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THE INFORMATION EVOLUTION OF THINKING: FROM DATA TO UNDERSTANDING.

INFORMATION METHODOLOGIES, PERCEPTUAL PARADIGMS

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S. A. Ivanova

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INFORMATION METHODOLOGIES, PERCEPTUAL PARADIGMS

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Author:

Ivanova, Svitlana A., – Candidate of Philological Sciences (Ph. D.), Associate Professor, Associate Professor of the Department of Advertising and Public Relations, ORCID: 0000-0002-9065-8687

Editor:

Shevchenko Gennadij Ya. – Candidate of Sciences (Engineering), Associate Professor, Partner, NGO "Noosphere Association", ORCID: 0000-0003-3984-9266

Reviewer:

Maxim Korneyev – Doctor of Economic Science, Professor, Department of International Economic Relations, University of Customs and Finance, Dnipro, Ukraine, ORCID: 0000-0002-4005-5335

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INTRODUCTION

This paper is devoted to the study of the processes of cognition, information interaction and cognitive transformation of consciousness in the conditions of crisis and post-information reality. The main attention is paid to the development of the methodology of «infology» as a practical tool for analyzing and organizing information. Through the deconstruction of established paradigms of thinking and the formation of new mental models, the author proposes an approach to working with information, aimed at the development of the subject of cognition – Homo Informationalis.

The work considers the role of information structures in the formation of worldview, emphasizing the importance of cognitive reflexion, systemic thinking, and the ability to conscious meaning-making. It analyzes the mechanisms of crises as transition points and the possibility of attainment of truth in a fragmented reality. Tools for interpreting, filtering and reconstructing information are described, including morphological schemes, question matrices and principles of deep knowledge.

As a result, a universal methodology is formed that allows to work effectively with information, to go beyond distorted models of perception and to organize the thinking process in the direction of sustainable understanding and systemic change.

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1.1 Modernity and information

The problematic development of the modern world is that it is filled with various crises: political, economic, ecological, existential, etc. These crises are intertwined and create a picture of universal confusion, meanings channel off and disappear from understanding.

We believe that the information crisis is the root cause of all these crises. Naturally, it is interesting to figure out what it is, and this paragraph of the monograph is devoted to it.

Issues related to the study of the nature of information have been on the pages of scientific journals and monographs for almost 100 years. These issues are studied from the point of view of information theory (N. Wiener, K. Shenon, L. Brillouin, M. Eigen, E. Jantsch, A. Kolmogorov, etc.), management (A.N. Whitehead, G. Kastler, M. Moiseev, I. Prigozhin, K. Meyer, S. Davis, etc.), epistemology and philosophy (K. Popper, E. Morin, N. Luman, Y. Lotman, V. Nalimov, J. Gleick and others), from the linguistic and semantic point of view (J. Derrida, J. Lyons, K. Agege, J. Lakoff, etc.), from the point of view of psychology and neurobiology (V. Frankl, M. Csikszentmihalyi, V. Ramachandran, M. Iacoboni, etc.). The list of works on the topic of «information» is endless. This topic fascinates scientists and raises new and new questions that require its development.

As part of the research, we have considered the concept of «information» (Ivanova, 2022) through the prism of analyzing definitions from various fields of knowledge. With the subsequent task of formulating a generalized definition of this concept, which would allow operating it for both theoretical and practical developments, including for overcoming crisis phenomena in various areas of human activity.

The object of this study is information as a phenomenon that is a key factor in the development/degradation of society.

The definitions of the concept «information» collected from various fields of knowledge were analyzed: information theory, management, philosophy, epistemology, cognitive science, neurobiology, linguistics, semantics, history, psychology and others. The affinity diagram allowed structuring the qualitative data and identifying seven main semantic categories characterizing the term «information». The diversity of interpretations allows us to outline the primary approximation of the concept «information». Obviously, each researcher can collect his own set of definitions, but they will reveal common semantic categories – which opens the way to further clarification of the term. With this work we aimed to «bring the meanings out of hiding» (according to Heraclitus), to make them available for perception and practical use. We also attempted to find a «formula of meaning» of information. Such a formula would allow us to assess the risk of distortions arising in the perception of information and, accordingly, to identify potential falsely connected objects that can provoke crises.

So, more than 140 definitions of this term were analyzed in this research. The definitions were taken from information theory (Wiener, 1965; Shannon&Weaver, 1949; Gleick, 2011; Grünwald&Vitányi, 2010; etc.), philosophy of science (Floridi, Popper, 1979; Godfrey-Smith, 2003, etc.), cognitive science and linguistics (Chomsky, 1957; Lakoff&Johnson, 1980; Vygotsky, 1986; Jackendoff, 2002; Luhmann, 2000, etc.), history (Samaran, 1961; etc.), etc., as well as the definitions collected by other scientists. The results were quite interesting and not entirely expected.

1.2 The study of the phenomenon «information»: semantic dynamics and methodology of comprehension

The easiest way to begin to investigate the changing meanings of a term is to consult dictionaries. An ordinary library is especially valuable in this respect, where one can get instant access to dozens of encyclopedic, specialized, etymological and explanatory editions. In addition to printed sources, digital copies of various dictionaries are at the researcher's disposal.

Working with these materials allows us to trace in practice how the meaning of the term «information» changed over time and in different disciplinary contexts. Thus, the term is absent in pre-revolutionary sources. It appears in scientific usage in the middle of the 20th century. And only in the 80s of the 20th century the phenomenon of «information explosion» is recorded, stimulating scientific interest in this topic. Table 1 presents the key researchers and concepts of information in the scientific tradition of the 20th century.

Table 1. Historical overview of scientific approaches to information: personalities and ideas

Scientist	Country	Contribution	Time
Claude Shannon	USA	Founder of information theory	1948
Norbert Wiener	USA	Founded cybernetics, linked information to control.	1948
John von Neumann	USA	Relation of information and theory of computation	1940s
Eugene Garfield	USA	Creating citation indexes – informational analysis of science	1950-1960s
Ludwig von Bertalanffy	Austria/Canada	General systems theory – information as a system property	1950-60s
Andrei Kolmogorov	USSR	Algorithmic information theory	1960s
Gregory Bateson	USA/UK	Interpretation of information in anthropology and ecology	1970s
Manuel Castells	Spain/USA	Information in society: the concept of the information society	1990-2000s
Hiroshi Inoue	Japan	Information aesthetics and cognitive approaches	1970-80s

*Source: author's elaboration on the materials of dictionaries and scientific literature (*Wiener, 1965; Shannon&Weaver, 1949; Gleick, 2011; Grünwald&Vitányi, 2010; von Neumann, 1963; von Bertalanffy, 1968; Kolmogorov, 1965; Bateson, 1972; Castells, 1996, etc.)

The etymological analysis of the term is interesting. In the French dictionary of the Academy of Sciences of 1798, the term *information* is interpreted as a legal action aimed at revealing the hidden. The related term *informe* means something incomplete, formless, devoid of final structure. This interpretation traces the semantic layer of «out of form» – an unsteady, transitional state.

The French Etymological Dictionary (1880) gives a very brief definition of the term *infomationem* as «the act of forming». The Complete Latin Dictionary (1862) translates the term *information* as outline, plan; representation; concept; notion; a concept contained in a term. According to the Dictionnaire Gaffiot (Latin-French, 1934) we can find out that the term *informatio* has the first meaning: drawing, sketch. Second meaning: idea, perception; an idea expressed by the image of a word. Third meaning: explanation in words, the meaning of words through etymology.

The definition of the term *informe* in the Dictionnaire de L'Academie Françoise is interesting (Table 2 shows an authentic text fragment and its translation).

Table 2. Authentic data and their translation (Académie Françoise. (1789)

INFORME. adj. des 2 g. Imparfait, qui n'a pas la forme qu'il doit avoir. Il se dit au propre et au figuré. *Une masse, un animal informe. Cet acte est informe. C'est une pièce informe qui ne vous peut servir. C'est un ouvrage informe, et qui n'est pas encore mis dans l'ordre où il doit être.* On appelle *Étoiles informes*, Celles qui n'appartiennent à aucune constellation.	**INFORME**, an adjective, is used to define 2 genera. Imperfect (incomplete), i.e., one that lacks proper form. The adjective is used both literally and figuratively. <Examples>: A shapeless mass, a shapeless animal. This act is not in proper form. This unfinished play cannot serve your interests. This work is in an unfinished form, not in the form it should be in. <In the olden days> «*Étoiles informes*», stars that were not assigned to any constellation. *Source: Dictionnaire de L'Academie Françoise, Paris, 1789&author's translation*

Thus, at the heart of the term *information*, judging by the different definitions, in the 18th century there was a meaning: «something lacking proper form». If we continue reasoning about this term, it becomes clear that it, in turn, consists of the parts «in-forma-tion». The prefix *in* has the analogy of translating «*outside*». The root *forma* is translated, respectively, as «*form*». The suffix *-tion* indicates that this is a feminine noun and is formed from a verb form. The verb form, offers the following meanings: «to warn», «to notify», «to educate», «to put on notice». It seems curious that the verb form takes on almost the opposite meaning to that of the adjective and its constituent parts.

However, in our opinion, this formlessness contains the element of randomness, choice – the key component that determines the transition from one state of the system to another through information. Moreover, this transition is not always predictable,

which only emphasizes the multivalued and dynamic nature of the phenomenon of information.

For a deeper understanding of the phenomenon, an author's collection of 145 definitions of the term *information* was created. This collection was compiled taking into account the subject matter of the definitions, their authorship and sources. All definitions were systematized using the affinity diagram method, a technique that allows grouping qualitative data by semantic proximity. As a result, the following key semantic groups were identified:

Process (37)

Display (21)

Algorithm (19)

Transition (16)

Data (15)

Code (12)

Ambiguity of definition (7): recognizing the polymorphic and underdetermined nature of the concept.

And also, a group (25) describing various **properties of information** was formed.

Within each group, in turn, subgroups could be distinguished.

Thus, in the formulations related to the concept of «**process**» we can distinguish semantic subgroups:

- ✓ a strict sequence of stages (information acts) with a specific result (11 items);
- ✓ process of interaction (17 items);
- ✓ system that ensures consistency (6 items);
- ✓ adaptive process (3 items);

Taking into account the collected material, we can derive our functional definition of the concept of *information* as a process: «**an adaptive system that provides a sequence of acts of the interaction process**». This definition is surprisingly suitable for solving various technical problems, related to ensuring the interaction of elements of various systems and subsystems.

In the formulations related to the notion of «**display**» we have the following semantic subgroups:

- ✓ content of display processes (14 items)
- ✓ specificity of displays and non-identity of information and display (7 items)

We can formulate a definition of *information* as a display: «a **display of recognized content**».

In the formulations related to the concept «**algorithm**» we have the following semantic subgroups:

- ✓ manual (9 items)
- ✓ self-organization (5 items)
- ✓ yes/no selection (2 items)
- ✓ reproduction (2 items)
- ✓ rule (1 item): within any algorithm it is possible to formulate a problem that will have no solution

We can formulate a definition of *information* as an algorithm: «an **instruction for selection, reproduction, self-organization**».

In the formulations related to the concept of «**transition**» it is possible to distinguish such semantic subgroups:

- ✓ differentiation (5 items)
- ✓ detecting the hidden (8 items)
- ✓ transition to order (4- items)

Taking into account the data, it is possible to formulate a definition of *information* as a transition: «a **change in the system (differentiation) leading to a new order through revealing the hidden**». This definition is very functional for investigative actions, as well as various types of research work.

In the formulations related to the concept of «**data**» we have the following semantic subgroups:

- ✓ explanations (7 items)

✓ understanding as a reduction of uncertainty (5 items)

✓ adaptive mechanism (3 items)

We can formulate a definition of *information* as data: «an **adaptive explanatory mechanism to reduce uncertainty**».

In the formulations related to the concept «**code**» we have the following semantic subgroups:

✓ fixity (5 items)

✓ fixation methods (5 items)

✓ principle of organization (2 items)

We can formulate the definition of information as a code: «a **way of fixing in a special way**».

Seven cards pointed to the fact that the definition of *information* is polymorphic and not fully defined.

There are also cards (25 items) that describe the information through some different properties. They can be presented in the form of the following chronological list (Table 3) of information properties with reference to the author-researcher.

Table 3. Properties of information linked to the author-researcher

Property of information	Researcher	Time	Description
Fixed	Ferdinand de Saussure	1916	information can be recorded using signs or symbols
True	Alfred Tarski	1930s	information may or may not correspond to reality; the criterion of truth is important
Incomplete	Claude Shannon	1948	information is often transmitted with the loss of part of the content, but remains functionally relevant
Excess	Claude Shannon	1948	the presence of repetitive elements allows the message to be preserved in the event of interference
	Norbert Wiener	1948-1950	distortion and redundancy of information disrupt control and feedbacks
	Jacques Ellul	1954-1977	Excessive information limits freedom of choice and promotes manipulation

Continuation of Table 3

	Herbert Simon	1971	Humans are not capable of processing all the available information
Broadcast	Claude Shannon	1948	information can be transferred from one entity to another
Purposeful	Norbert Wiener	1948	information is used to control the behavior of systems
Useful	Henry Morris	1949	information is meaningful if it is useful for decision-making or action
Propagated	Wiener and von Neumann	1950s	information can be copied and replicated without loss (digitally)
Relative	Ludwig von Bertalanffy	1950s	the meaning of information is determined by the structure and state of the recipient system
Semantic	Yehudi Menuhin and Bar-Gilel.	1953	information only makes sense in the context of interpretation
Entropic	Leon Brillouin	1956	information is opposed to entropy as a measure of order
Selective	Karl Popper	1963	a person selects information based on hypotheses and interests
Probabilistic	Andrei Kolmogorov	1965	a measure of information is related to the probability of an event
Algorithmic	Andrei Kolmogorov	1965	information is defined as the minimum length of the program generating the object
Perishable	Heinz von Ferster	1970s	information is not eternal; it disappears if it is not fixed in memory or media
Self-organizing	Heinz von Ferster	1970s	information plays a role in the self-organization of living and social systems
Contaminating	Igor Bestuzhev-Lada	1970-80s	The flow of false, speculative and harmful information destabilizes society
Structured	Yuri Lotman	1970s	information is conveyed through sign systems and organized texts
Changeable	Gregory Bateson	1972	information is subject to interpretive and contextual shifts
Contextual	Gregory Bateson	1972	the meaning of the information depends on the context
Devalued	Neil Postman	1985	Media turn information into entertainment, reducing its relevance and depth
Socially mediated	Manuel Castells	1996	information exists and is disseminated depending on social structures

Continuation of table 3

Cognitive overloading	Paul Virilio	1998	high speed of information transfer impairs the ability for critical thinking
Emergent	Peter Buck	2001	information can arise as a new quality in the interaction of system elements

*Source: author's elaboration on the materials of dictionaries and scientific literature (*Wiener, 1965; Shannon&Weaver, 1949; von Neumann, 1963; von Bertalanffy, 1968; Kolmogorov, 1965; Popper, 1979; Lotman, 1977; Bateson, 1972; Deacon, 2012, etc.).

Information, moreover, is neither energy nor matter, so it does not belong to the world of things, and the laws of conservation and transition of quantity into quality do not apply to it. This is a very important property. Often the quantity (like, everyone says) overshadows the quality of information (it was revealed, experimentally found, proved in the course of conducting a pure experiment). There is a phenomenon in society of believing in repeated «truths» rather than actual facts.

Thus, in the primary grouping by the meanings of the concept «*information*», 6 explicit groups and definitions were formed:

1. «an adaptive system that ensures the consistency of the acts of the interaction process»
2. «displaying recognized content»
3. «instruction of selection, reproduction, self-organization»
4. «a change in the system (differentiation) leading to a new order through the revelation of the hidden»
5. «an adaptive explanation mechanism to reduce uncertainty»
6. «method of fixation in a special way»

These definitions in turn can be grouped (secondary) in meaning into two groups:

Group 1: definition 1, 2, 4, 5

Group 2: definition 3, 6

General Group 1 definition: An adaptive mapping mechanism that provides a sequence of acts of system change that reduces uncertainty and leads to a new order.

General definition for Group 2: Instruction to select, reproduce, self-organize, and fixate in a special way.

It should be understood that the sequence of acts is a kind of «instruction», i.e. definition 2 is easily embedded in the semantic content of definition 1, in fact, it is an enumeration of the acts of working with information.

Together, they allow us to formulate a universal definition:

information is an adaptive process of display and instruction of selection, reproduction, self-organization and fixation of system changes that determine the degree of uncertainty and lead to a different order. Or in other words: information is a system organizational interaction, the main property of which is manifested in the regulation of (non)certainty of the system state.

Information has unique properties: it is not matter or energy, it is not subject to the laws of conservation, it is not directly transformed from quantity into quality. Therefore, working with it requires a careful and conscious approach. The number of repetitions is not equivalent to reliability: the phenomenon of public belief in «popularized truths» sometimes overshadows the real knowledge gained through experience.

In addition, the key stage of comprehension of information is fixation and realization of its significance. It is worth noting that the structure of an individual collection of analyzed material will always be unique: it will bear the stamp of the intellect of the individual collector and it will reflect his or her path of search. Each researcher who conducts a semantic grouping forms a unique picture – but at the same time, with a high degree of probability, it will echo the general structure constructed by others, since the central semantic nodes will remain more or less stable.

The methodology of working with information requires discipline and time, as well as a special form of thinking – thinking with connections. A competently assembled collection of definitions allows us to see a phenomenon holographically: to reconstruct a holistic image of a concept based on individual semantic elements.

Using all the previously accumulated semantic meanings of the concept *information*, we can construct the simplest semantic triangle (Fig. 1). Thus, within the

semantic triangle, the nomination «*information*», with its semantic content (process, transition, algorithm, display, code, choice, knowledge and data) should describe some object of reality. What is the object that has such meanings?

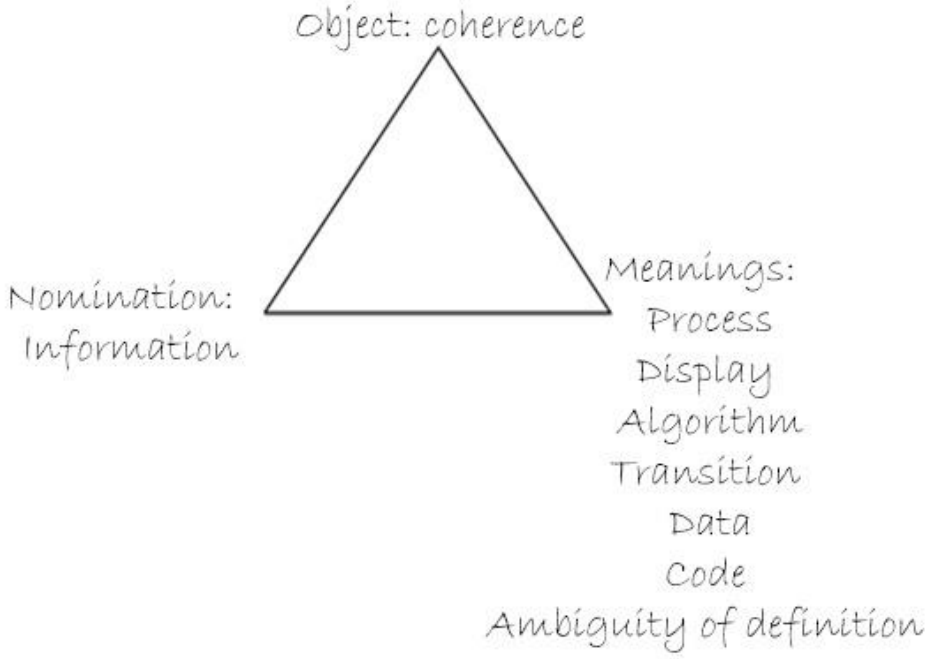

Fig.1. Semantic triangle representing the object of nomination «information»

We believe that such an object, which includes all the identified semantic diversity, when generalized in terms of its characteristics, very much resembles the phenomenon of «coherence».

