, theories; c) the latter differ in their ontological foundations, and hence in their functions in scientific and practical processes; d) concepts, like all other forms of science, reflect the essential characteristics of the phenomena of reality; e) the ontological base of concepts is the essence of elements, parts, sides, properties of phenomena, processes [7].

If we agree with such an approach, and it is determined by the essence of the process of interaction between the cognizing subject and the object, which was discussed in the section devoted to the general scientific algorithm of cognition, all phenomena, without exception, are "opened" to the cognizing subject first by their elements, parts, sides. And the form that captures their essence in science is precisely the concept. In a word, at their core, concepts are forms of scientific knowledge that reflect the essence of the elements that make up the phenomena under study. Often terms are

identified with concepts, treated as concepts and at the same time considered as words expressing the meaning of the latter [1].

Let's not be unfounded. Here is an illustration in this regard: The term (from Latin terminus – border, limit) is a concept; a word that expresses the concept [4]. Without pretending to consider all the interpretations of the essence of terms presented in science, we note that they, as a rule, revolve around the above conclusions. To summarize them, we can state the following: terms are forms of language; terms are verbal means denoting concepts; terms play the role of objectifying people's thinking; term - formal logical means, in contrast to concepts that are content-logical, scientific forms; It is especially important to emphasize that concepts and terms have a common ontological basis - these are elements of the phenomena of cognition.

But if the concepts reflect their essence, then the terms are the means of verbal consolidation of the latter. Thus, terms are linguistic, formal-logical means denoting certain concepts of a certain subject area. In our opinion, the problem of unity and difference of concepts, definitions and definitions deserves special attention. There are various points of view on this subject in the scientific literature. Let's summarize them.

1. Quite often definitions and definitions are identified.

2. Often definitions are identified with concepts.

On this account, we give the following conclusion: "A definition is a concept that is delimited from other concepts in terms of content and volume." As you can see, a definition is a concept, although it differs from others in content and scope. It has long been known that all concepts differ from each other in content and volume. It follows that such an approach to the essence of definitions and concepts complicates the understanding of their specificity. In general, we agree with the following position: concepts and categories are forms of scientific knowledge; they have a common ontological basis – the essence of individual elements, sides, aspects, their relationships with each other; both concepts and categories reflect the essential features of certain classes of phenomena; categories are concepts that, in a particular period of development of society, have the highest degree of generalization of information about the essential features of phenomena [2].

In fact, if the concepts reflect the essential features of certain classes of phenomena, then the categories are the essential features of all classes of phenomena without exception. In other words, on the entire scientific horizon, only philosophical (general scientific) concepts can acquire the status of categories. However, within the framework of private or sectoral sciences, this status may have the most general concepts. The main indicator of a high degree of generality of categories is the fact that, unlike concepts, they are closely related to laws. Categories are essentially scientific concepts that reflect the essence of the elements of the analyzed phenomena but are in regular interactions with each other. Categories are concepts serving the laws of science. They are forms of expression of their content and essence. Finally, emphasizing the high degree of generality of general scientific categories, it should be noted that they are the basic forms of research serving the general scientific algorithm of cognition.

Laws as forms of science

Laws are the second most important form of scientific theory after categories. They are designed to reflect the essence of stable, necessary, recurring connections between the phenomena of reality. Such an attitude to the essence of laws has been formed in science for a long time. It is generally accepted. At the same time, there are certain features, and even differences in understanding the essence of laws as forms of scientific theory. This makes it necessary to analyze the scientific literature, the results of which allow us to see the features in the interpretation of the essence of the laws.

Feature 1. The law is rightly considered to be related to the concept of essence1, since it reflects the connections precisely between the essences of phenomena.

Feature 2. The law is primarily a connection, not an interaction, not a relationship of interdependence between phenomena. Although one can often find the definition of laws as necessary, essential, stable, recurring relationships between phenomena. If we consider that communication is such a relation, interaction between phenomena, without which they cannot exist, then the essential difference between the interpretation of laws, on the one hand, through communication, and on the other hand, through relations, interactions of phenomena, will become clear.