The definition that we derived, namely information is an adaptive process of display and instruction of selection, reproduction, self-organization and fixation of system changes, determining the degree of uncertainty and leading to a different order, in essence, describes the **system organizational coherence**, and does not contradict the understanding of the term presented through the semantic triangle (nomination – meanings – object).

It is worth to specify that this definition can be easily used to describe processes: social, biological, mechanical, quantum, in fact, any other.

This definition allows us to understand that information is the key factor that ensures interconnections, i.e. the vitality of society and any other system. It is not just a set of numbers and words – it is a representation of processes that occur in the system,

and all data is a kind of confirmation of the presence/absence of coherent elements that continuously influence each other and are influenced by each other.

And various kinds of crises are, first of all, a breakdown of coherence between socially significant parameters within the system.

Note: the analysis of the term «crisis» by means of affinity diagram also gives very interesting results. It leads to the following semantic groups: fracture, inconsistencies (including paradigmatic), shortage (lack of resources), psychological difficulties, solution.

Then the general definition of the term can look like this: crisis is a state of instability caused by a discrepancy between the actual conditions and the capabilities of the system, accompanied by a shortage of resources, tension and the need to find a way out or a new paradigm in order to move to a new more stable state.

The very definition of crisis lays down the notion of «transition», which can be organized exclusively with the help of information: evaluation of information from the past, fixation of information of the present, projection of information image of the future. And further information service of this crisis: either to overcome it or to aggravate it.

If information is a systemic organizational connectivity, then the usual systemic models of interaction within society begin to be read differently. Thus, to change the system it is enough and necessary to transform the interconnections, that is, to change the **scheme of** the system and the technology of the interaction within it. This means: to find the «real» connections of the object in space and time, and to influence in accordance with the expected results on the transition of the system to a different state.

A person, as a rule, working with information, often does not even think about the amazing nature of this phenomenon. And, accordingly, does not pay special attention to such important aspects as quantity and quality of information. And also, the person does not think about the time spent on performing various significant procedures of collecting and understanding the meanings of information.

So, the work on grouping with the term «information» has given certain clarifications of meanings. Moreover, they are very practical and allow solving functional applied problems. It should be understood that there can be several approaches to studying the concept of «information» (and within the framework of the obtained definition including): physical, signal, linguistic, semantic, pragmatic,

neurophysiological. Each of these approaches, in turn, will reveal its own features of this concept.

It is worth realizing that similar work done by another person would have yielded different sets of definitions, but generally not contradictory to the conclusions presented above. It would have been influenced by selection as a process of gathering information, and by material selection as a form of achieving a conscious result.

Given that, according to its nature, information can disappear and reappear, statistical assessments should be applied to it with caution. When studying the material, the key aspect of human evaluation should be the concept of «information significance» (which is naturally subjective) and its resonance with one's own understanding of the phenomenon. If the reader makes his/her own study of the term *information* with the help of grouping, he/she will be surprised to find that his/her personal, achieved through suffering (e.g., on his/her own 145 examples) definition of *information* will not contradict the definition presented above, although it is possible that other accents may be placed differently, and it is also possible that other words will be used (although not a fact) in the definition, but the meaning will revolve around the concepts of systematicity, interaction, organization, and instruction. The collected materials will characterize the system as a whole, which allows to work with it as with a hologram, i.e. allows to reconstruct the object by fragments, pieces of materials.

At the same time, it should be understood that the property of connectivity provides not only opportunities for system changes, but also imposes great limitations and creates the potential for both development and degradation, as well as forms a wide field for manipulation. Today, all over the world, one can increasingly observe attempts of manipulative and false linking of the parameters of the system «society».

1.3 Quality of information

In the light of modern studies of the human brain, it can be argued that the picture of the world is redrawn[1] every time any new knowledge is acquired. Any new

[1] Which confirms the correctness of Eduard Meyer, who so astutely suggested this a century earlier (Meyer,1895).

knowledge is connected with already known knowledge and transforms its meaning. The process of cognition (as well as life in general) is characterized by a dynamic state. The dynamics of changes can be characterized by both counterbalancing and reinforcing feedback, i.e. a person can «smooth» new discoveries under his expectations, and can «flatten» them, attributing to them various shades, including unreliability. The process of «smoothing» in most cases occurs automatically, while the process of «highlighting» assumes that a person was able to notice something unusual and new in the flow and to emphasize it.

When working with information, its **quality** is important, which, in our opinion, **will be determined by the reserve of semantic strength in the process of increasing new details and data** on the subject under study. For example, Bayes' theorem allows us to understand the necessity of the process of data accumulation for a deeper understanding of the phenomenon under study.

Note: One of the earliest descriptions of the phenomenon of information accumulation to improve its understanding can be considered Bayes' theorem (Bayes, 1763), published in 1763. Thus, Rev. Bayes[2] in the XVIII century presented his inferences in the form of a theorem (1):

$$p(A/X) = p(X/A)\, p(A) / p(X), \qquad (1)$$

where (**A**) is some phenomenon about which we want to know and an observation (**X**) that gives some information about (**A**), **p is** a probability (i.e., a given function). Bayes' theorem is a mathematical representation of the process of increasing knowledge about (**A**) in the light of new information (**X**). The more we learn new data (**X**), the more multifaceted our knowledge of (**A**) can become.

Thus, Bayes' theorem allows us to understand how much knowledge about **A** *will increase in* the light of *new information* **X,** i.e., how much the measure of fuzziness of ideas about the phenomenon **A that has** been investigated will change. Very simplistically, the theorem can be presented in the form of a statement: an initial opinion can yield a new judgment when new evidence is obtained.

Thus, the approach proposed by Rev. Bayes underlies various approaches of statistics. The amount of data (recorded observations **X**) collected for any period is processed in order to find

[2] It should be pointed out that the work of T. Bayes appeared after his death with large edits by Richard Price, 50 years later these ideas were developed by Laplace in his work "Analytic Theory of Probability". There is an opinion that Alan Turing used this theorem to crack the enigma code. And Microsoft used this theorem to develop spam filters.

generalizing patterns and reveal new knowledge about the observed object of study. For example, in the business environment on the basis of Bayesian approach arrays of data about the enterprise are formed in order to identify hidden data and relationships.

In general, it can be argued that Bayes' theorem allows one to update an already existing opinion, but to do so with the support of new evidence. It also allows us to revise the probability of alternative solutions and evidence when new facts on the issue arise. In addition, Bayes' theorem helps to perform hypothesis updating when new evidence arises. Essentially, Bayes theorem allows us to quantify the probabilities after the occurrence of some event. The theorem clearly shows that people tend to overestimate the significance of a particular observation and underestimate a priori knowledge that was available before the observation.

V.V. Nalimov offers an original probabilistic model of everyday language semantics (Nalimov, 1981) using Bayes' theorem. From Nalimov's model follows the statement about *discreteness of language* and *continuity of consciousness*. Such a statement can be regarded as a prerequisite for describing the state of «permanent revolution of understanding», which is in constant correlation with the number of new facts studied.

In fact, the accumulation of data about the object under study allows us to check the quality of information, i.e. to experiment with the stock of its semantic strength. At the same time, if during knowledge detailing there is a feeling of general inconsistency, a kind of information entropy, it is a sure sign that the information is insufficient and the general state of the object can be characterized as one of the numerous stages of «ignorance». In fact, information entropy removes the veil of certainty and demonstrates the measure of ignorance of a person, and also specifies the measure of the stock of semantic strength.

Different approaches can be proposed to test the margin of meaningfulness. For example, to work with information productively as an analog of activity, we can consider the **5S** quality management approach**.** This is the simplest methodology (of Japanese origin) for dealing with disorder. If we apply it to work with information, we will get the following:

1S – cleanse: omit the superfluous, find the inaccurate, eliminate the erroneous;

2S – systematize: arrange materials in some information-relevant order;

3S – wash: cross-check, pass through a sieve of questions, get clean material; deconstruct;

4S – put in a new order: create your system of understanding taking into account all the new facts revealed in the research; reconstruct;

5S – observe the order: to introduce new elements into the research materials only after having subjected them to cleaning, analysis, washing.

The process of working with quality information can be represented in an infinite number of descriptions and terms. Thus it will look like in terms of biological systems:

1. to run the process on the system;
2. to allow recombinations to occur in the system;
3. Enable the system to perceive and respond;
4. Enable the system to learn and adapt;
5. sow the results, grow them, then select the best and strengthen them;
6. test resilience: destabilize the system.

Thus, qualitative information is not just data without noise, no, it is intelligently structured data tested for logical, cognitive and functional consistency. This work can be compared to the various processes of purification and cross-checking (5S methodology, the biological mechanism of recombination, adaptation and selection). In any retesting, the main criterion remains the robustness of the system when confronted with new data.

Thus, the quality of information is not a given attribute, but the result of active work: selection, verification, comparison, reconstruction and destabilization testing. Only in the process of such work the true value of information and its suitability for making decisions, hypotheses and forecasting models becomes obvious.

And if the process of searching for new things is started, the mechanism of self-organization of the system is launched. To begin with, a person, as the Creator, creates his own array of «cells» (information elements) in the form of a dossier of materials to be studied. With the collected materials one can proceed to recombination until full satisfaction: there are many tools (from «translations» to refined forms of quantitative-qualitative analyses). A person continues to subject the results of his/her recombinations to analysis and correction, that is, to perceive them and react to changes in the data. Thanks to this, he/she learns and becomes more conscious and wise,

approaching self-perfection, and thus adapts to the environment, which is in great need of a new type of human being: A Comprehended Person, *homo informationalis*.

1.4 Information perception

Human perception has a very challenging nature. Every day brings something new to perception. Even if nothing new happens, the perception forms a more and more stable picture of the world, which is more and more difficult to change. In fact, changes are always occurring: it is just that often a person is not able to notice them. The perceived world becomes a habit.

Any information that enters the brain is linked to information that is already there for further recognition. And the expression «everyone understands the world by virtue of their own depravity» acquires quite realistically reasonable outlines.

Man looks and perceives the world through his «paradigm glasses». And everyone has these glasses! And each pair of glasses has unique lenses, a single standard cannot be reproduced, although a whole army of specialists works on the creation of uniform standards. But everyone is different, everyone sees the world in their own way, and, moreover, sees standards in their own way. Although, of course, socio-cultural influence, education impose some common perception tracings, but they are very far from being identical. With the help of common perception tracings, stable systems of biased assessments are formed in the society, which, in turn, with their collective authority strengthen the belief in misconceptions supported by background knowledge.

Every human being is constantly confronted with peculiar boundaries of «acceptable perception», which prescribes how to «correctly» evaluate what is found and read. These boundaries of «correct, acceptable perception» are called *paradigms*. Paradigms are a set of rules and norms that fulfill two main functions: they set boundaries and prescribe how to act within the given boundaries. Paradigms allow us to explain the world in some fairly simplified way and predict its «behavior». «Paradigm effect» prevents deviation from accepted views of life, of norms, of rules. Paradigms provide recognition in perception, and ensure that «reality» is replaced by

«habitual judgments of reality». Crossing the boundaries of paradigms is, in essence, the pursuit of a state of «full-awake-thinking». The first stage of this journey lies in the realm of deconstruction. First of all, deconstruction of one's own perceptions.

Note: It is worth noting that under the concept of *paradigm*, quite different phenomena are understood.

Thus, the Latin-French dictionary (Gaffiot, 1934) at the time of its publication did not overthink the meaning (Table 4).

Table 4. Authentic meaning and translation of the term paradigm

părădigma, *ătis*, n. (παράδειγμα), exemple, comparaison [t. de rhét.] : TERT. *Anim.* 43 ‖ paradigme [t. de gram.] : CHAR. 277, 16 ; DIOM. 464, 17.	Example, comparison

Scientists took the term *paradigm* into circulation with the appearance of Thomas Kuhn's book *The Structure of Scientific Revolutions* (Kuhn, 1996). By paradigm Kuhn means some unprecedented result of science. Although, we should be realistic, in his book he gives about 28 definitions of this concept, and any generalization is an interpretation.

Some examples of Kuhn's definitions can be cited below:

«...universally recognized scientific advances that, over a period of time, provide the scientific community with a model of problem formulation and solutions»

«...commonly accepted examples of the actual practice of scientific inquiry – examples that include law, theory, their practical application, and the necessary equipment – all combine to give us the models from which specific traditions of scientific inquiry emerge»

In the twentieth century, the term *paradigm* continued its refinement and triumphal procession especially in management-related sciences. For example, J. Barker in his book *Paradigms of Thinking* (Barker, 1992) defines that a paradigm is a set of norms and rules (written or oral) that performs two functions: it sets boundaries; and it tells how to act within the given boundaries to achieve success. But Willis Harman specifies that a paradigm is a way of perceiving, conceptualizing, evaluating, and acting related to a particular vision of reality (Harman, 1976). Merlin Ferguson believes that a paradigm is a structure of thought...a scheme for understanding and explaining certain aspects of reality (Ferguson, 1980). Different definitions of this term can be found in a sufficient number, the important is the essence, which informs that it is a *way of perception* that is formed through the limiting mechanisms of already accumulated knowledge and perceptions. According to the phrase of V.V. Nalimov (Nalimov, 1981), cited in the book «Faces of science», a paradigm is a «stabilizing

selection», which acts both as a protective mechanism and as a mechanism preventing the emergence of new ideas.

In our work, a paradigm is understood as a set of stabilizing perceptual filters that adjust perceived reality to predetermined patterns. Dominant paradigms, as a rule, are not formulated explicitly, but exist as an unquestionable idea of reality, which is passed on to the next generations through culture and direct experience.

At certain moments, the models and paradigms of thinking stop working. A person tries to persistently move forward, using old-world recipes, which have been verified by time. He relies on «common sense», which has ceased to be common sense, but has become a kind of «dungeon of delusions», the old «shadows of the cave». It is «common sense» (a lawn of coupled paradigms backed up by experience) that forces a person to think that it will be so, not otherwise, because «so» has already happened in the past. As a matter of fact, F. Bacon wrote that people tend to believe what they want to believe to be true. At the same time, it is this phenomenon of paradigms that allows a person to be human. This fusion called «common sense» is what distinguishes a human being, for example, from a robot. So, for example, it is impossible to create a computer program of «common sense» at the current level of human development. «Common sense» is more than something that can be understood. And it is taken for granted. And this has two sides of the same coin:

1) making a person him/herself;
2) impeding the processes of perceptual change.

When working with paradigms, one must first of all realize that the transformation of the human event plan lies in the realm of double change: it is not enough to transform a real situation, one must begin to perceive it differently.

Hence the rule № 1 when working with information, to get out of the familiar frameworks of paradigms, those frameworks must be realized.

An interesting model of paradigm constituents by M. Bunge (Bunge, 1967) can help in this not at all simple matter.

Thus, M. Bunge gave an expedient description of the constituent components of the paradigm. This model, however, is suitable for comprehension of any mental work.

Thus, according to M. Bunge, the paradigm can be described by the following formula (2) (very productive for different areas of activity):

$$\boldsymbol{P} = < B, H, P, A, M> \qquad (2)$$

Where ***P*** (paradigm) is folded from:

B – a body, the basics of background knowledge, which includes philosophical principles, scientific concepts, background data, and anything and everything accumulated by a lifetime of hard work;

H – the set of hypotheses;

P – problematics;

A – a cognitive aim;

and finally, *M* (*methodes*) – a set of relevant procedures.

In other words, a *paradigm* is both a set of theoretical propositions and their methodological implications.

According to M. Bunge, a paradigm shift occurs in the case of radical changes in hypotheses *(H)* and problems *(P)*. The process occurs as follows: if an individual who has not only a broad outlook, but also a developed cognitive ability to face simultaneously many cognitive problems *(P)*, and manages to formulate a unique initial question *(H)*, this can lead to the emergence of a new unexpected idea that generates a paradigm shift. Actually, T. Kuhn also spoke about such a shift.

Thus, by hypothesis is meant a certain assumption (guess) or prediction, which allows to formulate the cognitive question in a different way, and will also offer a plan for obtaining evidence.

A legitimate question arises: how often do we observe a person (even a super-educated person) who, having a broad outlook, suddenly decides to formulate a unique initial question (hypothesis, *H*), facing numerous cognitive problems?! And how will he formulate this initial question, being inside the paradigm, i.e., being limited by its influence?! This is not explained by Kuhn or his followers. Really, they assume the existence of a certain «genius» who appears exactly on time and in the agreed place, where anormal experience has just been accumulated, which will allow him or her to formulate a new hypothesis. Actually, this is how Kuhn explains the evolution of

knowledge, although, as can be seen from the sources of official science, there is a large number of scientists who, not clearly on the basis of what theories and with the help of what tools and equipment, suddenly developed entire fields of knowledge (J. Wilkins, I. Kepler, T. Brahe, B.S. van Rooyen**,** J.-B.J. Delamber, etc.).

Going beyond paradigms by means of recognizing new problems (*P*) is also seen as an extraordinary event. Paradigms are precisely engaged in leveling the «recognition» of weak signals of the changing system. Of course, there are people who try to draw attention to this or that newly discovered information, but their voice is not so strong and cannot always be perceived by others who are in the dominant paradigms that are characteristic of society. Similar situation with cognitive goals (A), they can change due to changes in priorities, values, aspirations. And all this is under the supervision of paradigms. And all this is under the supervision, which resembles strict control.

One of the traditional approaches to comprehending new things in society, as is known, is education (school, university, master classes, trainings, continuing education system, etc.). But from the point of view of paradigm change, this approach is unpromising, because it affects mainly *B (body),* the background knowledge, which is growing at a catastrophic rate and is not verifiable in principle, because it is immense (!) and that is all. And in this background knowledge today it is easy and simple to find facts «confirming» and «disproving» simultaneously the correctness of any inference. There are many variants: our informational reality is filled with different differences. And if suddenly some facts are not available, they can be simply invented (see, for example, «ReCreating Strategy» by S. Cummings (Cummings, 2005), Chapter 3 «The Conventional (but fabricated) History of Management») and argue (or falsify) anything.

In practice, the most effective way to change the paradigm is to change the set of relevant procedures *M* (*methodies*) of study (research). Such a peculiar departure at the first stage from the question «WHAT do we do?» to the question «HOW do we do it?». The question «HOW to do?» is dealt with by methodology.

Hence, rule № 2 (the main one) when dealing with information: you need to change the learning style.

The question «HOW do we do it?» is also directly related to the values and attitudes of the person who is engaged in cognition. Hence the addition to the rule № 2: cognition implies complex involvement of a person and change of his behavioral characteristics as a comprehended person, as a kind of *homo informationalis*.

It is worth pointing out that going beyond paradigms will also lead to going beyond one's perceptions of oneself. And a comprehended person should be ready to recognize that cognitive practice is also a practice of spiritual rebirth: it is impossible to see the world differently and not to see oneself differently in this world.

It is necessary to understand that the world is not what we see directly, but how we interpret what we see. Our perception is always indirect – we perceive not the information itself, but its interpretations, which have passed through the filters of our consciousness, paradigms. Paradigms are a kind of «glasses» through which we look at reality. Each person has his or her own «glasses», and most often they are used unconsciously, determining at deep inner levels what to pay attention to, what to consider important and how to evaluate what is happening. Metaphorically, we can say that if thinking is a theater, then the paradigm is both the scenery and the scenario according to which the performance of our perception unfolds.

1.5 The Formula of Meaning.

Today, false coherence is enormous: there is actually no limit to it anymore. We observe it in history, economics, ecology, sociology, management, psychology, etc. Thus, many of our perceptions are based on false interconnections between objects, and these interconnections are integrated into our perceptions of the surrounding world and change the perception of what we see, feel, and learn. And naturally, all this can be figuratively called «mutation» of perception. Certainly, there are useful mutations, but as a rule, there are not many of them. More often there are mutations unhelpful and, moreover, dangerous for life. In any case, the decline in the ability to forecast and fading interest in life observed in society is clearly not a positive component of life,

especially in long-term perspective. The constant presence of various crises in life generates social and individual frustration with all its consequences.

The way out of this situation is seen in the development of a methodology for working with information (Shannon&Weaver, 1949; Naisbitt, Naisbitt, &Philips, 1999), which allows «clearing» information from false connections. A methodology that allows us to see the maximum number of potential information traces between objects and to understand the essence of connectivity between them in order to organize subsequent actions on the basis of understanding the actual situation rather than on the basis of some fictions about illusory reality.

It should be noted that the information world of a person today has a fragmented character. Fragments of knowledge randomly fill the corners of the mind, forcing the thought to move arrhythmically and non-synchronously, which also contributes to the development of various crisis states. Information loses its value of displaying coherence and becomes categorized as sets of information and data. These data sets become the essence of the human being. The more fragmentary the set, the more difficult it is for a person to navigate in the world and, accordingly, to predict his future actions. And manipulation of information acquires unprecedented scale in the invented falsely connected reality, because there are no systems of data verification in it. A person completely loses the function of the external world reflection: he ceases to understand it. He becomes a «funhouse mirror» that either hyper-amplifies or reduces the reflected object to the level of invisible or poorly discernible. The role of a person changes and is reduced to a simple function of information absorption, which naturally does not bring anything creative into the world. A person simply loses understanding of the meanings of the world around.

Let us try to formalize the concept of meaning of information, and take into account its main components. Then we represent the indicated concept with such a formula (3):

$$Meaning = \frac{\sum powers\ of\ influence}{n\ interpretations} \qquad (3)$$

where indicator «$\sum powers\ of\ influence$» will include:

- ✓ prior knowledge of the person (including the history of this knowledge formation, as well as the usual background knowledge of the object of study),
- ✓ sets of paradigms (where these powers will be manifested),
- ✓ systemic associative relations with other objects (including taking into account the potential types of feedbacks between objects),
- ✓ psycho-emotional state (that will also determine the information influence strength),
- ✓ situational features, etc.

and indicator «$n\ interpretations$» will also depend on many factors:

- ✓ accuracy in defining nominations and definitions,
- ✓ flexibility of text and context,
- ✓ trustworthiness of sources and opinions,
- ✓ number of enclosed fictions, etc.

It is clear from the formula that finding a single (common) meaning lies in the field of $\sum powers\ of\ influence$ decrease, that is, a kind of clearing of false knowledge, coherence and emotions, as well as detalization and making more exact the n interpretations specifics, in order to identify false content and delete it from the meaning formation process. Generally, this process can be called the objectification of information.

Taking into account the properties of information, such cleaning is a very difficult task. What can be traced (Table 5) when analyzing the properties of information, which have opposite characteristics.

Table 5. Properties of information and their opposites

Property	Opposite property
Useful (G. Morris)	Harmful (Wiener, Virilio, Ellul).
True (Tarskiy)	False / manipulative (Postman, Bestuzhev-Lada)
Excess (Shannon)	Deficient/incomplete (Shannon)
Precise	Noise / distorted (Wiener)
Contextual (Bateson)	Abstracted / universalized
Selective (Popper)	Obsessive / compulsive (Ellul).
Fixed (Saussure)	Ephemeral / perishable (Ferster)
Verifiable	Unprovable / speculative

Continuation of Table 5

Broadcast (Shannon)	Inexpressible (existential approaches)
Algorithmic (Kolmogorov)	Emergent (P. Buck).
Arranged (Brillouin)	Chaotic / entropic (Shannon, Brillouin)
Static	Changeable / dynamic (Bateson)
Rationalized	Emotionally colored
Slow / reflexive	Speed / instantaneous (Virilio)
Accessible to all	Secret / hidden / inaccessible
Linear (serial)	Non-linear / networked
Socially useful (Castells)	Socially destructive (Bestuzhev-Lada, Ellul)

*Source: author's elaboration on the materials of research of the concept of «information» (*Wiener, 1965; Shannon&Weaver, 1949; von Neumann, 1963; Kolmogorov, 1965; Bateson, 1972; Gleick, 2011; Grünwald&Vitányi, 2010; Deacon, 2012, etc.).

The importance of objectifying information is enormous. It can help to cut off false information about the world, and this means increasing the quality of coherence between objects. In itself, this cutting off of falsely connected objects in understanding the world is a huge step towards a more conscious perception of life in principle. Reducing the number of false coherence will also reduce the number of misconceptions, as well as make it possible to find really significant points of influence on the system in order to prevent crises of various etymologies. In fact, it will «clean» the picture of the surrounding world and allow to reveal cause-and-effect relations inside systems, i.e. it will allow to see reality (according to A.N. Whitehead) and not illusory individual realities. At the same time, it should be understood that conscious work with information is a really big work, which presupposes a certain discipline in a person, as well as a certain courage, which will have to be shown when defending one's opinion and arguing it.

But information as coherence gives, besides all the complexities and contradictions, also an additional potential. It consists in the fact that a person (society), having understood any area really well and having revealed really significant characteristics of one object, begins to connect other objects in his perception through it, and, accordingly, begins to see them differently. This does not mean that understanding of other complex objects will happen automatically, it means that coherence can help to see new things in any material that a person knew and will study

in the future. A person's perception will change holistically. It should also be noted that today there is a great number of schools of management (e.g., the approach of Peter Senge, Otto Scharmer, etc.) that are preoccupied with finding true coherence between managed objects. It is assumed that the identification of the true causes of crises will help to avoid new ones. But if the main cause is the crisis of information, then the solution should be sought, first of all, in the mental layers, in the improvement of the information environment. In the system approach there is a rule: to start changes from the simplest things. By changing one object in the system, we automatically change the whole system. Of course, it is not quite accurate to say that changing the information field is the easiest way, but at least it does not require large material investments and construction of new material objects. In fact, it is a mental practice that can be done by anyone with any income level. Besides, it can be stated that it is also the most effective way to change reality.

So, the concept of «*information*» has multiple meanings. The object that describes these meanings resembles organizational systemic coherence. Systemic coherence implies the existence of interaction between objects, which can be represented as an algorithmized process. This definition can be used in various fields of knowledge and it allows solving applied problems. The modern world is filled with a large amount of falsely connected data, which makes social and individual orientation difficult and generates various crises (economic, political, ecological, existential, etc.). Working with information within the infology approach is a complex process aimed at revealing the connectedness of objects with each other and their influence on each other. The perceived false coherence generates erroneous decisions and, in the long term, crisis phenomena in society. Moreover, it is characteristic for any field of activity. «Cleansing» of information from false coherence allows you to see the world differently, and also returns to a person the function of forecasting with a high degree of probability of forecast fulfillment. Fulfilled forecasts for a person are an important component of his dynamic development, supported by a system of internal «rewards». In addition, it is also an important organizational factor in the development of society as a whole.

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2. Communication: the problem of declining quality of understanding

2.1 Problem Statement

The modern era demonstrates a certain obsession with the generation of information: the quantity of information is increasing, while its quality is not increasing, but rather decreasing. This naturally leads to a decrease in the ability to recognize meanings: information is becoming more and more difficult to understand and interpret.

Moreover, there are also theories that people will understand each other less and less outside employee organizations, i.e. a new Tower of Babel is clearly being built. Indeed, people stop understanding each other, stop understanding the information «traces» of other people, and lose the ability to predict the results of communication. And as soon as predictive operations are poorly performed, the degree of effectiveness and satisfaction from communication immediately decreases, and the level of dopamine also decreases. And it is the latter that drives development and is «a fundamental ingredient in building behavioral repertoires with an efficient way to acquire experiential capital to make optimal contingent calculations across the lifespan» (Lambert, 2018).

Issues related to communication are always relevant (Luhmann, 2000; Berwick, Chomsky, 2016; Lotman, 1977; Lakoff&Johnson, 1980 etc.). A person learns about him/herself in dialog (Bakhtin, 1981), in communication and interaction with others. At the same time, communication is fundamentally pragmatic in nature and is built on two basic assumptions: firstly, people, always have common interests, one way or another, and secondly, all differences are potential opportunities for communication and understanding.

Topics related to communication problems constantly attract scientists, and raise more and more questions that require answers that must be comprehended in order not to lose the skill of communication and the ability to interact with others.

2.2 Communication and its characteristics

According to Luhmann, communication is a selection of three components: information, message and understanding (Luhmann, 2000). The issues related to the complexity of the definition of the concept of «information» were discussed in detail in the first chapter of this monograph; earlier attempts to describe this phenomenon can be found in our article «The crisis of information: essence and potential« (Ivanova, 2020).

Our research allowed us to consider the nature of information as a phenomenon of «cohesion», «coherence». Actually, such nature of information allows providing system interaction of objects with each other. In this chapter of the monograph, attention will be emphasized on the issues related to understanding and interpretation of the received information. The interest in this topic is not accidental, since in the modern world there is a general deterioration of people's understanding of each other.

In this paper we will mainly consider the phenomenon of message from the point of view of the problems of encoding in order to transmit meaning and, accordingly, decoding information in order to obtain the transmitted meaning. It is worth to specify that the problem of coding has a complex nature, not fully understood and studied. One of the important questions that continuously arises in connection with the problem of encoding in a message is the question of what exactly is encoded: information (pure) or representations of the image of information. It is worth clarifying that encoding with language is both a «stumbling block for explaining evolutions» (Berwick&Chomsky, 2016) and, in general, an enigma for understanding the nature of the phenomenon of human communication.

When evaluating the message as such, it is also worth considering the problem of induction. It was first formulated by Parmenides: «Most mortals have nothing in their deluded minds except what got there through their deluded senses» (quoted by Popper, 1979). Indeed, a person opens up in his or her view of the world and models the nature of him/herself rather than the nature of the world he or she is describing. Accordingly, when evaluating a message, the question always arises: how much of it is fictitious and

how much of the information has been interpreted, that is, there is a question to the criteria for the truth of the message.

If we return to communication in general, a very simplified scheme of communication can be represented as follows (Fig.2):

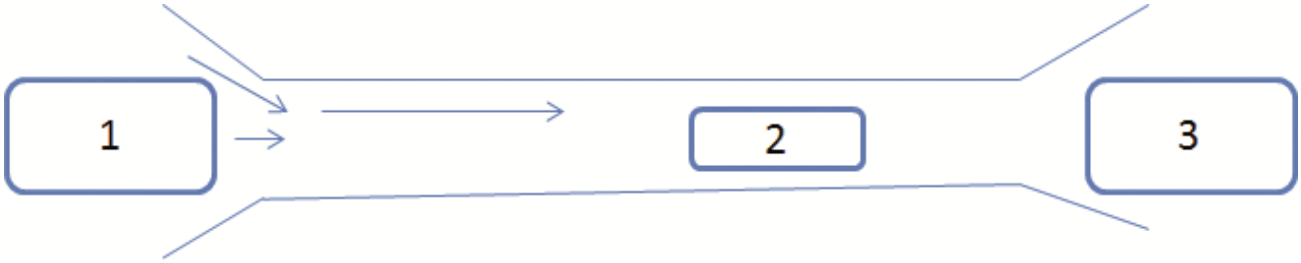

Figure 2. Scheme of the communication process

Source: *author's elaboration of Lasswell's (Lasswell, 1948) and Berlo's (Berlo, 1960) generalized linear communication model scheme developed from Shannon&Weaver's (Shannon&Weaver, 1949) model.*

where

1. a sort of chaos of thought, i.e. a dwelling place of numerous differentiations, some of which are realized by a person, and some of which are not realized. It is worth noting that at this level the automatic mental schemes of information processing begin to work: distortion, crossing out, construction, generalization. It is also necessary to understand that at this level there is also so-called pre-word processing of information, the nature of which is still poorly studied and poorly understood.

2. an array of elements with the help of which a specific message is transmitted and the whole volume of information is minimized, i.e. «meaning» is translated into a form. It is worth emphasizing that information minimization cannot be considered as a technical reduction in the amount of information – it is a complex mental process that is only partially controllable, many parts of this process are usually not realized by a person and, in fact, occur automatically.

3. Receiving, decoding (interpreting) and understanding the message.

It should be understood that points «1» and «2» lie in the field of social, psychological, emotional and other fields of the transmitting object. Point «2» is

influenced by the technology of transmission (noise, interference, specifics, channel capabilities, etc.). Besides, point «2» partially, as well as point «3», lies in the field of social, psychological, emotional and other fields of the receiving object. The scheme demonstrates the potential impossibility of transmitting and receiving the same information: the probability of this tends to zero. And it is characteristic not only for information transfer between people, but also, for example, for DNA-information transfer.

This scheme can be supplemented by taking into account the so-called **communicative barriers**. The scheme of communicative barriers was proposed by researcher Predrag Micić (Micić, 1988). More complex models of communicative barriers are also distinguished in the literature, for example, personal, physical, semantic, linguistic, organizational, status, cultural, temporal, etc. However, we will focus on the scheme of P. Micić, as it is simple and easy to understand, and the main thing is that it is clearly included in the general communicative scheme, allowing it to be supplemented (Fig. 3) for a deeper understanding.

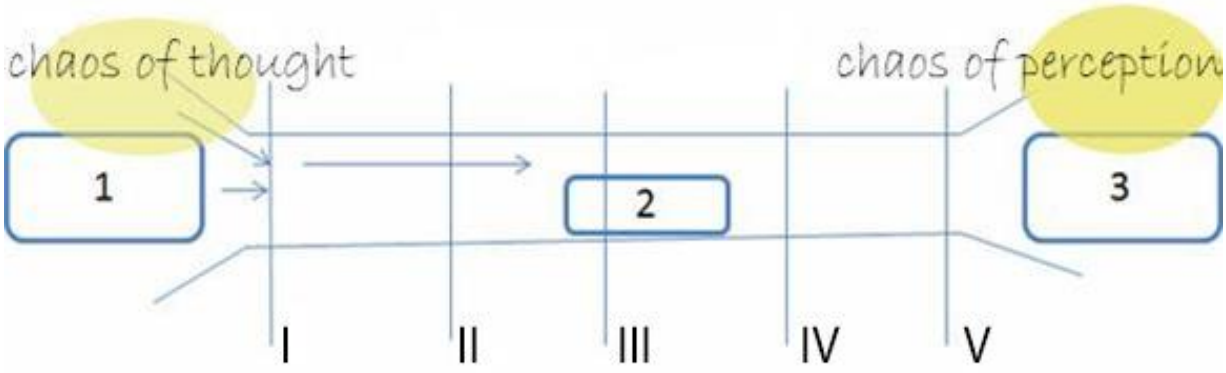

Figure 3. Scheme of communication barriers

Source: *author's elaboration of a generalized linear model scheme with the addition of communication barriers by P. Micić (Micić, 1988).*

It is necessary to make a remark that in positions 1 and 3 an additional state is «chaos» (including «pre-word»), i.e. a certain state in which any prediction is very difficult, since it is not known what is actually going on in the minds of those who communicate. Indeed, it is impossible to know exactly what differentiations the person-

encoder person-decoder will choose to transmit/receive information. For any given situation evolving over time, it remains unknown to what extent a person's choices are conscious (as evidenced by numerous studies in neurobiology). It also remains unclear which neurotransmitters will influence a person's responses at a particular point in time. And it is also not obvious which mental models will be connected at the unconscious and conscious stages of information decoding. This means that the state of a person's approach to the first (and fifth) communicative barrier is not actually calculated at the level of personal reactions. It is worth noting that collective reactions can be more predictable, given the peculiarities of the work of human «mirror neurons» and the resulting collective reactions such as «herd feeling», «crowd effect», «circular reaction», which in a sense look like mutual contamination.

Thus, the states of message formulation and reception are very variable. One more important component of these «chaoses» should be pointed out – the volumes of noise information (point «2» is characterized by noises of different etymology and location), which, in its turn, can influence positively/negatively the encoding and decoding of information by a person.

So, communication is influenced (according to P. Micić) by five communication barriers, which we have previously written about (Ivanova&Abelseitova, 2021). Let us briefly consider each of the communication barriers.

Barrier I. can be formally enough called, according to P. Micić, the barrier of «imagination limit». This barrier separates what is conceived from what has acquired verbal or visual forms. According to P. Micić, at least 30% of information is necessarily lost at this stage. Even Alfred Korzybski (Korzybski, 1933) noted that at the «silent» level information is lost on the one hand, but on the other hand this «cutting off» of information allows a person to cope with the processes of understanding at a particular moment in time. It should also be taken into account that these figures of P. Micić are true only if a person really wants and is able to convey factual information about real-world objects in a relatively undistorted form. Otherwise, quite large-scale deviations from the real description of reality may already occur here. Thus, in the modern world there is, for example, the concept of information «fake», which is based

on the conscious distortion of information at the first communicative barrier in order to transmit false, but quite expected (i.e. probable from the point of view of belief) information.

At this stage of message formation, a person has clarity about WHAT he or she can and what needs to be conveyed through the information channel.

Barrier II is the so-called active language filter, which demonstrates what exactly can be transmitted through the information channel (i.e. can actually be heard or seen by the recipient). In order to increase the filter performance, various additional tools are actively used: schemes, models, visualization, and so on. To date, there are a lot of works, for example, by Dan Roam (Roam, 2008; Roam, 2009) on the so-called visual thinking, which allows using pictures and schemes to transfer more information into the transmission channel. It should be noted that D. Roam's works can be considered, first of all, as a popularization of ideas that were previously the object of scientific research (Arnheim, 1969; Bertin, 1983; Buzan&Buzan, 1993; Tufte, 2001, etc.). It should be pointed out that in order to pass more useful information carrying meaning through this barrier, various figures of speech are also used, for example, such as metaphors, oxymorons and so on. The use of figures of speech allows a person to communicate at the level of concepts, which take part in the control of thinking (Lakoff&Johnson, 1980).