Feature 3. In the literature, one can find interpretations of laws that are presented both as a connection and as a relation of phenomena. This approach to the essence of the laws seems to us to be somewhat vague, in other words, inaccurate. The law is always a connection and only a connection, that is, such interactions without which phenomena cannot exist.

Feature 4. Often, the scope of laws is limited only by the connections between natural phenomena and society. At the same time, they act in the minds of people, in the public mind. In a word, in nature, society and consciousness.

Feature 5. Despite the fact that laws also operate in the minds of people, they are objective, that is, they are formed independently of it. This is rightly noted in many sources.

Feature 6. It seems to us very important, because it emphasizes the fact of the operation of laws not only between phenomena, objects, processes, but also their elements, the internal states of objects.

Feature 7. One cannot deny the truth of defining the essence of laws as invariant connections of phenomena. Really objective laws are invariant. This quality of them is manifested in the stability, independence of their existence from the consciousness of social subjects.

In the literature we can find conclusions that identify laws and principles. In particular, the following provision needs additional comments: "The laws of dialectics are laws that are the general principles of the development of nature, society and thinking." In this regard, it should be noted:

a) the laws and principles of science – its forms;

b) closely related forms based on each other;

c) "flowing" into each other, that is, in a given situation, the law can be transformed into a principle, as well as vice versa;

d) in a place with the fact that the law in each specific situation is the law, and the principle is the principle;

e) in any situation, their differences can be found based on their ontological foundations. For laws, these are essential connections, and for principles, this is a way of connecting phenomena, the result of which is the integrity of phenomena. In a word, the law and the principle of science have their ontological foundations and there is hardly any reason not to distinguish between them.

Let us dwell on the judgment, according to which the Laws underlie the regularities and trends in the development of phenomena. Since in reality the laws are connected with each other, there is a need to reflect these specific connections in science in a special form. It, in our opinion, is precisely the regularity. It reflects the essence of the links between laws. It can also be qualified as a law of laws, working in a specific subject area. On the pages of this work, we will talk about trends as specific processes. Looking ahead, we note that trends are the results of regularities.

Summarizing all of the above, we can propose the following definition of law as a specific form of science. Law is a form of scientific knowledge that reflects stable, necessary, essential and recurring connections between the elements of cognizable phenomena among themselves and phenomena with the environment. Practice shows that content and form, essence and phenomenon, systems and their functions, necessity and chance, organization and structure of phenomena, conditions and causes, causes and grounds, quality and content, functions and forms of phenomena, etc. [5].

In a word, all aspects of reality are naturally connected. This gives the right to talk not

about the three traditionally well-known laws offered by philosophy, but about the system of philosophical laws, which should include all the studied stable, necessary, essential connections between the universal phenomena of being. Therefore, we can talk about a system of philosophical laws, which today could include several dozen of them. This system is the subject of a special study. It seems to us that the hour has come for a careful research attitude towards it. In this work, it is simply not possible to pay additional attention to this problem. Perhaps this will be done later. At the same time, the context of this work persistently dictated the need to designate new approaches to the system of philosophical laws, which was formed due to the fact that, along with the system of philosophical categories, the philosophical algorithm of cognition presupposes the work of the system of philosophical laws. After the creation and use of their latest modern system, the possibilities of the philosophical algorithm of cognition will expand significantly.

Principles as forms of science

It was noted earlier that principles are a specific form of scientific theory. Their ontological basis is the essence of ways of links between elements of phenomena, objects, processes located in the same space and time. In a word, the previously presented general scientific algorithm of cognition orients us to the study not only of the essence of the pair connections of the elements of the analyzed phenomena (this task is solved by laws), but also to the study of the essence of the methods of their connections that ensure the integrity of the objects of knowledge. The forms expressing them in science are principles. It would seem that everything is clear. But this is far from being the case, since the analysis of the literature indicates a very wide and contradictory range of interpretation of the essence of such a form of scientific knowledge as a principle. statement about the axiomatic nature of the content of the principles. Of course, this is true, but, unfortunately, it cannot be considered as a distinctive feature of the principles. In our opinion, all forms of scientific knowledge are axiomatic in their essence, since they are called upon to objectively reflect the phenomena of reality. There are conclusions whose authors identify principles with laws.

Let us give an example: "Principle (Latin principium – the beginning, basis) – 1) the initial position of the theory that does not require proof (the same as an axiom or postulate) ... In the original sense of the word – a certain substance ... or law ... that underlies universe and from which everything that exists can be explained. But it is obvious that a principle is a principle, and a law is another form of science. In addition, there are precedents when the principles are not interpreted as methodological means. In our opinion, the identification of theoretical forms with means is not entirely justified. At the same time, on the pages of modern sources, one can find conclusions that the principles of social philosophy "represent general methodological guidelines from the standpoint of which the study of society is carried out." It was necessary to pay attention to the content of the system of philosophical principles also because the latter form, along with philosophical categories and laws, the theoretical and methodological basis for the functioning of the general scientific algorithm of cognition [6].

Concepts as forms of science

It is easy to see that the term "concept" is widely used in science. It would seem that this circumstance should lead to a very rigorous scientific interpretation of the concept of a scientific concept. However, the analysis shows that the named concept is interpreted in a very wide range, very contradictory, rather subjective. Let's give some arguments on this. Firstly, quite often a concept is presented as a certain system of views on a particular phenomenon. It must be agreed that every concept is a system. But consistency, as practice shows, is far from the only sign of a concept as a form of science. There is little rigor and certainty, informativeness in this

approach. Moreover, if he agrees with him, then any system of views on the phenomenon can be defined as a concept.

With a certain degree of tolerance, it can be recognized that each belief system carries a conceptual charge, but is not necessarily a concept. In our opinion, the concept has a number of essential features that distinguish it from other systems of views on phenomena. Secondly, those researchers who understand the concept as a system of views go a little further in understanding the essence of the concept, supplementing this message with the remark that this is also the main idea that reflects the content of the phenomenon. If we consider the idea as a form of knowledge that has reached the highest degree of penetration into the essence of knowable phenomena in given specific conditions, then with this approach one can see a certain increment of information about the essence of scientific concepts. The conclusion that the concept is "a concept, an image of a concept, a way of understanding, considerations and conclusions" sounds quite original. Such a definition contains many mysteries. In particular, questions remain open: what is the image of the concept, the way of understanding, considerations and conclusions? In fact, again, the ontological basis of the concept as a specific form of scientific knowledge is leaving the view. It seems to us that those researchers who consider the concept to be a theoretical and practical phenomenon are much closer to the truth. They orient us towards a theoretical-active approach to the content of the concept as a specific form of scientific knowledge. We emphasize that special attention to the essence of concepts as forms of science was due to the fact that they are necessary scientific and theoretical elements of the general scientific algorithm of cognition.

Conclusion

There is every reason to believe that all scientific forms "work" in philosophy: categories, laws, principles, scientific concepts, and they represent a scientific theory. In unity, they reflect the essence of the phenomena of its subject area. This gives the right to note once again that true philosophical knowledge is scientific. This is on the one hand. On the other hand, these forms have a general scientific purpose, which means that they are forms of a general scientific algorithm of cognition.

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INFORMATION ABOUT THE AUTHORS

Danijela D. Kostadinovic – Dr. Sci. (Philology), Assoc. Prof., Faculty of Philosophy, University of Niš (The Republic of Serbia);
e-mail: danijela.kosladinovic@filfak.ni.ac.rs

Yana V. Bondareva – Dr. Sci. (Philosophy), Prof., Head of the Department, Department of Philosophy, Moscow Region State University;
e-mail: bondareva.iana@yandex.ru

ИНФОРМАЦИЯ ОБ АВТОРАХ

Костадинович Даниэла – доктор филологических наук, доцент факультета философии Университета Ниша (Республика Сербия);
e-mail: danijela.kosladinovic@filfak.ni.ac.rs

Бондарева Яна Васильевна – доктор философских наук, профессор, заведующий кафедрой философии Московского государственного областного университета;
e-mail: bondareva.iana@yandex.ru

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