At this stage of message formation, a person has clarity about HOW he or she can accomplish the transfer of information with minimal distortion to the intended message.

Barrier III is the «thesaurus barrier» which takes into account the **Familiar Worldview** (i.e., some expected event or phenomenon that fits into the so-called «common sense logic») of the people communicating and their stock of available communication tools.

A familiar worldview can be represented in the form of various schemes. These schemes will help to imagine what the thesaurus barrier is and what it is necessary to understand in order to overcome this barrier when organizing communication.

Thus, people in communication should have «thesaurus-bases» points of contact which actually allows to find points of understanding. The more identical «thesaurus-bases» are, the easier it is to find a common meaning for the speakers. Identical understanding is rather difficult to achieve, or rather, actually impossible in the usual state of consciousness. Thus, the issue of maximally common understanding of information is addressed by Otto Scharmer (Scharmer O., 2009). He proposes his famous U theory, the concept of presencing. Based on his experience, understanding is a process stretched in time and organized according to special rules, taking into account the peculiarities of human receptivity.

The perception of a person is influenced by all the memories associated with his/her Familiar Worldview, as well as by the attitudes embedded in the background knowledge and paradigms. In addition, habits formed by certain actions and experience have an influence. At every moment of time a person does not perceive a «pure» picture of reality, but perceives something that is correlates with his or her database of the Familiar Worldview and looks for coincidences that help to recognize what he has met in reality. Naturally, such recognition is also influenced by emotions (momentary and memories of similar phenomena at the moment of similar recognitions), and the physiological state of a person, and the state of the surrounding world... A person who is a reflector of information, in fact, always has a clouded «mirror» of perception. It is always covered with some layers: memories, emotions, background knowledge, simulacra[3], etc. These layers make their corrections to the images, i.e. to the information that a person receives and interprets. In this case, the received information about reality (with all «naturally embedded» distortions) is interpreted by a person as the truth in the last instance, which forms his own reality of displays.

In essence, information that relies on the common background knowledge of the sender and receiver can be passed through the thesaurus barrier. Thus, this barrier

[3] It is interesting that the concept of simulacrum is introduced by Plato, for whom the mental plan of working with any object has already presupposed a distortion of the representation of this object in relation to reality as a form of visualization, representation. Thus, the mental work (of an artist, poet) with an object is a distortion, a "copy from a copy". The era of postmodernism introduces this term into social reality, where it appears as a pseudo- object that replaces the "agonizing reality" with a kind of simulation.

prevents the passage of paradigmatically different information and, accordingly, its role can be assessed as helping and/or hindering the flow of communication.

At this stage of message formation, the information is «lapping, adjusting» to the capabilities of the communicator and the recipient.

Barrier IV is the so-called passive imagination filter. It gives an idea of the fact of loss of information at its reception. The size of these losses depends on characteristic features (cognitive abilities of the person, emotional condition, degree of concentration, etc.) of the person who decodes information. An important role at the moment of information perception by a person plays his psychoemotional state, which, in its turn, is connected with mental models of brain work, as well as with mental traps, in which a person stays, and with «big picture» of his cultural paradigms.

At this stage, the recipient interprets the received information and identifies/not identifies meaning-containing elements, tries to understand what was communicated to him in the communicative act.

Barrier V is the barrier of memorization volume, i.e. the amount of information that a person is able to remember: a kind of dry residue of what remains in his memory after the moment of perception. Ideally, no more than 20% of the information that was intended by the sender is memorized. Thus, passing through all the filters, according to P. Micić (Micić, 1988) at least 80% of the information that was conceived at the beginning of the communicative process is lost. Actually, hence the interest in such approaches as the U theory (Scharmer, O. 2009), which allows to reduce the loss of information and really agree on a common vision of the issue.

Of course, such a model of communication does not allow one to be sure of a high level of understanding. It is worth noting that a similar process can be traced in written communication, for example, reading a book (document) a person still has a similar «communicative pipe» of perception. The author has encoded the information and conveyed it through the text. The reader, at his level of understanding, decoded the information and memorized something. At the same time, what the author wrote and what the reader understood and remembered are essentially different things.

Thus, when working with a communicative product (speech, text), the quality of information is important, which is determined by the stock of semantic strength with the increase of new information and data on the studied issue (objects, phenomena, etc.).

To date, the semantic strength of data is almost a chimera. If we recall the formula of meaning (Ivanova, 2022) that we proposed earlier, the communication process appears to be a compound form (formula 1):

$$Meaning = \frac{\sum powers\ of\ influence}{n\ interpretations} \qquad (1)$$

As follows from the formula, in order to achieve the overall meaning, it is important to reduce the influence of unnecessary external and internal factors and increase the accuracy of interpretation. This requires two steps: first it is necessary to remove distortions caused by emotions, context or attitudes, then to clarify and structure the content of the message, eliminating errors and manipulations. This approach helps to make the meaning more accurate and understandable for all participants in the communication.

At the same time, the whole process of communication is a highly variable structure, where variations are as if sewn into the very essence. Moreover, the variations inherent in the communication process have the character of both general and special. It is worth pointing out that the elimination of general causes of variability, as a rule, requires intervention in the system and changes in the existing process, while the elimination of special causes requires intervention in the existing process.

Naturally, changing the communication system as such in order to reduce variability seems to be very problematic. Given the fact that people do not fully understand: how communication between people takes place, what is the role of language, what are speech and text, what is the role of non-verbal signs, etc.?

At the same time, eliminating the specialized causes of variability is seen as a somewhat achievable goal, both at the individual and societal level.

If we return to the formula of meaning, we can see that the sum of forces of influence («$\sum powers\ of\ influence$») is now deliberately expanding: all kinds of

information are replicated: both verified and unverified, invented and distorted. A person is under the constant influence of society (with its media system), culture (with its changing values), family (with its traditions and innovations), educational and formative institutions (with their rules and directives).

In essence, in communication with a person, society intentionally introduces an array of information that has a special variability. And the amount of this information is very large, and it changes the system itself and, accordingly, transfers many specialized (special) reasons to the rank of general. Thus, the creation of disinformation systems and fake culture leads to the formation of false realities, which, in turn, begin to produce more and more variability. The processes in which a person is involved cease to be statistically manageable and stable. All life acquires the colors of unforeseen circumstances, which time after time take social processes out of the state of statistical controllability, and thus, shake up the social system. Any communication in such conditions turns into a certain rebus with unknowns, which are included in the general expression «$\sum powers\ of\ influence$», and thus increase the number of summands, and thus worsen the general level of understanding.

It also generally reduces social cognition, which «is not equal to the sum of knowledge of all members of a social system, but represents that part of knowledge which is common to all members and manifests itself in notions of a collective worldview and culture» (Gharajedaghi, 2011). Naturally, such influence also drastically reduces the «thesaurus-base» for potential understanding in the communication process.

As for «$n\ interpretations$», the situation is no less tragic in terms of communication. It is quite difficult to find precise formulations – everything has a «flou» character, moreover, the stage of co-tuning to common definitions and terms is often omitted altogether. Cutting off false understanding also looks quite a difficult problem, as there are so many opinions and variants of the event that it becomes almost impossible to analyze them all. And a person simply chooses the variant of reality that he or she is ready to believe in.

Each person must realize a share of responsibility for his or her own understanding as well as for the replicated utterances to the audience.

If earlier the Hippocratic Oath was taken by doctors, today any person who is embedded in the communicative processes of society should also repeat the words: «do no harm». It is necessary to cultivate a culture of limiting the circulation of empty and false information. It is necessary to cultivate the habit of checking and cleaning information, i.e. the habit of objectivizing information.

Such tasks can be accomplished both through individual work and in teams. In this case, all efforts should lie in the area of improving the quality of information by increasing the stock of meaningful information exchanged between people.

Systemic work aimed at deep study of both oneself and objects of the surrounding world can fundamentally change a person and his/her perceptions of the world. In fact, such work allows stabilizing the perception of a person on the basis of a better understanding of the objects that surround him and have a certain influence on the quality of perception, on the formation of a certain stable stock of strength of understanding.

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3. Working with information

Given that the modern world has accumulated volumes of misconceptions and erroneous attitudes, it is probably necessary to take seriously the task of forming a new mechanism of data verification, which will be able to find common ground in reasoning, to fit the data into *unified but individual* models of understanding and cognition. It is also necessary to develop new systems of self-checking and collective verification of the obtained results in order to increase the stock of semantic strength and improve the quality of understanding of information

Infology as a Method of Cognition

In order to reduce variability, we propose an «infology» approach, which allows us to come to a clearer understanding of the questions through individual detailing. This, in turn, allows to conduct a dialog with the help of reasoned presentation of information, which is collected according to an algorithm based, among other things, on the methodology of working with questions (WHO, WHAT, WHERE, WHEN, HOW MUCH, HOW). This approach allows to improve the quality of understanding, i.e. increases the stock of semantic strength**,** which is not destroyed by the increase of new information and data.

It is interesting that as soon as a person gets a certain stock of semantic strength, then «$\sum powers\ of\ influence$» also changes. Its variation decreases, as the general understanding ceases to experience a number of psycho-emotional states associated with uncertainty and various doubts, the paradigmatic perception of the world changes, associations are clarified, etc.

Thus, increasing the stock of semantic strength lies in the competence of a person and his potential ability to change the methodology (procedures) of working with information.

It is worth specifying that within the framework of the experimental testing (Ivanova, 2020) of the method «infology» (2019) a semester-long work was carried out with 1st year students (Dnipro National University, Ukraine) which was aimed at studying students themselves and fixing the discovered characteristics in a diary. The

organization of such work gave certain guarantees that the student could not cheat and look up the result in the Internet. It is important that in the final works more than half (68%) of the students claimed the following: «I have never thought that I would be able to...». Thus, working for only 4 months of the second semester allowed students to look at themselves differently, and accordingly to change their behavior and their vision of themselves in the world. Also, within the framework of the elective discipline «Infology» students of the 2nd year of study prepared quite serious and interesting works (Poltavets, 2023; Chernyshov, 2023, etc.). At the same time, in 2025 students studying the discipline «Brand Communication» during the analysis of works indicated that the amount of new information for them in these studies ranged from 60% to 90%.

So, as we have demonstrated in the previous chapters, the easiest way to change paradigms is to change the algorithm of working with information. The meaning of this statement is reduced to the fact that it is necessary to learn to search for and notice it in various lanes and pantries of information labyrinths. If we remember Mario Bunge's formula, it becomes clear why the solution can be found in the method, i.e. in changing certain procedures of working with information.

Such a method at the first stage of shaking paradigmatic perceptions can be infology. This is an approach to working with information, which takes into account the origin of information, its carriers, goals and objectives of message creation, as well as the role and capabilities of the interpreter in obtaining information components. And at the same time, infology allows a person to «accumulate» own «anomalous experience», to collect contradictions and absurdities, to some extent even to foster doubts in the generally recognized and accepted array of information. In essence, it is an opportunity to create one's own field of a-paradigm experience.

At its core, infology is a method of navigating through information reality. Its goal is to learn to identify the meaningful, to doubt, to reconstruct, to anticipate. The approach is based on the principle of self-organizing systems (synergetics of connections).

The essence of the method is as follows:

1. Notice oddities: anomalies, inconsistencies, questionable details.

2. Deconstruct: to take apart information about a worldview into its component parts.
3. Reconstruct: to assemble from the elements a new model that is more logical and adequate.

As a metaphor, the method can be represented as a broken old «construction set» from which new realities are assembled, where the parts are the same (or almost the same), but the connections between them are different.

Note: Infology is a practical methodology of cognition based on mental experimentation and formulated taking into account the approaches of historical knowledge theory, information theory and cognitive science.

Infology is developed taking into account the peculiarities of the perception of the «observer», i.e. it takes into account the cognitive characteristics of the cognizing person.

Infology studies a document (fact) as an information element (abbreviated «inel») preserved as a «trace of information», a «trace of organizational form of interaction» of someone or something in time. Such «traces» in time are left by events, processes, objects, personalities. Each «trace» has different characteristics and descriptions, which depends on the addressant and addressee of the «trace»-message. The document, in turn, is considered as an element of past communication, which is characterized by a set of specific characteristics (addressant, addressee, message, source, code, interpretation, transmission channel, noise, etc.), that is, it displays the informational unity of the object, subject and communication channel.

The approach to the following-document as an information element, an inel (due to a certain abstraction and understanding that it is not reality, but only its specific representation), allows to carry out some cognitive actions at a different level of understanding.

Infology relies, first of all, on systematization and detailing of information. A set of cognitive tools allows performing various actions (grouping, sorting, translation, etc.) over the previously systematized and detailed information. Inels, as a rule, are characterized by infinity of possible interrelations between them. This allows us to talk about the potential infinity of meanings when interpreting data, which directly depend on the degree of study of the object of research and, accordingly, the completeness of knowledge about it.

Infology is also a logical continuation of works that consider the process of cognition as a complex and ambiguous process of working with facts, which are presented in the form of direct and indirect documents.

Any inel by its nature is heterogeneous and in each specific case has a *limited volume of technical characteristics* and *unlimited volume of meanings,* a certain *content inexhaustibility*,

comprehended through the identification of existing *links of* the object under study with other objects. Connections, reflected through organizational forms of interaction, assume the presence of at least 2 participants of the process, that, in turn, are constantly in various system relations with other objects. Each inel also has peculiarities of the language of information expression, which can shed light on its objective and subjective characteristics.

The objects of research are typified categories: object, event, process, person. An object is understood as an artifact, event, phenomenon. An event means something that happened at a certain point in space-time and had a result fixed in time (document-trace). A process means the changes that occurred with an object, person within a certain event series within a certain time interval. The study of personality implies the formation of an array of information about the person and the surrounding relations in the time interval, i.e. in the process of life.

The general algorithm of infology can fit into a very short list of actions «collect → understand → transmit». However, the actions «collect → understand → transmit» have functional features in infology and are ensured due to changes in the methodology of cognitive actions.

A more detailed algorithm of actions can be presented as follows:

1. Choosing a goal (what is to be understood or reconstructed?)
2. Paradigm diagnosis (what are the filters interfere?)
3. Identification of reference elements (what is known accurately/is it really known?)
4. Testing causal relationships for strength and quality of meanings
5. Rethinking / deconstructing (what if it isn't so?)
6. Assembling a new picture (according to the principle of least contradiction)
7. Assessing the predictive power of the new model (can it explain and predict something?)

Infology as a method of mental experiment forms the attitude to work thoroughly with the material under study – info-studying of materials. It also forms the habit of identifying weak, poorly verifiable facts for further pre-study. Infology allows developing the habit of observing the quality of one's own thought. It is known that observed objects change their behavior.

Infology does not contradict the modern scientific approach, but opposes formalization and deliberate creation of a «paradigm cowl» in the information field.

This approach of «paradigm cowl» can be observed more and more in official science, which develops its own rating technologies, standards, which is ensured by promotion of certain materials with the help of certain technologies. The question of the possibility of the emergence of new information and knowledge in such a thoroughly sealed field of scientific search remains unresolved. And, accordingly, the expectation of accumulation of contradictions and scientific mysteries can be prolonged for a long time.

Taking into account the peculiarities of human perception, which, as it were, tunes to the information admissible/inadmissible and then ranks it according to its perceptions and expectations, information science offers ways to collect information in its own way: by passing it through a kind of «sieve» of questions. This approach forces us to «forget» the familiar (prescribed by the paradigm) idea and start looking for answers to simple questions, so-called anti-virus (which will be presented below). The point of this work is to change the procedures for studying information on the chosen topic. In essence, it is not a scientific question that is studied, but a question in information interrelationships. Moreover, the questions that can be studied through infology approaches can be very diverse: from generic research to the study of business processes.

Infology science helps to understand some of the distortions introduced by the Familiar Worldview. And, most importantly, it teaches to realize that a person, as such, does not operate with the facts of reality. He or she operates with information about reality, i.e. with representations that have seeped through his distorting paradigms and Familiar Worldview. And these distortions give ground for the emergence of new misconceptions and errors, and allow the principle of minima non curat preator[4] to come in full force. And, therefore, the habit of disregarding little things and small inaccuracies becomes a normal phenomenon, a norm of life. It is known that a series of small inaccuracies is more difficult to notice than a large distortion. A series of small inaccuracies can change the picture of reality beyond recognition, or rather distort it

[4] "Little things do not matter to the praetor," which meant that a proven but, in the opinion of the decision-maker, unimportant provocation could be disregarded in forming the punishment.

fundamentally. And a person is doomed to repeat and repeat distortions, while automatically adding distortions of distortions into new arrays of distortions.

Nowadays, the problem of distortions takes on additional characteristics. For example, a study conducted by scientists from Utrecht University (Netherlands) and the University of Western Ontario (Canada) found that large language models (LLMs), including such well-known ones as ChatGPT and DeepSeek, in 73% of cases distort the essence of scientific papers when they are automatically summarized. The work is published in the Royal Society Open Science journal and has attracted the attention of Phys.org, The Times of India, Healthcare in Europe and The University Network (Peters&Chin-Yee, 2025).

In a large-scale analysis, the researchers analyzed 4,900 summaries generated by ten leading language models, including ChatGPT-4o, DeepSeek, Claude, and LLaMA. The basis was articles from leading scientific journals such as *Nature*, *Science* and *The Lancet*. The results were alarming: in 73% of cases, the models provided generalized or inaccurate conclusions. Often they turned cautious scientific statements, such as: «Treatment was effective in this study,» into overly categorical statements like, «Treatment is effective.» What was particularly unexpected was that when explicitly telling the models to avoid inaccuracies, by contrast, they were nearly twice as likely to produce distorted and generalized formulations compared to normal, neutral summarization requests. The study also showed that new versions of known language models perform even worse in summarization accuracy than their predecessors, despite improvements in other aspects of performance.

Thus, the horizons of application of the method of infology are not limited only to work with the peculiarities of the information perceived by a human, this method also allows cleaning the information generated by artificial intelligence.

One of the main tasks of infology is conscious deconstruction. It is, in fact, the formation of one's own a-paradigmatic internal field of reasoning, which can include information from various fields of sciences and concepts without total negation and without total acceptance on conditions of probable validity. Within the approach proposed by Richard Feynman (Feynman, 1994): «I think it's much more interesting to

live not knowing than to have answers which might be wrong. I have approximate answers and possible beliefs and different degrees of certainty about different things, but I'm not absolutely sure of anything and there are many things I don't know anything about, such as whether it means anything to ask why we're here. I might think about it a little bit, and if I can't figure it out then I go on to something else. I don't have to know an answer. I don't feel frightened not knowing things, by being lost in a mysterious universe without any purpose, which is the way it really is as far as I can tell». Such a state, surprisingly enough, can only be achieved as a result of intensive work on oneself.

General strategy of the infology cognition method

The general strategy of the infology cognition method is in a basic algorithm of actions (info-study):

1. «state approval» of the incoming information elements (inels) and initial evaluation of each inel within the framework of probable reliability;
2. an assessment of the likely reliability of the information source;
3. creating meaningful «collections» of assessed inels on the study question;
4. working with evaluated information within the framework of mental experiments: grouping, combining, unfolding and collapsing according to various filters; «translation» of data from one type into another (verbal or numerical into visual representations and vice versa);
5. formation of own conceptual field on the issue under study for adequate interpretation of events, taking into account various communicative barriers related to the peculiarities of the era, ethnic specifics and other factors;
6. drawing of probable scenarios of realization of the event (object, person);
7. discussing the results of the work and external peer review to improve the overall quality of the work;
8. forming an image of the event and a model of understanding the event;

9. creating presentation arrays of data and inferences-conclusions about the issue under study in the form of easy-to-check interesting materials.

10. developing the discipline of self-organization in conducting surveys and supporting a culture of sharing only verified data.

The work on steps 1-3 in some way guarantees the formation of a «solid foundation» for the study materials. Only after proper selection and labeling (marking classification) of information, it is possible to perform certain actions on it (point 4), i.e. to search for a meaningful order and logical completeness.

Today, there is a huge number of different research techniques at one's disposal. Undoubtedly, they all have a right to life. But on one condition: the presence of carefully collected information and assessed as potentially reliable one. And it is also worth clarifying that the collected data, which at the time of collection surprised and inspired, will not necessarily turn into a brilliant study. The brain can carefully (i.e., not at all noticeably) weed out any «inappropriate» information. Hence an important rule of the researcher**:** «All information has a right to life and must be analyzed and recorded. Information must be consistently recorded.

«Cleaning» of information is done not by automatically crossing it out, but by thoughtful rechecking of facts and sources with methodical identification of inaccuracies and inconsistencies. At these stages, serious work begins on deconstructing previously known information and forming collections of data of a different level of elaboration.

The obtained research results should be correctly interpreted, and this implies understanding of the context of the epoch, peculiarities of the territory, specifics of communication, i.e. the researcher should have an array of additional knowledge (step 5), preferably encyclopedic, which will help him or her to understand in what way and in what manner the events could have taken place (step 6). It should be clarified that, even with very new data and facts, which more than once made the heart beat faster, a person may be inclined to distort (falsify) them in favor of existing versions. Hence another rule: «You should be courageous, be confident in your research, to allow yourself to defend your vision». Both deconstruction and

reconstruction of data are intertwined in these stages. Moreover, these intertwining processes are quite difficult to separate from each other. Deconstruction gives rise to reconstruction, and vice versa.

It should also be emphasized that not every new decision by a researcher will be the right one. But the feeling of discovery can be intoxicating and relaxing. Hence the importance of discussion and dialogues (step 7), which allow you to get feedback on your own conclusions, which means there is a chance to look at the events under investigation from a different angle, to think about some additional questions, to double-check your arguments. But discussion can also become mere «chirrup». Discussion should also fix certain points of «agreement» and points of «disagreement». Hence another rule of a true researcher: «Learn to be open to new perspectives on the issue under study».

In fact, the study of the topic may be finished here, but, as a rule, a person is very eager to share his or her discoveries with others. And this requires a comprehensible story-narrative (step 8), presented clearly and reasoned (step 9). It is worth remembering Thomas Kuhn **(**Kuhn, 1996), who pointed out in *The structure of scientific revolutions* that from Tycho Brahe to E. O. Lorenz, some scientists gained their reputation as great not for the novelty of their discoveries, but for the accuracy, reliability, and breadth of the methods they developed to clarify previously known categories of facts.

Self-organization and a culture of sharing quality material (step 10) is just a bonus: the brain, once it has tried making interesting internal predictions and felt the pleasure of reducing the number of errors, will continue to work in this way in the future. In this way, the brain can get in the habit of thinking structurally and in detail. Hence the rule: «A new quality of thought is brought about by person’s effort and the practice of structurally organized thinking».

If you look at the preparation of today's research articles, the early stages of research are usually done rather carelessly. And not necessarily because the researcher is bad. Not at all. It's just that the researcher is so caught up in his own conclusions,

which seem to him to be correct, that all further work is reduced to the usual falsification of his expectations.

As for infology, this method still emphasizes activities related to the search for truth, the search for one's own understanding of the world that surrounds. Thus, the first 4 stages in the basic infology algorithm can be referred to the «context of discovery». With all the resulting actions that can lead to a discovery. Even if it is small, but specifically your own personal discovery. Stages 2 through 5 can be referred to the «context of justification». It is clear that there is no clear «divide» between these stages. We cannot say that here «I am discovering» and there «I am justifying». At the discovery stage, an element of justification may appear (if you are lucky, of course). An additional discovery may appear at the justification stage (if one is lucky, of course). At the same time, the phenomenon of luck in cognitive activity should be considered as a carefully prepared phenomenon, which at some stages of work also took a lot of time and effort. There is certainly a chance to quickly understand and discover something. But this chance, as a rule, is a carefully prepared action, it is a mountain of elaborated materials, it is a search for facts that are unique ones and that can at the right moment stand in the right cell of the puzzle and reveal the truth to the seeker.

Additional ethical considerations in the development of information handling and discussion skills resulting from the work on infology algorithms:

1. A culture of consciously limiting the production of low-confidence information. Self-discipline of interaction.
2. A culture of public expressions of ideas and inferences (in particular, criticism of other works) as the result of a series of carefully performed investigations (including experimental ones). At the same time, ideas and inferences are criticized, not the person who carries them. Self-discipline of expression.
3. The habit of verifying the material at all stages of work with information: input control of information quality, self-control of research work quality, as well as voluntary external control (approbation, opposition) of the obtained research

product. The scientist proves his version, first of all, for himself and should feel satisfaction from his proofs. Self-discipline of cognition.

4. Realizing that in real life, one is usually dealing not so much with truth as with the probability of truth. The habit of doubt.
5. The public presentation of information that has led to a rejection of the established viewpoint in science and society is considered a likely result and is significant to the overall knowledge and understanding of the object of study. Habit of honesty.

Ethical principles of working with information, in turn, form a certain value orientation of the researcher, for whom the Way to the truth is important, not the last word in an argument. Any knowledge in the light of suddenly discovered knowledge, observations can be revised. Any idea expressed in a balanced and constructive dialog can become a missing link in the process of understanding the accumulated information.

Modernity sets before a person the tasks associated with working with an ever-increasing amount of information. In this information abundance and diversity, it is necessary to find person's understanding of the world. And the tasks related to understanding are very difficult: there are so many materials and opinions about how the world works! And not a few of them give a false idea of beingness.

Infology allows us to take a utilitarian approach to working with information and build a sequence of steps that allow us to work at a new level of understanding and self-organization. At the same time, the finish when working with information as a display element can be removed as new and new details become clearer. It is *non-finito* in its essence. This means that with information a person will have to move along the spiral, to repeat turns and twists, but each time a new qualitative level of understanding will appear.

It is worth noting that no speculative attempts to understand infology can be compared to practicing algorithms. Algorithms are not a panacea; they are ways to bring changes to the usual procedures of working with information and to break the

framework of habitual paradigms. If they are practiced, changes can be brought in, which means that there will be a chance to start going beyond the usual by changing the relevant procedures of working with information. If you do not practice them, you should not expect changes in the perception of the surrounding world. All the tools of information science are not a strict set of procedures as such, they are flexible, but it is initially assumed that a person does not work with the first material he or she comes across, but with material that has been collected and checked thoroughly.

Infology thus acts as a tool for personal evolution of thinking, aimed not just at accumulating knowledge, but at developing the ability to think more deeply and freely.

Practice working with questions

The world today is overloaded with information. And its quantity is increasing. At the same time, the quality of information is clearly not growing, and the stock of its semantic durability tends to very small values. It becomes more and more difficult to separate the important and necessary facts from the information garbage. Sometimes garbage wins: kitties, memes, emoticons overshadow the epic picture of life. A person moves to a flat level of poorly reasoned arguments, and sometimes banishes thoughts from his or her mind altogether. And life comes, not burdened with thought exercises, but filled with bright faces of pictograms and kitties. Here, it is high time to remember rule No. 1, which says that first you should realize that you live in some imposed world of perceptions.

This is why exercises for developing cognitive abilities are important; without them, «moving our brains» in our «slightly crazy world» may not come at all. They are also necessary for the practice of conscious deconstruction, which allows us to go beyond the usual pictures of the world, beyond the framework of paradigms. It should be recognized that it is very difficult to make this transition – for this purpose it is necessary to remove the garbage of information and to search for meanings. A person, in fact, becomes a catcher of elusive meanings. A person's activity is reminiscent of maieutics (the art of midwifery), in the process of which meaning is born through the

agonizing posing of successive questions leading to the discovery of the meaning of general concepts, a kind of birth of understanding.

The first steps in this direction can be helped by information algorithms, as well as the alien method, which proposes a research approach in which one consciously excludes oneself from cultural, scientific and political patterns. The person looks at what is happening as if he or she was not a participant, but an outside observer with a different experience of thinking. The key principles of the alien method include the following attitudes:

1. Not accepting either side as «yours»,
2. Asking questions that are different from the current context,
3. Look at human actions as a system,
4. Seeking constancy impossible to common logic.

It should be understood that algorithms are just a primary antidote (a kind of anti-virus) to the mental clipping and fussy perception of information, and an antidote to creeping structureless control. It is a movement towards automatism in recognizing manipulations and lies.

First aid: anti-virus or simple questions

It makes sense to start working with information from the simplest and most uncomplicated things. Such relatively simple practice can be working with questions (anti-virus). The questions are familiar from childhood:

- WHO?
- WHAT?
- WHERE?
- WHEN?
- HOW?
- HOW MUCH?
- HOW did I know that?

Asking and answering the question «WHY» should not be rushed. This question is insidious: it calls for judgment and gives a certain explanation (true/false). And it

makes sense to judge and explain only after having managed to saturate yourself with «selected» information, in which various types of data and information have been collected. Besides, it should be realized that if an explanation already exists, there is no motive, as such, to search for something and explain it further. Unless it can be done by a pedant or a perfectionist.

In addition, we remember that the human brain always brings something of its own to the interpretation of the surrounding world: its memories, its experience, its values, its beliefs, its background knowledge. A person is always in direct interaction with his personal Ouroboros, which controls the perception, and thus all that is possible/impossible to know. The individual also interacts with the collective Ouroboros, the social pet, so to speak, who also has his paw on the seal of social cognition. Taking into account that Ouroboros is a very systemic and cyclic phenomenon, the work with it should be of a systemic nature. The task of such work is to create systemic prerequisites for deconstructing what a person already knew and what can affect the perception of new information, i.e. the violation of rules on crossing the boundaries of paradigms should have a clearly expressed systemic character. In essence, the work of conscious deconstruction is an activity organized in a certain way to change perception.

Schematically, anti-virus questions can be represented as a kind of «question target» (Fig.4):

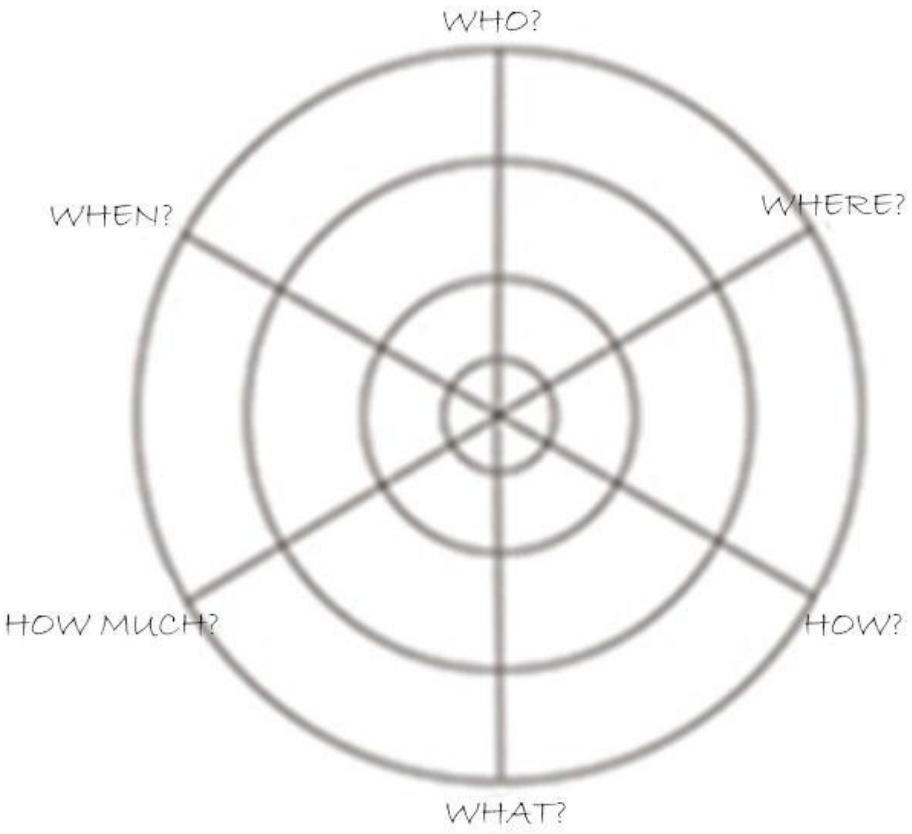

Figure 4. Target of questions

So, the first tool in this process may be the so-called question target. Its use will allow a person to distract from the usual acquaintance with information, and this, in fact, interrupts the usual «run of thought», i.e. it produces a certain deconstruction of familiar ideas. A person stops looking for an answer to his question (on which he or she, as a rule, already has his own opinion and judgments[5], formed within the framework of background knowledge), and looks for information on smaller sub-questions like an alien (who knows nothing at all), thus filling the cells of the «question target» with versatile information. That information, which was managed to be found, and caught. «Catching» information is a little predictable action: in a book you may come across a missing fragment of understanding, in a conversation you may hear an important statement... No one knows where the most important for understanding information will be found. In any case, information can be taken from various sources and accumulated primarily as facts reflecting something that happened. There is a

[5] By the way, a person will willingly and unwillingly formulate the judgments in search keywords as well. Questions just distract from judgments.

chance that a person, while collecting information on questions, will forget (physically will not be able) to falsify the whole volume of information under his expectations, as these expectations may simply not exist: the task is different, completely unfamiliar. Besides, a question cannot be false or true in its essence, as it is not a statement. A question has a peculiar potential for answers. As soon as a person determines the answer – the question is removed. But as practice shows, the search for answers according to the «question target» allows accumulating material, including contradictory material, i.e. not automatically crossing out what does not agree with the primary opinion.

In addition, using the question target gradually forms the habit of noticing details and potential connections between objects, i.e. thinking in multiple layers. In addition, the work of collecting information through questions automatically creates a classification label for the obtained information and demonstrates the amount of information on issues related to the topic of study, as well as spatial and temporal characteristics and quantitative and technological features.

Working with questions can be productive both at the information gathering stage and act as a kind of continuous change monitoring tool that allows you to notice potentially problematic tasks that require the attention of the person studying the question.

A blitz on the possibilities of questions

WHAT question. It is paradoxical, but very often a person studying something is not able to clearly formulate the object of his or her interest, let alone identify related topics. It should be understood that some unsystematized facts are simply lost and forgotten in the general mosaic of all kinds of accumulations of information. The creation of lists, collections of found information, data, testimonies, etc. allows forming the primary concept of studying the object.

Answering the WHAT question clarifies the nature of the study questions and gives the activity some focus on a particular topic. Answering the WHAT question allows you to identify potential **THEMES** of study of an object.

WHO question. Answers to the WHO question are oriented on the object of study through the prism of specific persons and their connections with other people. And exactly in connections between people it is possible to find some sense necessary for understanding of the information. Answers to the question WHO allow to recreate the coherence of events and processes through the coherence of people. Thus, for example, the connection «WHO – WITH WHOM» gives a lot of material for search of possible reasons of the observed events. In each case, when evaluating any person, naturally, different variants of possible questions will be observed. But you just need to learn to play the cascade of questions in your head, sorting them into: know/don't know.

WHERE question. Answers to the WHERE question allow you to link the object of study to a specific territory, to the changes occurring in this territory, to the resources available in this location. They also provide food for thought about potential movements of artificial objects (e.g., boundaries) in the territory. And having a «map» of movements (of persons, troops, materials, etc.) in front of the eyes, a person involuntarily begins to think about the way of life, logistics, communications with all the new questions that follow, which gives rise to new and new leads in the management plan.

WHEN question. Answers to the WHEN question allow to form a certain chronology of changes in the state of the object of study, i.e. to reconstruct the sequence of events. Answers to the WHEN questions in combination with answers to other questions allow us to look at the object of study more soberly and sensibly, with a certain degree of skepticism. Each person has his or her own set of disciplinary knowledge and beliefs, which will determine the degree of skepticism in relation to the assessment of the reality of the identified chronological changes.

HOW MUCH question. Answers to the question HOW MUCH provide fuel for thought about the singularity or massiveness of processes, about the quantitative results of activities, about the productivity and efficiency of processes. In general, it is a very interesting type of data that can be used, among other things, for various statistical models and calculations of the probability of various events.

HOW question. The answers to the HOW question are essentially answers about technology, logistics and communications. It is worth noting that often these questions are ignored in cognitive activity and substituted by some numerical data. Thus, instead of answers, various ways of «crossing out» information, giving an impossible explanation as an extremely obvious one that must be simply believed, etc. are used.

Answers to the HOW question allow to reveal the **PATTERNS of** changes in the states of the object under study. Answers to the HOW question are actually the most tricky and complex, but they allow to double-check the probability of the described events and changes occurring with the control object.

So, anti-virus can be applied in any field of activity, it is an open tool for working with information. Answers to questions and their subsequent processing can give a deeper picture of understanding of the studied object. Various questioning techniques are widely used in management, in goal setting works, in drawing up activity procedures, in production algorithms, in marketing, for data segmentation, etc.

In addition, the information gathered through the target of questions partial attenuation of the influence of background information on the object under study, that is, to interrupt the «memories» of what was previously known. In fact, this is one of the easiest ways to begin unauthorized crossing of paradigm boundaries.

Compound questions or advanced use of question target and its transformation into a polyhedron of questions

Having a model of the target of questions in front of the eyes (in the mind), a person does not forget the list of questions and can (even mentally) mark on a scale the number of collected answers. The more this number allows one to move away from the center of the target, the more information a person has on the issue under study. In its essence, the question target is also a tool for self-assessment of one's own performance, such a demonstration of one's own priorities in the data being studied.

Questions can also be presented in a more complex composition. For example, in the form of intersecting triangles that form a kind of polyhedron of questions (Fig. 5)**.** Such a representation allows you to mentally link information on different questions in order to ask a more precise new question.

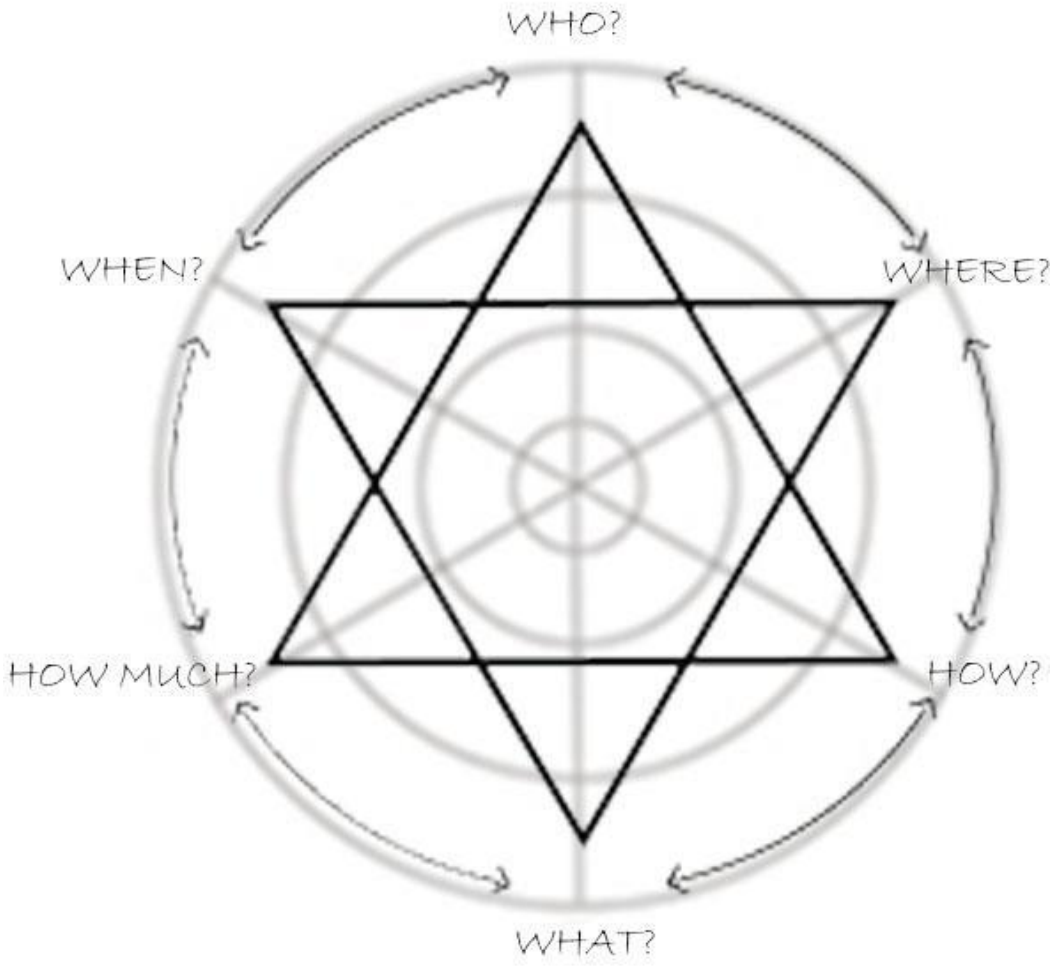

Figure 5. Polyhedron of questions

When studying an object, a person, as it were, goes through possible questions from the factual material, captures possible meanings. This material is organized by means of questions into chronological and thematic groups, as well as linked to the source from which it was obtained.

The information collected into thematic clusters of questions can be easily analyzed from the perspective of fuzzy logic, i.e. any information item can belong to different subsets of information and take part in different probabilistic scenarios.

As the answers to the questions «WHO, WHAT, WHERE, WHEN, HOW, HOW MUCH, FROM WHERE», as well as to compound questions are accumulated,

it is possible to approach understanding of the probable answer to the question «WHY, FOR WHAT», i.e. to start judging the phenomenon. But for such a judgment, inference, it is necessary to understand what characteristics of an object are connected with each other and combined with other objects in specific modules-bonds of interaction.

In addition, the polyhedron of questions allows us to find additional options for analyzing coherent information. And thus, it gives the character of work with information the form of filling potential options of choosing from n-possibilities. At the same time, n-possibilities are formed by the person and have a certain value and meaning for him or her. A person studying a topic begins to see a multitude of possible variants, i.e. begins to work with information, taking into account its specific character.

It can be seen that collecting information through the questions of the first triangle «WHO_WHERE_WHEN» immediately creates a link to a specific person who performs a certain activity in space and time. The second triangle «WHAT_HOW_HOW MUCH» makes a reference to the analysis of so-called inanimate objects (activities, tools, technologies, timing). These questions hold great promise for analyzing artificial objects and their technological features. The triangle of questions «WHAT_WHERE_WHEN» is especially productive for analyzing changes occurring in a particular system in dynamics with reference to a specific territory. The triangle «WHO_HOW_HOW MUCH» allows to better understand the activity character of a particular living object of study. The triangle «HOW_WHEN_WHERE» is especially attractive for analyzing technological and logistic features of the object under study in dynamics. The «HOW MUCH_WHERE_WHEN» triangle allows to clarify aspects of quantitative changes occurring to the object of study in space and time. Thus, the habit of considering information about the object as a set of special questions gives a different depth of understanding and detailing of different levels.

All new data obtained through the questionnaire are also carefully recorded, labeled and dated. It is mandatory to record the sources of information in the notes.

Evaluating the «fullness» of each category of questions allows you to identify gaps and formulate additional topics of study or to notice excessive noise on any of the questions.

Simple techniques of working with the models of «question target» and «question polyhedron» help at the first stage of analyzing information to get out of automatic perception formed by habitual paradigms of thinking. This allows you to take a critical look at your knowledge and realize your own illusions.

Keeping in mind that human perception is largely based not on the perception of the new, but on recollection: we pick up familiar analogs and familiar patterns from memory. Cognition of an object is an iterative process: understanding is gradually accumulated, refined and clarified.

The more a person is immersed in the topic, the more he or she traces connections and details, the more vividly the image of the object under study appears in mind, which means that there is an accumulation of choices in the variety of n-possibilities for interpreting the collected material. Thus, the effect described in Bayes' theorem can be observed in one's own on-line cognition process. The object of study begins to live in a person's understanding, nuances are discovered in it, insights occur. The meanings are pulled together and become more accessible and understandable to a person.

It is worth remembering that any modern cognitive process is burdened with an already accumulated abundance of false information about the world around us. The world is immersed in information garbage of different size and quality. This is its peculiar difference from previous epochs. It does not mean that there were no distortions before, it means that there was no such abundance of garbage information and such a huge number of channels of distribution of this information.

It is necessary to learn how to create your own Order of Understanding of the surrounding world. And remember that without learning to sort the wheat from the chaff, a person will not be able to go further into the world of understanding.

Practical information handling

The main difficulty of working with information is its variability, probable reliability and dependence on perception. Information is rarely unambiguous, often contains internal contradictions (redundancy and incompleteness at the same time), is not always verifiable, is subject to distortion during transmission, and it disappears or is transformed. A person operates not with actuality, but with subjective reality that has passed through the paradigm filters of perception. The concept of beingness (according to Whitehead) emphasizes that information is only a realized fragment of a multitude of potentialities. In this context, any knowledge is a variable construct, and working with information requires an awareness of its nature as unstable, ambiguous one, and deeply connected to the mechanisms of interpretation, memory, and context.

The basic infology algorithm «collect → understand → transmit» involves three actions that are different in nature. Collecting is not just an accumulation, but a classification aimed at identifying what is significant. Understanding is a process of interpretation, in which disparate elements must be put together to form new knowledge. Transmission is communication, which today increasingly substitutes meaningful content for mass replication of messages. In the midst of meaningful noise, interpretation becomes difficult and emotions come to the fore. Modern society actively replicates emotional responses, substituting them for meaningful perception.

***Collect stage*:** the essence is the collection and selection of information

The main task of this stage is not just to accumulate data, but to meaningfully collect and select relevant information. It begins with the formation of a kind of «information history» – a preliminary inventory of knowledge and identification of gaps. This allows information to be categorized and provides a basis for further interpretation.

It is important to understand that phenomena and events in the world are interconnected, but not all connections lie on the surface and are realized at the moment of acquaintance with information. Often it is the non-obvious traces and hidden interconnections that turn out to be the key to a deeper understanding of the topic under study. At the same time, it is necessary to take into account that the modern system of

scientific search is not immune to falsifications – both intentional (according to Popper, 1979) and accidental ones. Therefore, a critical attitude to sources and the ability to recognize genuine connections become an integral part of working with information.

Automated collection creates the illusion of completeness, but in reality, it only increases information noise. Information can be lost, hidden or known to be unreliable, and its verification is limited. Therefore, just accumulation is not enough – a critical assessment of the reliability and relevance of the information under study is required. At this stage, the infology method proposes an algorithm:

- ✓ Information intake – capturing data and its sources.
- ✓ Validity assessment – preliminary verification of information.
- ✓ Collection formation – creating a structured base of significant items (including through the capabilities of anti-virus and question polyhedron).

This approach helps to avoid the illusion of knowledge supported by a superficial system of education and testing. Meaningful collection allows to realize the depth of one's own ignorance and to form a multiview picture of the studied object – a kind of «holographic knowledge».

Thus, the infology approach develops the skills of thoughtful perception of information, improving its quality through detailing, systematization and clarification. This stage can be long, turning into a research or collecting immersion, but it provides the basis for real understanding. The collection and selection of information elements (inels) is closely related to the peculiarities of human perception. In conditions of information overload and data instability, only a person can consciously select the meaningful things – no system can do it for a person. The first stage of the infology algorithm forms the brain's skill of a different type of thinking that is attentive, observant, capable of fixing non-standard, «inconvenient» facts that do not fit into the usual paradigms. This approach requires rejection of black-and-white thinking and transition to fuzzy logic, where the spectrum of probabilities is evaluated. Gradually, an internal «collection of traces» is formed – significant elements found independently that change the perception of reality. The main thing is to learn to enjoy the very process of understanding, because it is the anticipated meaning that brings satisfaction

to the brain and helps to build a conscious attitude to reality. The skill of gathering information is important not only for science, but also for living in the present in a meaningful way.

Understand stage. The second task of the infology algorithm is to interpret the collected information in order to understand the essence of the object under study. This stage implies departure from the usual interpretations and selection of significant data from the collection taking into account systemic interrelations. The main goal is to identify what happened, what could or could not have happened, what information is missing, and what information is distorted or falsified.

Interpretation acts as an analytical process that includes:

- ✓ Mental experiments: data grouping, comparisons (chronological, synchronistic, cartographic), modeling, «translation» of information between formats, quantitative-qualitative analyses.
- ✓ Formation of the conceptual field: taking into account the links with territory, time, society, technology and human factor.
- ✓ Developing plausible scenarios: building causal models, testing hypotheses, creating and destroying versions.

These actions are based on individual perception: people interpret through the lens of their education, experiences, and paradigms. The same information can lead to different conclusions for different people. Mental experiments allow us to see new things in what is known, to refine and double-check data, and to develop the habit of thinking rather than compiling. The result can be both refinement of hypotheses and rejection of previous ideas.

The key skills for this stage are:

- ✓ Analyzing the object both individually and in systemic relationships;
- ✓ Generalization and detailing;
- ✓ Refining the research questions;
- ✓ A systemic assessment of information;
- ✓ Create scenarios based on carefully selected data.

Thus, this stage forms the ability to go beyond template thinking and manage one's own perception. The toolkit of mental experiments is diverse, but one should start with basic operations: thematic, chronological and cartographic groupings. Their absence reduces the quality of analysis already at the start. Only on systematically processed material reliable quantitative and logical conclusions are possible. TRIZ (theory of inventive problem solving) methods for generating solutions can also be useful. All this turns interpretation into a meaningful and productive stage of understanding.

***Note**:* Some tools for working with information

«Translation» from one type of data to another one has as its main objective the presentation of material in a different way**.** For example, a text presented in the form of a diagram is perceived differently and gives a different view of the relationships that exist between related objects.

Matrices of cause-effect relations and networks allow to create blocks of coherent information, which reveals and organizes connections of the studied object with other phenomena. A similar and complementary tool can be *matrices of interpersonal relations*, with the help of which it is easier to present the scheme of relations between people, collectives and organizations.

Mind maps allow you to organize information into simple and understandable models with drawing of meaningful connections. It is an effective tool for visualizing information, allowing you to reflect the structure and logic of the studied issue on one page. Such a scheme activates the imagination, helps to identify connections, clarify the stages of research and see the individual way of learning. Maps can be of different forms: radial, block, matrix, mixed. Their structure is selected according to the task. Their main purpose is to serve as a guiding scheme of thought, increasing awareness and depth of work with the material. According to S. Cummings (Cummings, 2005) one of the main advantages of depicting information in this way is the ease with which one can relate what is drawn to the research topics and to its specific trajectory of connectivity. The drawing is easier to 'complete' or finish' in order to be able to understand and convey the sequence, coherence and change in the research.

Information Analysis. Analyzing by various methods the array of information on the object under study. Searching for matches by connections in the data system on the object under study. Fitting the object into the event and technological context. Analyzing movements (routes) and logistics of the object. Presentation of information in a special way.

Fact grouping. Fact grouping involves combining information within the specified search characteristics: place, time, technology, logistics, personalities, author, etc., in order to identify potential connections of the objects described by the inels. In order to reveal potential connections of

the objects described by inels. For example, the formation of temporal and thematic ribbons allows to present known information in a different way and grouped in its own special way. The grouping of facts presupposes the building up of a layer of coherent materials around the object under study. Moreover, this layer is growing in a structured form, not as a scattered mosaic. Having passed the stage of data grouping, a person can present the results of the study in different ways: as a description, a flowchart, a graph, a mental map.

Combining of facts. This is a cognitive experiment aimed at discovering hidden meanings by combining data from different sources, times and topics. In contrast to simple grouping, combining involves meaningful joining of data – objective and subjective – to develop a coherent picture. Triangular questions are an effective tool for this, as they help to move beyond conventional paradigms and open up new interpretations. The combination also allows for technological, logistical and biographical contexts to be taken into account, enhancing the analytical depth of the research.

Context analysis allows you to «fit» the object under study into the situational environment and to evaluate inconsistencies and contradictions that arise when examining material in coherent data. In this type of analysis, it is necessary to evaluate a variety of available data (from linguistic to geographical and chronological). Various kinds of synchronic tables can also be productive in context analysis.

Technological analysis makes it possible to assess the technology of manufacturing something, as well as to recreate technologies of movement, extraction, utilization of certain resources. Representation of these data in the form of *«translations»* (route sheets, organizational mental charts, flowcharts of technological process stages, etc.) allows to recreate the supposed technological processes more accurately. And these same processes, run through a contextual synchronistic table, can show inconsistencies in chronology and technological capabilities of the epoch.

The Infology Toolkit does not offer a dogma of use. It offers a set of simple and straightforward actions that can improve the quality of information preparation and processing. Infology allows to create a new quality of information, which will give more understanding and bring more meanings, and which will be verifiable (at least to some extent). In essence, working according to infology algorithms allows us to increase the reserve of semantic strength of the research, which was demonstrated in this monograph on the example of studying the concept of «information».

In general, it is recommended to start any study with mapping, i.e. designating the «place» of the object's action. In fact, it can serve as a starting point of classification,

as a kind of linking the event to a certain space, to a certain territory. At the same time, the indication of «time» makes it possible to clarify which particular temporal «layer» of information tells about this territory. Thus, the approach «sine loco, anno vel nomine» (without specifying the place, year and name) is not used in infology.

It should be noted that, of course, this rule is well known and has been described more than once. Thus, for example, Charles Samaran in his work «History and its Methods» devotes the first 90 pages of the narrative precisely to the issue of «unity of time and place» (Samaran, 1961) when studying any phenomena.

The order and choice of research tools depend on the logic of the individual's own thinking. The research system remains flexible and open, and the sequence of actions is individual. The main condition is the availability of quality initial information and recording of intermediate results.

It is also useful to use different methodological approaches, such as TRIZ or principles of neuroaesthetics, which can give unexpected and valuable results (Table 6.) Correlation of TRIZ approaches and laws of aesthetics by V. Ramachandran (Ramachandran, 2011) allows to show the common when analyzing an object.

Table 6. Correlation of TRIZ laws and principles of neuroaesthetics

Aesthetic law	TRIZ principle	Comments
Grouping	Unification principle	The law of grouping in different variations is widely used in TRIZ, in scientific activities
Maximum offset	Allocation principle of «hindering» or «helping» information fragment The anti-system principle Reverse principle The principle of «turning harm into good»	The law of maximum displacement is widely used in various techniques designed to get away from a template view of an issue and form an alternative vision
Contrast	The Principle of Transition to Another Dimension	The law of contrast is widely used for modeling situations (management, marketing, engineering, etc.).

Continuation of Table 6

Isolation	Principle of fragmentation into separate information fragments	The law of isolation is the basic approach of analysis in any field of activity
Peekaboo (perceptual problem solving).	The «straw» principle	The law of Peekaboo has broad applications in the formation of arrays of checklists and reasoning (including «homework», predictive modeling up front)
An aversion to coincidence	The principle of asymmetry	The law of aversion to coincidences, judging from the official history was not taken into account when falsifying various historical events
Order	Inel Quality Principle The principle of accommodation	The Law of Order presupposes the existence of some Rules of Order and Regularities and is used to identify them
Symmetry	Principle of universality	The law of symmetry is manifested in the choice of various objects of the surrounding world, be it an apple or a favorite person – an object without asymmetric deviations is chosen, so symmetry is a universal regularity of the structure of living things. Although today there is serious work in this direction to change these ideas.
Metaphor	All principles are to some extent peculiar functional metaphors of activity	Metaphor allows us to look into the human subconscious and tease out what a person does not consciously communicate

Source: author's elaboration of the analysis of works by Altshuller (Altshuller, 1996) and V. Ramachandran (Ramachandran, 2011).

It is interesting that TRIZ and neurobiology approaches represent different directions of research. But the results of these works give similar ideas about the regularities that can facilitate human work with information and show the mechanisms of formation of the human thinking system. And lead to a more fruitful development of scenarios of probable events.

This activity requires the ability to present the material in a clear, concise and structured way, forming an argumentation base: a problem statement, a brief overview

of the background, a hypothesis and its proof with visual materials that are easy to verify – even if they contradict conventional wisdom.

When working with diverse information, it is easy to notice its redundancy (unnecessary details) and incompleteness (missing links). This opens the way to building new scenarios: some elements are eliminated, others are searched for. These steps are subjective and are to be refined as new data become available.

An interesting way of scenario modeling can be an individual morphological research matrix that a person composes from collected materials.

Note: morphological matrix allows to perform structural system analysis in order to find new combinatorial solutions. The structural matrix consists of parameters and expressions that can be used to find the most adequate solution.

The number of parameters and variants in the morphological matrix can be different – the main thing is that it is convenient for the researcher to think and work. It is worth taking care of readability and storage: the A3 format is optimal; if necessary, the sheets can be glued together and conveniently folded. A1 format is more suitable for the final visualization – the general mental scheme of the research.

When information is in front of your eyes, it is easier to manage it, find connections and ask new questions. Working with the matrix activates thinking: it is in the intense search that insights are often born. The task is to see the field of possibilities and find the most successful combination, taking into account the material, the author's thinking and the target audience. The form of the matrix may vary, but its function is always the same – to form new knowledge and understanding.

So, the process of knowledge accumulation is iterative, cyclical and requires effort. Insight is instantaneous, but it takes a long time to prepare through conscious work with information. A person must create his or her own system of understanding that goes beyond the established paradigms. This is the way to new forms of thinking, practical experience and meaning-oriented discoveries.

The infology algorithm helps to consciously organize the learning environment, assess the quality of sources, and record both positive and «erroneous» results.

Working with hypotheses, refinements and comparisons of data forms contour thinking – the thinking of the cycle, in which understanding deepens at each turn.

Mental experiments allow us not only to see new things, but also to witness the transformation of our own reality. This is the way to meaning understanding through individual meaning-making.

Modern cognition is complicated by information noise and blurred boundaries between truth and falsehood. In order to build true understanding, it is necessary to develop one's own Order of Understanding – an individual system of filtering, analyzing and evaluating information. This is not only working with data, but also with yourself: with your attitudes, values and perception of the world.

***Transmit stage*:** A person is a contradictory and surprising creature: weakly systematic at the level of behavior and conflictual in matters of interaction. Information acts as a mechanism of cohesion, «embedding» a person in the social system and adjusting to his expectations and those of others. It needs both autonomy and belonging at the same time. Hence the complexity of communication, which requires dialog.

Dialogue is possible under the assumption that everyone is right and interesting in his or her own way, and respect for the «specialness» of the other brings us closer to a true understanding of the world and of ourselves. But in order to understand the other, one must first get out of one's own skin: detach oneself from habitual attitudes, see the other's paradigm, and be attentive to words, actions, and emotions. But communication is hindered by a fixation on one's own logic. As a result, people talk to themselves and are surprised that they are not heard. But mutual understanding is built on clarification: a good question is not an «attack», but an invitation to clarify and develop the thought. It can illuminate a meaning that the interlocutor hasn't even noticed.

Discussion is not an argument, but a relationship management. Sometimes it is worth trying on someone else's logic temporarily, not to abandon your own, but to better understand, deepen, clarify. Through questions, both sides can move forward.

The presentation of the material requires a system: verified information, selected inels, and logic of presentation. The research design is not a limitation, but a framework

that allows for deviation for the sake of meaningful deepening. The key is clarity, coherence, and respect for the mind of the Other.

Transferring knowledge is a complex task, because everything that was understood during the research remains in the active memory of the author, while the reader has only background knowledge, often distorted by fictions, falsifications and personal interpretations. Therefore, the presentation should be clear, logical, reasoned and engaging. It is important for the author to remember that his journey to understanding has been gradual, and the audience often expects results «on demand».

Many scientific and public texts are overloaded: connections are unclear, meaning is lost. This is not always a sign of carelessness – more often it is the effect of deep immersion, when the author considers many things «already clear». But the ability to know is not the same as the ability to explain.

And the third stage of the infology algorithm – «transmit» – focuses on overcoming barriers to understanding. It includes discussion, reviewing, forming an image of the event, and creating verifiable and meaningful presentation materials. Here, clarifying questions are especially important – not for criticism, but for joint clarification of logic, evidence, terms, alternatives, and the very course of thinking of the interlocutor.

Communication requires not only accuracy but also respect. It is the material, not the author's personality, that is being discussed. Criticism is an opportunity for revision, not a judgment. By accepting comments, the researcher refines and improves his or her understanding.

In order to communicate a discovery to a wide audience, you need to tell a comprehensible story with a clear idea – a «model of understanding». Such a model helps to identify viable versions and weed out inconsistencies. It should be as concise as a movie logline: the shorter and more precise the message, the more deeply it is understood.

However, without realizing the main idea, everything turns into a jumble of details. The modern media flow demonstrates this: analytics turns into fortune-telling, news into gossip, and shows into politics. In order to keep sober thinking, the

presentation of research should follow the logic of a classical story: the plot (the problem), the development (argumentation), the denouement (hypothesis testing). And most importantly, the outcome (confirmation or refutation) is not evaluated as success or failure, but as a step in knowledge.

The narrative scenario begins with the selection of the material: you need to imagine the future reader and build a path of perception for him/her. The new should be presented through the familiar, relying on associations, comparisons and clear contexts. This is the key to effective knowledge transfer.

Algorithmic work with information forms not only self-organization, but also a culture of sharing verified materials. The result is not a strenuous breakthrough, but a gradual «phase transition» to a new level of awareness. Old paradigms begin to be cleansed of the false and mundane, and it is as if one recognizes the hidden. It is not the world that changes, but its perception: illusions disappear and clarity appears.

Following the infology algorithm allows the brain to enjoy accuracy, reduce errors, and awaken self-motivation. This way of interacting with information makes perception meaningful, reduces boredom, and activates the flow of meaningful insights. Over time, algorithms may become unnecessary – if mindfulness becomes a natural background to life.

Cognition is a way to understand what is happening and ourselves. It does not always give the truth, but it opens up space for reflection, questioning and personal integrity. It is a way away from cliched thinking and fictional worlds to real perception and the real self.

Observer and meaning: how working with information changes reality

The behavior of an object is changed by observation. This is true for physical systems as well as for thinking processes. Observation of one's own way of cognition is a step towards awareness and formation of new forms of understanding. It allows us to get out of the automatism of perception and rethink our own actions, interpretations, and expectations.

Meaningful cognition is not a path of instantaneous results. Deep meanings are not given from the outside and are not transmitted directly. They are born in individual work with information, in persistent search, in painstaking self-observation. This is the way of revealing connections, regularities, meanings. Each researcher, aimed at understanding, becomes a kind of a Trapper of Meanings, he reveals hidden interconnections in the world.

However, meanings tend to slip away. They are hidden under layers of patterns, lost in the background noise, distorted through false connections. The modern media environment does not encourage reflection – it encourages fragmented, superficial digestion. Implicit perception, working automatically, substitutes for reflection – it reacts to emotions, habits, known images. This reduces the quality of thinking, breaks logical connections, weakens the conceptual apparatus.

Explicit thinking, on the contrary, requires effort: to observe, to fix, to verify, to construct. Working with information requires straining the mind, collecting data, searching for contradictions, modeling, and making versions. In the process of such observation, a structure – a personal system of cognition – is formed. It becomes possible to see not only the object, but also one's own ways of perception, preferences, distortions. Awareness of your own filters emerges – what is allowed in the field of attention, and what is cut off unconsciously.

This structure is formed only through methodological work. The use of mind maps, «question targets», schemes and analytical matrices allows to fix the research route, visualize thematic distortions and unexplored areas. The perception of the research process itself as an object of observation becomes a key to understanding one's own cognitive mechanisms.

Less structured information leads to greater resource costs. Lack of understanding of connections generates chaos. On the contrary, the systemic organization of information offers advantages: clarity, controllability, reflection. And, most importantly, it allows us to get out of paradigms, out of background knowledge imposed from the outside.

Cognition becomes a practice of transformation. As a person develops, he or she restructures not only himself or herself, but also the picture of the world. Behavior changes, and the environment changes with it. Reality acquires new connections, new forms of meaningfulness. Thinking emerges as active action rather than passive perception. The world becomes a non-linear, multi-layered system in which everything is connected with everything else. Reflexion appears. The space of meanings opens up. And in this world, man is no longer an element rocking on the waves of misunderstanding, but an active personality structuring his environment, not absorbing information, but managing it.

This is the way of *Homo Informationalis* – not just a thinking being, but a realizing and transforming element of being. Not just knowing something, but capable of discerning, combining, verifying, clarifying. Cognition becomes a way of life, structuring chaos, transforming the meaningless into the meaningful, restoring order.

It is in this vein that it becomes evident that the problematic of the development of the modern world is primarily related to the crisis of meanings, structures and interrelationships. Political, economic, ecological, existential – all these crises are intertwined, reinforce each other and create a sense of universal confusion. The root cause of many of them lies in the information crisis – in the disconnection of knowledge, in the abundance of false information, in the loss of skills of discernment, comparison and reflection.

Overcoming this crisis is possible not only through institutional reforms or technological breakthroughs, but primarily through changing the way we work with information at the individual level. The formation of a conscious approach to the perception, collection, interpretation and transmission of information allows us to restore the lost coherence, to reassemble disparate fragments of knowledge into a coherent field of understanding. This is where the potential to overcome the crisis is hidden – through the restoration of the ability to distinguish, comprehend, verify and create meaningful semantic structures. This approach builds internal resistance to manipulation, reduces chaotic thinking, and opens up space for constructive action.

Information awareness becomes the anchor that holds both the individual researcher and society as a whole in the conditions of meaning turbulence.

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4. Some reflections on cognition and crises

It is necessary to realize that the less developed a person is, the greater resource costs are required to achieve his or her goals in the system called the world. From the point of view of working with information, we can reformulate this statement: **the worse the information is structured by a person, the worse he understands the connections of the surrounding world and the worse he manages them, which leads to resource losses and crises of different etymology**. Hence – losses, conflicts, crises. Crisis is not an anomaly, but a signal to the need for rethinking. It shows the limits of current perceptions and management models.

By mastering the art of meaningful cognition, a person does not just cope with difficulties - he or she moves out from the crisis, creating order where before there was chaos. Learning to understand means learning to live differently: more accurately, more deeply, more sustainably. Studying something deeply, a person gains an understanding of its essence, destroys familiar patterns, gets out of background perceptions: he becomes different. He generates a different structural understanding of the world around him. This understanding allows a person to see an interconnected world. A world in which everything and everyone affects everything and everyone.

A person ceases to be afraid to doubt and make mistakes. He is not afraid to search and double-check. His picture of the world is re-created, and a deeper understanding spreads to other objects, creating a new understanding of everything around him. And this happens naturally, that is, without involving any supernatural forces and magic, without waiting for someone from outside with anormal experience. A person learns to create his or her own anormal experience and to perform operations with it, which enable him or her to see the world differently.

As people and their behavior change, so does the world around them. In such a world, reflexion can appear, and diversity can manifest itself in this world. Cognition allows us to turn the world around us into an open system, a system filled with meaning and surprise. A system in which objects connect with each other, influence each other, change each other. A person becomes an active element of changes in informational structures. A person is *homo informationalis*. A person structures the world and thus

allows it to change. A person sees interconnections and transforms them, and thus changes systems. A person operates with information, and becomes capable of managing it.

Meanings are intertwined, refined. Meaningfulness becomes the norm of life. Madness and the race for chimeras fade into the fog, opening the gates of understanding to n-possibilities of probable meanings. These meanings must, of course, be sought, but there are methods that allow us to find them on a regular basis.

Today, human life is largely lived in a fictional reality. All discussions about working with information are centered on the problem of fiction. Fiction is the norm today, but it was also the norm in earlier times. And all these fictions bring even more difficulties in working with information. After all, information itself is not a simple phenomenon. It is something flexible, formalizing, over-abundant and under-abundant... It is something that connects everything to everything. Depending on what a person and his perception is connected to, his picture of the world is formed. And it can be connected with the world of beingness (the potentiality of all that can be), with the world of reality (this is what has materialized), and with the world of fictional reality (a variant of perceived reality) (Whitehead, 1929).

We remember that fictions accompany us everywhere, they are clearly embedded in our heads and relentlessly influence our interpretations and do not, in fact, allow us to manage our lives. Fictions form a bizarre world of unreliability. Our modern world is like Borges' library: it contains all information and all misinformation. And it is without labeling of what is what and what is related to what.

Replication of information has become routine. Man stopped paying attention to the verification of information, both at the input of his perception and at the output of his communication.

Information incrementally grows, accumulates, and turns into piles of compressed junk, which is rarely analyzed and sorted out. It is not for nothing that Nathan Rothschild claimed that «who owns information he owns the world». We are used to interpreting this saying by inserting the concept of «data» in place of the word «information». It means that some data allows us to own the world. This is probably

not quite true. But possession of the coherence of what is happening and the ability to form future coherence is indeed the ability to own the world.

Today, the quantity of information is daunting and cannot be converted into quality. We are used to some formulations that, alas, are not obvious at all, but rather the opposite: they are attributed obvious characteristics that, in fact, do not exist. The world can only be seen as it appears through paradigmatic lens of perception. Everyone's subjective realities are becoming more and more isolated and individually oriented, yet clearly embedded in the labyrinths of general structureless governance. They have a certain number of common junctures, and, as a rule, these junctures lie in the realm of simulacra rather than actual facts.

Actually, the possibility of achieving truth has been debated at all times (Plato, 1997; Kant, 1998; Popper, 2002; Kuhn, 2012; Peirce, 1992; James, 1922; Gadamer, 2004; Heidegger, 1962; Rorty, 1989 and many others). The question has never been resolved, neither in the distant past nor now. What is clear: our knowledge changes as new information and facts accumulate. The world is comprehensible in the measure of person’s passion, in the measure of his devotion to the processes of Knowledge, in the measure of his love of truth. And these are not empty words: comprehension can be found only through yourself, through your perception (and it should strive for the state of «no distortion»).

All cognition at some stages consists of errors and misconceptions. And what is possible for a person is the progressive identification and elimination of errors of false coherence, i.e. deconstruction of already accumulated knowledge of unreliability and active search for new complex explanations of phenomena and events in the light of newly discovered connections and their potential influences on the surrounding world. And it is on this basis that the transition to a new level of full functional management of one's life is possible.

Here it is appropriate to recall the concept of «system of deep knowledge» by E. Deming, a guru in the field of quality, and slightly modify it (literally adding cognitive science to «knowledge in the field of psychology», which in the light of

modern research of the human brain, seems to be a very appropriate addition). And then we will get the following scheme (Fig.6):

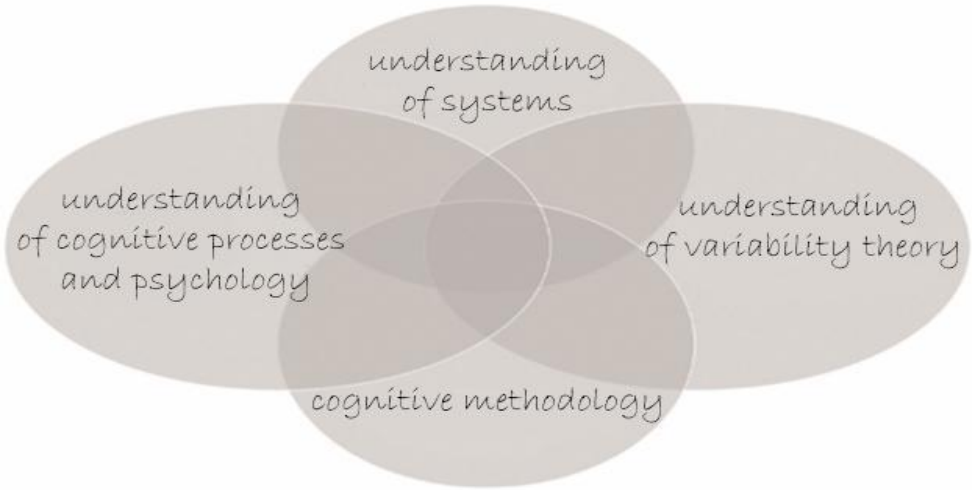

Fig. 6. Modified system of deep knowledge according to E. Deming (Deming, 1982).

Additional «points of intersection» of deeper understanding of cognitive processes also emerge from the scheme (Fig.7).

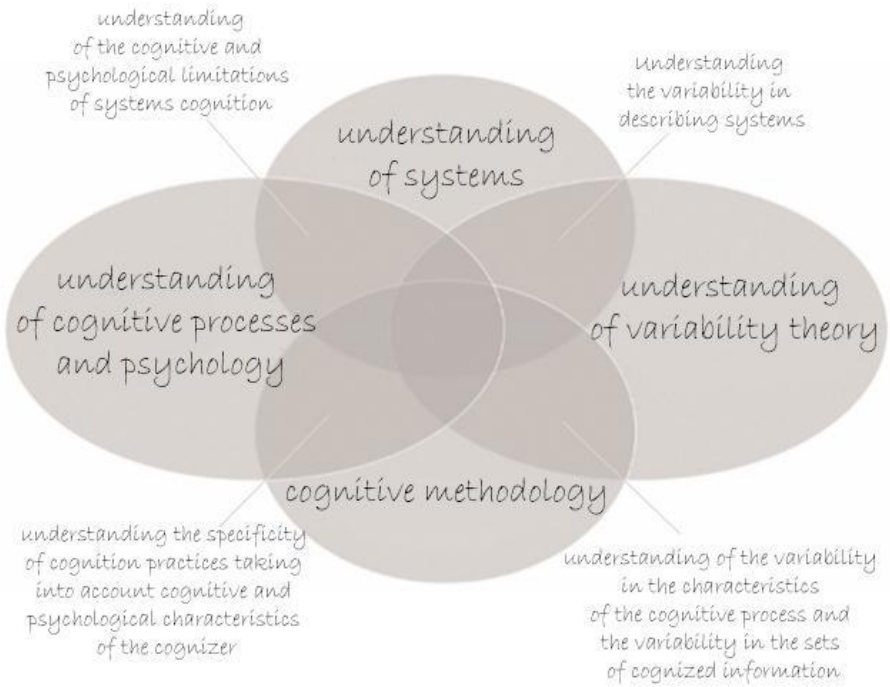

Fig. 7. Modified system of deep knowledge according to E. Deming (Deming, 1982) with additional explanations

If we understand this concept, it becomes clear that the system of deep knowledge is, in fact, first of all, the understanding of the incompleteness of cognizable objects and the infinity of the cognition process as the *Way of movement to understanding*, through overcoming cognitive limitations and «alterability» (variability) of the information field of the studied phenomenon. This is the understanding of the specifics of information perception by each person and, accordingly, the specifics of his/her interpretation of this information due to his/her own cognitive limitations and peculiarities of alterability of both the cognition process itself and information about the object under study. At the same time, understanding of the nature of alterability also makes it possible to identify general and special causes of variability, which expands the range of understanding of the issue and provides additional levers for managing cognition processes.

It should be emphasized that cognition as a systemic process is characterized by emergence, i.e., the appearance of new properties in the system. In our case, this is a new understanding of life as such, as well as possible mechanisms for overcoming emerging crises.

At the same time, this new understanding can arise from the internal accumulation of systematic and structured facts, and from the external field of data (sometimes quite variable), as well as on the basis of newly discovered deep understanding of the essence of the object of study. All this allows moving from *Ignorance* to *Knowledge* and *Understanding of Meanings*. This process becomes all-encompassing, as soon as a new understanding of any object has occurred, together with it, many other perceived phenomena and objects of the surrounding world become involved in this understanding. The whole perceived world begins to undergo deconstruction: it is transformed, becomes different. Together with it, human life itself changes. The tools for managing one's life and one's cognitive activity also change.

Alas, the modern world demonstrates quite different conditions. Thus, remembering the definition that information is coherence, it becomes really scary, because coherence is falling, and only fragmentation and mosaicism, i.e. incoherence,

are increasing. And this means that information-coherence mutates and transforms into simulacra, into pseudo-events that reflect nothing but fictions and fakes.

If we remember again the formula of Meaning (formula 1):

$$Meaning = \frac{\sum powers\ of\ influence}{n\ interpretations} \quad (1)$$

It doesn't take a genius to know that in «$\sum powers\ of\ influence$» we carefully and not very carefully insert layers of emotions and background knowledge, which are able to displace any awareness from a person's head, and which do not provoke any search aimed at raising awareness. This is all, as it were, unnecessary today: the right information appears implicitly on emotion, is anchored by the background, and that's it. Awareness presupposes the presence of explicit assimilation, which observes the implicit absorption and explains it, gives it an assessment. By the way, artificial intelligence is based on the attributes of implicit assimilation: continuity, automaticity, and limitlessness of assimilation volume. And it is these attributes that form what is known as defenselessness against what is called «mind clogging». This makes us think about the potential quality of the «thought» of artificial intelligence and its possibilities of development as such. But the explicit assimilation just allows to realize a «phase transition» to a new understanding, to comprehension of the world at a qualitatively different level.

Although it should be understood that «$\sum powers\ of\ influence$» contains a huge cognitive potential. The more accurate a person's prior knowledge of the world and its regularities, the more clearly he or she can perceive new information and understand the essence of surrounding phenomena (and the cause of the same crises). The better developed are the skills and abilities to go beyond paradigms, the more easily a person minimizes their influence when perceiving and interpreting new information. The ability to see actual regularities allows to cognize on a qualitatively different level and to act in the system of profound knowledge.

Cognitive activity can and should be organized, for example, according to ***infology*** algorithms, which will allow integrating a person's own cognitive experience and data of other people (of different epochs and countries). It also allows organizing

an adequate analysis of artifacts. In addition, cognitive activity should be based on the study of the surrounding world, which contains mysteries and can provide answers.

To verify (anything) a person must have some «standard of study», which can be formed at a higher level of understanding. And to do this almost automatically, simply by noticing excessive or insufficient information, noticing distortions that are not connected in the descriptions of reality, and so on. In fact, this allows us to carry out a certain structuring of information in accordance with our «learning standards». The closer these standards allow to approach beingness, the more adequately a person will display the world around, the more he or she will approach the image of *homo informationalis*, which is a link of reasonable binding, and potentially a link of full functional control of himself and his surrounding world.

If we recall the example with the concept of «information» and its array of definitions and descriptions (presented in this monograph), it becomes clear that the meaning of this word will be different in people's perception. And of course, it will depend on the preliminary awareness of a person about the subject «information», as well as on all other influencing factors. Actually, the development of awareness and understanding of the essence of things is the potential of a person to develop himself and to penetrate into the worlds of understanding of meanings. The less distortions live in a person's perception, the less distortions he or she brings when interpreting new information. And accordingly, the less he is deluded and mistaken. The more clearly he can formulate his goals and achieve them.

The example with the term «information» shows that, in practice, each person has his or her own truth. It can become common only in case of «agreement» on the common meaning of this phenomenon. But it will be difficult to agree on a common meaning, because it is «neither energy nor matter».

As for the interpretation of the term «information» the situation when $n=1$ is clearly still ahead. The situation $n>1$ cannot be interpreted as negative. It is practically a prerequisite in the movement to divergent thinking, allowing several correct answers in the situation of modern ignorance and unreliability. The most problematic question in today's situation is: who will initiate agreements on complex issues? And the world

has accumulated a sufficient number of such issues at various levels of interaction and understanding.

So, the world, which is governed by a phenomenon with a not quite clear genesis called «information», appears to be a very complex structure. And this world is clearly not easy to understand. This complexity must be lived in order to begin to discern the contours of beingness, which harbors vast fields of the unknowable. This living of understanding will demonstrate both the potential multiplicity of meanings and the difficulty of «grasping» meaningful understanding. But it will also reveal the secrets of the birth of shared meanings and the ways of organizing arrangements about these shared meanings.

And perhaps *homo informationalis is a* person who moves toward understanding the world and must initiate agreements on complex issues. His goal: to comprehend the essence himself and to explain it to others, and at the same time to agree with them on the meanings. Its form of comprehension: it is a competition with oneself for purity of understanding. It is the formation of a system of profound knowledge that can be shared with others. It is necessary to share one's «pure understanding» with others, but not to impose it. Naturally, such a person will have little in common with representatives of modern homo sapiens fighting for material resources and a place under the Sun. Why fighting for a place under the Sun, if you know how to find the right place for yourself and your calling. After all, if you know your genius knowledge (and everyone is a genius in something, but often they do not know what it is), there is no need to fight with anyone - it makes sense to do what you have to do and what you do best. In fact, any person has the opportunity to realize his or her own «phase transition» to reasonableness and to reasonable activity. It is just that this «phase transition» needs to be organized properly. It must be provided with a managerial mechanism for achieving goals. It is necessary to project it, i.e. to see it in advance and move towards the achievement of one's own goals!

However, one must realize that it is impossible to teach a person to think. But it is possible to show the Way, which will allow one to learn to think independently. Having learned to think independently, one can try to get out of the established stable

Pictures of the Familiar World, and remove the veil of background knowledge from one's perception. This is done, among other things, with the help of the practice of asking questions, or rather the practice of asking questions that no one has asked before. And to notice what no one has noticed before. To do this, one must cultivate in oneself the «love of truth» as a state of living the encounter with reality.

The modern world is losing the skill of cognition, as evidenced by the degradation of educational programs and the degradation of the general educational level of society.

But the skill of cognition is a very important skill. It is important, first of all, for survival (in our rapidly changing world) and for the development of a new, innovative space of being. This skill is acquired and can be used in various situations. A person with the skill of cognition will always be in demand, because the world, changing, pulls new and new complex tasks out of its sleeve, creating new and new crisis situations.

A person with the skill of cognition will cope with the role of *homo informationalis*, he or she will be able to be an active part of the informational world, which will be influenced as an active operator who understands the essence of the ongoing processes.

Alas, the world is full of people who do not understand. And a person who does not understand cannot make an adequate decision, cannot manage his aspirations, cannot make realizable plans for the future, cannot find a way out of crises. In fact, such a person is not able to see his or her necessary future. With all resulting consequences: lack of guidelines for realization, lack of motivation, lack of significant results. In addition, there is a variant of the development of events in which a person accepts «false» reference points as basic. And on their basis, he or she builds the foundation of his vision of the future. And he moves without realizing where he is going, and then is greatly surprised when he comes to the wrong place.

A conscious, understanding person should take into account that it is not enough to break the program, it is necessary to offer another program, a certain *Path*. And it is necessary to see it. And this vision is hindered by paradigms and familiar (including imposed) worldview. Accordingly, a person must be taught to understand and to be able to find new in the familiar.

The «infology» approach allows one to make an initial deconstruction of the material that is already known and to get real about the issue. It also gives an opportunity to form one's own pool of knowledge and understanding on the basis of structured information. Structured information makes it possible to perform more qualitative mental experiments and, accordingly, to obtain results with a greater reserve of semantic strength.

Infology allows people with different backgrounds to reach a common vision by following their own path. It is only necessary to find a meaningful topic for yourself and move into your own *Way of Knowledge*, without forgetting the simple algorithm «collect → understand → transmit».

The «infology» approach really allows us to see the new in what seemed to be known and well-studied. In fact, it allows you to go beyond your perceptions and paradigms. This is a very important quality in a world ruled by judgments and opinions.

And these are exactly the qualities that a person needs to design the future. First of all, in order to see a really common necessary future, then to design it and realize it.

So, the person of the potential future is a kind of *homo informationalis*. He is an active element that is able to change informational structures. He is able to see contradictions and paradoxes in the surrounding world. He is not an additional part of the computer, no, the computer may or may not be his or her assistant. *Homo informationalis* is first of all an operator of intelligent connection in the world of information, in the world of coherence. *Homo informationalis* is capable of structuring and understanding this world.

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The path from ignorance to Knowledge is not that long. It is inherently limitless, no-finito. And so the journey called conscious living of life is limitless.

We are not moving toward the truth. We're moving towards ourselves. The path to self is always full of obstacles. Personal and social. It's a path full of doubts, mistakes. Of overcoming. We are always searching for «I don't know what», for «a needle in a haystack». The haystack is growing with the power of the Internet potential,

special tools for replicating and disseminating information are created. Alas, this information is often empty, incoherent. And it is already measured in yobibytes!

There is too much information: it is no longer verifiable, it is infinite. It is necessary to learn how to work with such volumes, clearing them of garbage and noise; it is necessary to learn how to see, hear, touch actual information. And for this purpose it is necessary to comprehend its nature of «fluidity of meaning», «underdefinition», «kaleidoscopic interpretation», «coherence», «variability», «redundancy», «insufficiency», «selectivity», «verifiability», «unprovability», «emergent», «algorithmic», «entropy», «dynamism», «static», etc. (see Chapter 1 of this monograph, Table 5).

Today, the concept of «information» as «the process of displaying system connectivity» is being replaced by some «data». If information is a display of the mysteries of connection, then a person must be assigned an active role: these displays take place on his surface of perception. Accordingly, the depth and clarity of the display will depend on the person – *homo informationalis* - on his or her level of development, and not on the amount of some data that are replicated with unprecedented force. If it is a display-understanding of coherence of everything with everything, it is also a completely different level of responsibility for one's things, actions, words. These are certain limitations, including the replication of false data, false values, false heroes, false stories. And it is precisely these things that fill the modern world to the brim.

The modern world produces many programs of life without the need to know the essence of things. The modern world allows us to exist by consuming, burning, shaking with fear, and not developing.

What will make us stop and think about the importance of Cognition?! Probably the realization that the world has somehow become quite strange and often quite unpleasant. There are too many lies and violence in it, and they keep coming and coming. The world has become a tangle of doubts; points of reference for understanding have been lost; there are no bases for dialogs....

What will we leave our children as a heritage?! A pile of incoherent texts, the illusion of a well-fed life, an empty field? Or the realization that we are responsible for

the world we live in. And the extent to which this responsibility is multifaceted remains to be clarified.

The world is filled with unreliability. There is an information field that is more fertile today than ever before. But its fertility borders on unrestrained sowing of weeds. It is more and more difficult to find what we need: we need a clear focus in the search and a skillful search of the huge information array. It is necessary to be able to search for information elements (inels) that are significant for oneself and really describe the object in all its diversity. It is necessary to learn how to create your own hologram of understanding! The task is difficult, but so interesting! And it can be accomplished *by homo informationalis*, an active integrator of structural changes in the world, a person Living and Comprehended.

On the way to understanding, first of all, the emergence of a conscious desire to eliminate errors, to «love the truth», to realize that all theories *are hypotheses and* all *can* be refuted is important (Popper, 2002). After all, relying on erroneous judgments, a person will extrapolate erroneous conclusions, create the ground for the development of new and new distortions and misconceptions, for new erroneous actions.

Inferences are not reality, «the map is not the territory» (according to A. Korzybski (Korzybski, 1933). But inferences allow us to conceptualize any events at some level of understanding. The modern world has accumulated volumes of misconceptions and erroneous attitudes - a new mechanism of data verification is needed, capable of finding common ground in reasoning, fitting the data into *unified but individual* models of cognition, new systems of self-verification and collective verification of the results obtained. After all, *the real voyage of discovery consists not in seeing new sights, but in looking with new eyes*, Marcel Proust once wrote. Indeed, everything is within us: we have simply narrowed our perceptions into too narrow paradigms of allowed variations of the possible, into linear limitations of perception. These limitations lead to a vortex of errors that accumulate, multiply, intensify, and ultimately rule the world.

Mistakes. A strange part of our lives. They're wrong. But it is only through them that one realizes that the truth is different. In fact, they are the most important element

of comprehension. And often, to succeed in complex and new areas of knowledge, you have to make a lot of mistakes. But this statement is true only if mistakes are identified and analyzed. The more complex the issue – the more it will generate errors. But the identified errors allow to clear the way for correct guesses and solutions.

An interesting example is given by Matthew Syed in the pages of his book «Black Box Thinking: The Surprising Truth About Success» (Syed, 2015) about Unilever's attempts to develop a nozzle for its very complex and specific problems. Unilever first turned to mathematicians, with a specialty in «high pressure fluid behavior». All the calculations and theoretical modeling came to nothing. Then Unilever (out of desperation) turned to biologists. They, of course, didn't understand pressure or the behavior of fluids under pressure. But they did understand the relationship between failure and success. They tested the first 10 nozzles with quite variable performance, but generally similar to the prototype. They chose the best nozzle. They made 10 variations of it and tested it again, and chose the best one to make 10 variations of it again. And so on 45 times in a row! After 449 «failures», the biologists got a nozzle that completely met the customer's needs. Thus, the scientists went through a path of trial, errors, error analysis, adjusting the conditions, improving the working model, conducting new trials and experiments... In fact, in their project plan they included the possibility of numerous errors and considered them as experimental material.

If we abstract away from the details and summarize this experience of biologists, conclusions about the importance of errors can be found quite a lot. Thus:

1) Mistakes are beneficial if they are realized, analyzed and put aside in memory (fixed);

2) Mistakes as a result of «scientific trial and error» provide results (but constant fixing is necessary);

3) Mistakes can be treated creatively: you can conduct mental experiments with them (they should be recorded);

4) Mistakes are a great tool for detailing the non-obvious (it's important to record mistaken experiences and periodically review «personal mistake lists» to understand where the failure occurs and what generates the error);

5) Mistakes teach us to double-check: the world is not simple and its explanations may be outdated or false. By the way, neurobiologists have found a lot of arguments on this subject and proved that it is very useful to double-check (but any double-check needs input material, i.e. previously recorded data).

6) Mistakes allow you to «refine» the world and can teach you a lot (you need a willingness to learn from mistakes, and there's always the ego dilemma);

7) Mistakes are experiences that allow one to engage in «revision» of one's accruals, beliefs, knowledge and to perceive one's own perceptual paradigms differently (fixation analysis).

Understanding and mistakes always follow each other. And K. Popper (Popper, 2002) even wrote that the history of science, like the history of all human ideas, is the history of mistakes. Mistakes should not be seen as something negative. Alas, the world is very complex. But people often consider it very simple. And, therefore, it does not require any additional checks, does not require work on mistakes. And it is mistakes that can help to better understand the truth. However, it is important to form an attitude to mistakes as an indicator of one's own non-compliance with certain criteria. And accordingly, to develop a program of «getting up to speed» oneself to these criteria, that is to create one's own principle of competition with oneself for better understanding and for better results of Cognition. After all, a failure (error) in Cognition is, first of all, one's own way of comprehension, one's own way of «cleaning» all the knowledge that has been collected over the years of one's life.

Realization of truth is a constant transition to different states from one's personal truth to collective truth, from collective to being one and back again. The attainment of truth is also the elimination of errors, it is also the transition to a new level of understanding. Each transition is an event that is carefully prepared for, and which may or may not occur. Everything else remains the same.

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Afterword

Modern society is not just at a crossroads – it is like a traveler at a stone with an inscription predicting possible outcomes: «If you go left, you will fall into crisis; if you go right, degradation will catch up with you; if you go straight ahead, you will find the path of development». This symbolic choice reflects the four real strategies that humanity has today.

The first is to stay where you are and go with the flow, trusting to chance. But such a strategy is a random, high-risk path, especially in the context of global instability.

The second is to enter the crisis consciously, counting on hidden opportunities. But crisis is always associated with tension, failure of resilience, and loss. Even if troubles are not frightening, they undermine resolve and distort judgment.

The third is to slip into degradation. History knows many examples when whole societies gave up their positions and lost meanings were replaced by primitive routine. The repetition of such a scenario is unlikely to arouse the enthusiasm of sensible people.

The fourth is the path of development. This is the most constructive and promising strategy. But development requires not only desire, but the ability to distinguish genuine progress from decorative forms that mask outdated ideas. Development begins with inner work – the ability to discern meaning, evaluate information, and see connections.

In the early works of Japanese thinkers we can find such a model of the world: «The world is a network, in the nodes of which there are precious stones, and each stone is reflected in everything and reflects everything». Considering the world of information, it seems to us that this model is quite good. Only in the nodes of the network, there are not stones, but people, *homo informationalis*, who are reflected in everything and reflect everything. This is a world in which cause and effect no longer rule the ball, it is, above all, a world of connections. It is a world of connectedness, of coherence. A person potentially knows everything, but his or her way of knowing puts obstacles in the way of comprehension, his small goals do not give energy for

realization. Man is floundering in the flow of incoming information and is unable to identify the significant and important.

Today, in a world where everything is changing rapidly, and information streams pour down on people like waterfalls every day – blinding, knocking down, drowning out the voice of reason – skills of orientation in this chaos become not just useful, but vital. Ordinary automatic patterns of thinking that once seemed reliable are now helpless in the face of systemic crises.

A person – and therefore society – needs to learn to go beyond established paradigms, to overcome imposed models of perception, to recognize noise and separate it from signals. This requires a special culture of thinking and a new practice of working with information. This is where the methodology of infology comes in.

Infology is not just a set of tools. It is a way of thinking differently. It allows a person to detach from chaos, to observe information processes from the outside, to understand how meanings are formed, how data is distorted, how perception changes reality. It is a method that teaches not to absorb information uncontrollably, but to analyze it, classify it, identify patterns and see the whole behind the fragments.

The use of infology gives people one possible way out of a chronic crisis – not through slogans or external control, but through an internal reorganization of thinking. It creates subjects capable of thinking clearly, acting reasonably and interacting intelligently.

In order to find a way out of crisis states, modern society needs to cultivate a culture of cognitive information thinking. In this context, infology acts as a solution – not only from information overload, but also from collective misunderstanding. This is the way to sustainability, maturity and a meaningful future.

Thinking is always better than not thinking. Thinking is always more productive and interesting. Good luck and new discoveries!

Annex 1

Glossary

Algorithm: a simplistically described process of actions aimed at solving a certain task.

Artifact: a «trace» left in time by events and phenomena.

Cognition: an active process of destroying ignorance.

Deconstruction: the destruction of distorted and established meanings as a result of a more meaningful view of objects and phenomena.

Diagram: a simplified, visual representation of the processes of learning and working with information.

Document: information element (abbreviated «inel») preserved as a «trace of information», as a «trace of an organizational form of interaction» of someone or something in time.

Familiar Worldview: a familiar picture of the world that influences a person's perception and sets that perception to a pre-formed understanding.

Image: a multifaceted and volumetric representation of an event, phenomenon, person, formed by archetypes, stereotypes, paradigms and Familiar Worldview.

Inel: an information element as a unit of analysis.

Infology: practical methodology of cognition of information about an object, event, phenomenon, based on mental experiment, and, formulated taking into account the approaches of the theory of historical knowledge and information theory.

Information: an adaptive process of displaying and instructing the selection, reproduction, self-organization, and recording of system changes that determine the degree of uncertainty and lead to a different order. System organizational coherence.

Measure of information: a surprise factor of the message.

Meme: a unit of information that has character, is well remembered, and is easy to transmit.

Method: a strategy for research activity.

Model: a simplified form of representation of reality that allows information (data) to be passed from person to person.

Paradigm: stabilizing filters of perception.

Questions: a method of evaluating information, a primary anti-virus for selecting information to work with.

Reconstruction: the formation of a new understanding of reality on the basis of evaluated and meaningful information elements.

Research: a special form of working with information, aimed at identifying meaningful information and meaningful connections between the objects under study.

Researcher: a person who studies the information traces (sources) left by human activities over time.

Source: the original object from which the information is taken.

Spatio-temporal classification: primary assessment of information, with reference to geographical and chronological coordinates.

Systemic constructs: models that allow us to think about complex processes, taking into account the existing interrelationships between objects of study.

Time: a system for capturing the changes that occur in the world.

TRIZ: theory of inventive problem solving.

Understanding: a form of assessing reality based on working with incoming information.